PhD Opportunities

PhD Research Project Opportunities

Bangor University

2016/17 Academic Year
PhD Opportunities
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International Research with Impact at Bangor University

Research at Bangor University has a strong track record of delivering impact. Impact can be seen as economic, societal and cultural benefits. Impact not only adds value to the research portfolio, but also enriches the intellectual and personal development of our staff and students. The effects of impact are wide-ranging: staff at Bangor have had the opportunity to experience first-hand how plant breeding affects the lives of impoverished farmers in Northern India and East Africa; to work closely with a specialist university in China to develop state-of-the art broadband technology; and to develop culturally-sensitive methodologies for dealing with violence in mental health in India.

These engagements not only support the research of our staff, but also deepen their understanding of economic and societal issues overseas, and how their research can lead to benefits; whether they be environmental (understanding the importance of biodiversity), policy-based (impact upon Government), and economic (product performance and value).

Bangor University International Research Collaborations

A list of the countries we have collaborations with are listed on the next page.
International research collaborations also provide unique opportunities for our students: for those coming to study in the UK: to experience study and life in a new country, and for home students travelling overseas: exposure to a different culture, life skills and improving their proficiency in a second language. This indirect impact is contributing to graduates entering the workplace who are fluent in the importance of internationalization, trained to become global citizens and are aware of how far-reaching the outcomes of research can be.

At Bangor, postgraduate students make a huge contribution to University life; whether they are part of our Peer Guide scheme, gaining valuable experience through the Bangor Employability Award, or contributing to academic success as the author of a paper or inventor of new Intellectual Property.

Internationalization is something that we actively encourage in Bangor, and pride ourselves on our achievements. Our research networks extend across the globe, and we continue to build on our portfolio of relationships, exploring opportunities and engaging with new partners.

We are particularly proud of the successful impact of our international research activities, case studies of which are included in this booklet.
How to use this Directory

This directory lists PhD research degrees topics at the following Bangor University academic schools:

- Bangor Business School
- Biological Sciences
- Chemistry
- Computer Science
- Electronic Engineering
- Environment, Natural Resources and Geography
- Healthcare Sciences
- Medical Sciences
- Ocean Sciences
- Psychology
- Social Sciences
- Sports, Health and Exercise Sciences

Topics are listed by school and are based on academic staff research interests.

Please note the research project opportunities detailed in this booklet are NOT funded by the University. Candidates must secure their own funding to meet the costs of PhD study. International self-funded candidates will however be considered for an international scholarship valued at between £2,500 and £5,000 per year. Further details at: www.bangor.ac.uk/international/future/scholarship.php

Candidates who wish to research a specific research topic and who have developed a full research proposal relevant to the academic expertise at Bangor University are also encouraged to apply for admission. In such instances, candidates are NOT required to select a topic from this directory. Such candidates when applying for admission should include the research proposal together with the PhD application and other supporting documentation.

To ensure you select an appropriate research topic, you should visit the webpages quoted alongside the topic of interest, the academic staff member’s profile page and read his/her publications before submitting an application.

Candidates may undertake 2 routes for entry:
1. Combined English language and PhD Programme of Study (4 years & 1 year writing up)
2. The PhD Programme of Study (3 years & 1 year writing up)
3.
1. Combined English Language and PhD Programme of Study

The programme will normally be 4 years in duration and will be in two parts:

- **Part 1**: Year 1 / The Preparatory Year. This will include English language tuition, academic study skills, regular meetings with the PhD supervisor and integration with other research students at the Academic School. During Part 1, you will research and write a full PhD research proposal based on the topic selected on the application form.

- **Part 2**: Years 1, 2, and 3 of the PhD programme. Candidates undertake the research over a 3 year period and are granted a further 1 year for writing up. The final dissertation should be submitted 4 years after starting Part 2 / the PhD.

Progression from Part 1 to Part 2 will be conditional on having:

1. completed a fully developed research proposal that meets the Academic School’s requirement for entry onto a research degree.
2. achieved the required English language level required for entry onto a research degree.

The duration of Part 1 will depend on the English language test score on entry, the English level required to progress onto the research degree / Part 2 and the completion of a satisfactory research proposal. The minimum score required is 4.0/4.5. As a guideline, students require 1 full year to increase by 2 IELTS bands e.g. from 4.5 to 6.5.

**How to apply**

After reviewing the areas of research listed in the directory and selecting a topic, please complete the online application form at: [https://apps.bangor.ac.uk/applicant/](https://apps.bangor.ac.uk/applicant/)

Follow the guidance on how to complete the online form on page 6 of this publication.

The following supporting documentation should be supplied with the completed application form:

- Bachelor degree certificate and transcript
- Masters degree certificate and transcript (if undertaken)
- English language test certificate
- Academic reference / recommendation letter
- Confirmation of funding / sponsorship
- Passport ID page
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The Next Step

You will normally be contacted by the Academic Supervisor of the research topic you have selected to assess your suitability to undertake the project. You should expect to receive an email from Bangor University within 2 weeks of submitting the application. Please make sure you respond. If you do not respond, it will delay your application.

The Offer of Admission

Once the Academic Supervisor has discussed the project with the candidate and has reached a decision to accept, successful candidates will receive 2 offers:
1. Year 1, the Preparatory Year.
2. The PhD Programme. This offer will be conditional on successful completion of Year 1 / the Preparatory Year

Please Note: Candidates must successfully complete Part 1 in order to progress to Part 2. In order to successfully complete Part 1, students must complete a fully developed research proposal for the research to be undertaken in Part 2 and have reached the required English language level for research degree entry. The research proposal must be of an academic standard acceptable to the Academic Supervisor, demonstrating suitable ability, skills and knowledge to successfully complete a Doctoral degree by research.

2. PhD Programme of Study – 3 Years & 1 Year writing up period

This programme is designed for candidates who have already met the English language level required for entry. The duration of the programme will normally be 3 years plus a further 1 year writing up period. The final dissertation should be submitted 4 years after starting the PhD.

How to apply

After reviewing the areas of research listed in the directory and selecting a topic, the candidate should write a research proposal directly relating to the selected topic, outlining the research project he/she wishes to undertake.

The research proposal should be submitted together with the completed application form and the following supporting documents:
• Bachelor degree certificate and transcript
• Masters degree certificate and transcript (if undertaken)
• English language test certificate
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- Academic reference / support letter
- Confirmation of funding / sponsorship
- Passport ID page

On receiving the application, it will be sent to the relevant school to be considered for admission.

The Offer of Admission

Successful candidates will be issued a letter detailing the offer of admission including the area of research, supervisor name, start date, financial arrangements.

Guide to completing the Bangor University online Postgraduate application form

Type this URL to your address bar: https://apps.bangor.ac.uk/applicant/

Section I: How to create a log–in and activate your account to access the portal

A. Click on the APPLY ONLINE link which will lead you to the application portal page. Select the ‘Sign-Up’ option highlighted below:

B. Enter your Email address and select a password. You must keep a note of your email and the password in a safe place as you will need these details later on. Do not share the details with anyone.
C. You must follow the instructions displayed on the right side of the page for selecting an appropriate password, otherwise the system will show an error message like this:

Password *

Password

Must be more complex (must contain 1 or more unique uppercase characters)

D. Once you have entered the details correctly, the system will send a verification email to the email address you have provided. Open the verification email and click on the link provided in that email. You will then get confirmation that your account has been activated. Please note, without verification you may not be able to proceed further with the application.

E. Now you can log into the portal by entering your email address and password to proceed with the application;
Section II: How to submit a fresh application

A. Log-in to the portal by following instructions in the Section I above.

B. Complete all 10 individual sections one by one by clicking onto them. Detailed guidance below:

1. **PERSONAL DETAILS:**
   Enter all Personal Details as they appear on your passport. Please pay particular attention to your name details - nicknames and pseudonyms are not acceptable. Click *Save and Continue*. 
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Title *
Select your title

Given name *
Enter your first given name as it appears in your passport

Family name *
Enter your family name in full as it appears in your passport

Previous surname
Enter your previous surname if applicable

Middle names
Enter your middle given name(s) as they appear in your passport

Date of Birth *
January 1 1949
Insert your date of birth as it appears in your passport.

Gender *

Nationality *
Your nationality corresponds to your nationality in your passport

Passport Number *

Passport Expiry Date *
January 1 2020
It is important that you enter your passport details AND upload a copy of your passport ID page. If you do not have a valid passport, tick the statement below.

I do not have a passport.

Country of Birth *
In which country were you born?

Ethnicity *
Asian or British Indian
Give details of your ethnic background

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2. **DEGREE PROGRAMME:**

2.1. Select the appropriate degree program level first;

2.2. Enter the details of the Bachelor degree program you wish to apply for, and press ‘ADD’ button and then jump to point 2.7 below;

2.3. Enter the details of the Master degree program you wish to apply for, and press ‘ADD’ button and then jump to point 2.7 below;
2.4. From the drop down menu, select one of the advertised studentship options you are applying for, and press ‘ADD’ button and then jump to point 2.7 below;
2.5. Provide the details of the PhD Project position you are applying for, and press ‘ADD’ button and then jump to point 2.7 below;

**PhD Project Opportunity**

For information about the list of PhD Opportunities please see PhD Research/Project Opportunities at Bangor University, and select your PhD project before completing this application.

**Start date**

Please select start date before selecting Programme

**Programme**

Start typing for list of programmes...

Enter the name of the programme you wish to study and select the programme from the shortlist:

**Part-time**

International students requiring a Tier 4 student visa must study full-time. If you do not require a Tier 4 student visa and wish to study part-time, select 'part-time' here.

**Project/topic title(s)**

If you are applying for a Bangor University advertised Research Project Opportunity write the full title here, one on each line. (200 characters)

**The Academic: Research Supervisor(s)**

The Academic Research Supervisor(s)

2.6. Provide the details of your own PhD research proposal here, and press ‘ADD’ button and then go to point 2.7 below;

**Own research project**

**Start date**

Please select start date before selecting Programme

**Programme**

Start typing for list of programmes...

Enter the name of the programme you wish to study and select the programme from the shortlist

**Proposed research title**

If you have discussed your research proposal with supervisors, please enter the same here

**Part-time**

International students requiring a Tier 4 student visa must study full-time. If you do not require a Tier 4 student visa and wish to study part-time, select 'part-time' here.

2.7. If you wish to apply for more than one program then you may select ‘Add Another program’ option and start over again from point 2.1 above, otherwise click ‘Continue’
3. Additional Information
Select appropriate options and provide details, where requested.

Additional Information

Are you a current Bangor University student, or have you applied to Bangor University or studied at Bangor University previously? *

Do you have any disabilities? *

During the period of your proposed study, will you be registered simultaneously for any other Higher Education qualification either at Bangor or elsewhere? *

Have you lived in the UK/EU continuously with the exception of holiday periods since birth? *

Do you have any criminal convictions? *

3.1. Disability/Health: This section is included for the purposes of monitoring equal opportunities and to ensure that the University can provide students with appropriate facilities. It will not affect the University’s decision whether or not to offer you a place, and the information will remain strictly confidential.

3.2. Residency information: This is to enable the University to classify you for fees-payment purposes. In some cases, it may be necessary to request, in addition, completion of a Fees Status Enquiry form.

3.3. Criminal Convictions: To help the University to reduce the risk of harm or injury to its students caused by the criminal behaviour of other students, we must know about any relevant criminal convictions that an applicant has.
Relevant criminal convictions are only those convictions for offences against the person, whether of a violent or sexual nature, and convictions for offences involving unlawfully supplying controlled drugs or substances where the conviction concerns commercial drug dealing or trafficking. Convictions that are spent (as defined by the Rehabilitation of Offenders Act 1974) are not considered to be relevant and you should not reveal them (but see below).

If you are applying for a programme in teaching, health, social work, or programmes involving work with children or vulnerable adults, you must tell us about any criminal convictions, including spent sentences and cautions (including verbal cautions) and bind-over orders. For these programmes, you may need an ‘enhanced disclosure document’ from the Disclosure and Barring Service. More information may be found on the Disclosure and Barring Service website at https://www.gov.uk/government/organisations/disclosure-and-barring-service.

Courses in teaching, health, social work, and other courses involving work with children or vulnerable adults

For these courses, you must answer Yes in the box if any of the following statements apply to you.

- I have a criminal conviction.
- I have a spent criminal conviction.
- I have a caution (including a verbal caution).
- I have a bind-over order.
- I am serving a prison sentence.

If you are currently serving a prison sentence, you must also give the prison address as your postal address on page 1 of your application and a senior prison officer must support your application.

All other courses For these courses, you must answer Yes in the box if either of the following statements apply to you.

- I have a relevant criminal conviction that is not spent.
- I am serving a prison sentence for a relevant criminal conviction.

If you are serving a prison sentence, you must also give the prison address as your postal address on page 1 of your application and a senior prison officer must support your application.

Convictions that are spent (as defined by the Rehabilitation of Offenders Act 1974) are not considered to be relevant and you should not reveal them.
Applicants who answer Yes will not be automatically excluded from the application process. However, the University may want to consider the application further or ask for more information before making a decision.

If you are convicted of a relevant criminal offence after you have applied, you must tell us immediately. We may then ask you for further details of the offence before making a decision.

4. Permanent Home address –
Provide your permanent home address and place of abode. Please note the FULL postal address is required. Your phone number must contain all country codes and area codes.

5. Education

5.1. Start with the highest Academic Qualifications you have obtained and click Save and Add. The details provided must match exactly as they appear on your certificates/transcripts.

5.2. Select Add Education history on the next screen to add additional qualifications

5.3. Once you have filled-in all academic qualification then select Continue.
6. Employment History

6.1. If you do not have any employment history then you may skip this section by pressing ‘Continue’ button.

6.2. Otherwise, provide details of your employment history. The details provided must match exactly as they appear on employment certificates/papers.

7. Language

Provide details of your English Language ability under this section;
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Language Ability

7.1. Select appropriate option.

7.2. Select the English test you have undertaken (E.g IELTS) and provide the scores, and press ‘Save and Add’, and go to point 7.3 below;

7.3. If you wish to add more another English test score, then start from point 7.1 again, otherwise press the ‘Continue’ button and jump to point 8 below.

7.4. Select appropriate option;

If Yes, go to 7.5 below.
If No, click ‘Save and Continue’
7.5. Provide details of the test you are waiting to undertake, and click ‘Save’ button to continue;

8. Finance
Select the appropriate option about how you will finance your studies;

*International applicants, please note: you will have to demonstrate to the immigration authorities when you apply for your student visa that you have sufficient funds to pay for your fees and support yourself throughout your course*

i. Self-funding – if you are planning to cover the expenses from your own/family savings

ii. Student loan – if you are planning to cover the expenses by undertaking a loan from a financial institution (e.g. Bank)

iii. Sponsored – if any sponsoring authority has promised to meet all expenses for your studies

iv. Partially sponsored - if any sponsoring authority has promised to cover some (but not all) expenses for your studies

v. Scholarships from Bangor University – if you are planning to cover the expenses from your own/family savings, and wish your application to be considered for available scholarships from the Bangor University.

9. International Visa

Please provide details of the current or previous UK visa permissions you have/had in the past. This section must be completed if you are an international applicant.
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9.1. Tell us if you are already studying a course in the UK:

- If Yes, go to 9.3 below.
- If No, go to 9.2 below.

9.2. Tell us if you previously studied in the UK:

- If Yes, go to 9.3 below.
- If No, go to 9.4 below.

9.3. Provide the details of the course you are studying in the UK, and continue to point 9.4 below.

9.4. Tell us if you ever been refused a visa to enter the UK:

- If Yes, go to 9.5 below.
- If No, go to 9.6 below.

9.5. Tell us how many times your visa was refused, and then continue to 9.6 below.

9.6. Tell us if you were every suspended or discontinued from your studies in the UK.

- If Yes, go to 9.7 below.
- If No, press ‘Save and Continue’.

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9.7. Provide details of the UK institution from where you were either suspended, or discontinued your studies, and press ‘Save and continue’;

9.8. Select the nationality as on your passport from the drop down, and press ‘Save and Continue’;

10. Documents

Upload scanned copies of the relevant documents under this section.

10.1. References: Please ensure that you include with your application a written reference from a suitable referee (usually not from a family member or relation). It is your responsibility to provide this reference together with the referee’s full contact details. Recent graduates should provide an academic reference, e.g. from the last institution at which you studied. If you are applying under the mature student regulations, your reference should be from a relevant employer. Additional references may be sought at a later date. The University may contact the referee directly where further information is required. All offers of a place on a course remain conditional until satisfactory reference(s) have been received.

Alternatively, your referee can send their reference directly to the Admissions Office, Bangor University, College Road, Bangor, Gwynedd, LL57 2TF, United Kingdom, e-mail postgraduate@bangor.ac.uk (for UK/EU applicants) or to the International Education Centre, Bangor University, College Road, Bangor, Gwynedd, LL57 2TF, United Kingdom, e-mail international@bangor.ac.uk (for International applicants). NB – Please
note, if you are applying to study in the School of Ocean Sciences, two references are required.

11. Submitting your application:

Once all sections are duly completed, you will receive a confirmation of the same on the screen. **Review the application details** by selecting View Summary.

![Submit your application](image)

1) If you notice any errors then you can amend the details by selecting the relevant section in the top bar
2) If all details appear correct then you can **Submit your application**

**NOTE: PLEASE ENSURE THAT YOU SELECT AND CLICK 'SUBMIT YOUR APPLICATION' in order to complete your application and submit it to the University for consideration**

Section III: How to manage already submitted applications

Once you have successfully submitted an application, then you can check the progress of your application by accessing the portal using the same Log-in credentials.
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Bangor Business School

Useful links:

School website: www.bangor.ac.uk/business
Research information: www.bangor.ac.uk/business/research
Academic staff: www.bangor.ac.uk/business/staff

Specialisations:

Accounting and Finance with specialisations in:

- Impression Management
- Corporate Narrative Reporting
- Corporate social and environmental reporting
- Organisational Legitimacy
- International Financial Reporting
- Earnings quality
- Accounting Policy choice
- International Cross listings
- Tax Avoidance
- Accounting History
- Asset Pricing
- Monetary Policy

Banking with specialisations in:

- Credit risk and credit ratings
- Market Microstructure
- Investment Management Risk
- Depositary Institutions
- Appropriation of computer technology
- Corporate Finance
- Real Estate Finance
- International Banking
- Islamic Banking and Finance
- Banking and Development
PhD Opportunities

- Financial Exclusion
- Emerging Markets
- European Sovereign Debt Crisis
- Regulation

Economics with specialisations in:

- Financial Economics
- Development Economics
- Game Theory
- Political Economy
- Behavioural Economics
- Macroeconomic Modelling
- Micro-econometrics
- Public economics
- International Trade
- Banking Markets

Business and Management Studies with specialisations in:

- Business History
- Human Resource Development
- Marketing
- Employee Voice
- Employment Relations
- Employment Regulation
- Impact of change
- Strategic Information Systems
- E-business
- E-marketing
- Data Protection
- Communication
- Knowledge Transfer/Management
- Organisational Management
- Public Administration
**1. Bank liquidity risk and stock returns**

**Supervisor:** Dr Ru Xie  
**T:** +44(0) 01248 388119/ E: r.xie@bangor.ac.uk

The current financial crisis has illustrated starkly how increased funding costs and changes in market liquidity can trigger stock market failures. According to asset pricing theory, expected stock returns are sensitive to changes in liquidity conditions. The importance of funding liquidity and market liquidity for asset pricing has been increasingly recognised in the literature. The project aims at providing further evidence about the relationship between unexpected bank illiquidity and contemporaneous excess stock returns. In particular, we will investigate the impact of bank idiosyncratic and systematic liquidity risks on excess stock returns.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

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**2. British Management after Thatcher**

**Supervisor:** Prof. Bernardo Batiz-Lazo  
**T:** +44 (0) 01248 388349/ E: b.batiz-lazo@bangor.ac.uk  
**Supervisor:** Dr Koen P.R. Bartels  
**T:** +44 (0) 01248 388/ E: k.bartels@bangor.ac.uk  
**Supervisor:** Dr Tony Dobbins  
**T:** +44(0)1248 388393 / E: a.dobbins@bangor.ac.uk  
**Supervisor:** Dr Andrew Edwards (School of History, Welsh History and Archaeology)  
**T:** +44(0)1248 382839 / E: a.d.edwards@bangor.ac.uk

This project aims to evaluate the impact of the Thatcher years on management thinking and practice. Margaret Thatcher is commonly cited as one of the most influential figures in modern British politics and society. However, "Thatcherism" has not only left its deep marks on the political system, the economy, and society, but has also had profound implications for the ways in which both the private and public sector are managed up to present day. This project aims to evaluate the impact of the Thatcher years on management thinking and practice. In order to get a deeper understanding of this important yet surprisingly not very systematically studied topic, the project will combine a number of methods and areas of expertise: (1) a historical analysis of media reports, policy documents, managers' (auto-)biographies, and academic literature; (2) an assessment of changes in organisational arrangements, workplace regulation, and management-employee relations; and (3) a grounded theory analysis of qualitative interviews with public and private sector managers about their daily practices. PhD students are invited to base their thesis on one or more of these dimensions.
3. Challenges of marketing in Welsh social enterprises

**Supervisor:** Dr Sara Parry  
T: +44 (0) 1248 388457 / E: s.parry@bangor.ac.uk  
**Supervisor:** Dr Siwan Mitchelmore  
T: +44 (0) 1248 388345 / E: siwan@bangor.ac.uk  
**Supervisor:** Dr Gareth Griffiths  
T: +44 (0) 01248 388543 / E: Gareth.griffiths@bangor.ac.uk

This research focuses on the perceptions, benefits and challenges of marketing within social enterprises in Wales. There are over 3,000 organisations carrying out social enterprise activity in Wales, with a combined turnover of £2.2bn (Welsh Assembly Government, 2010) however there is a lack of research investigating Welsh social entrepreneurs and their perceptions of marketing. The research will be a two stage study incorporating semi-structured interviews with social entrepreneurs across Wales followed by a large scale survey. The aim is to achieve a holistic view of how marketing is perceived, conducted and prioritised in Welsh social enterprises.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

4. Competition, Conduct and Regulation of Retail Banking

**Supervisor:** Prof. John Ashton  
T: +44 (0) 1248 38 8193/ E: j.ashton@bangor.ac.uk

In recent years the retail financial services industry has been associated with the creation of systemic risks, financial crisis, miss-selling and anti-competitive practices. I would welcome enquiries from prospective students wishing to undertake economic and financial studies addressing such conduct of business, competition and regulatory concerns for this industry, using both conventional and non-conventional data sets for the UK and internationally.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
5. Consumer behaviour
Supervisor: Dr Louise Hassan
T: +44 (0) 01248 383280/ E: l.hassan@bangor.ac.uk
Supervisor: Prof. Edward Shiu
T: +44 (0) 01248 382046/ E: e.shiu@bangor.ac.uk

- The influence of multilingual packaging on consumers information processing and perceived value of the product
- The applicability and usefulness of place attachment theory in understanding consumers' shopping behaviour regarding the local high street versus the internet
- The maximization paradox
- Examining factors that predict susceptibility to scams targeting vulnerable consumers

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

6. Contemporary expressions of conflict at work
Supervisor: Dr Tony Dobbins
T: +44(0)1248 388393 / E: a.dobbins@bangor.ac.uk
Supervisor: Prof. Sally Sambrook
T: +44(0)1248 382046/ E: sally.sambrook@bangor.ac.uk

How is conflict in organizations expressed in different contexts? As well as traditional forms of conflict like strikes, is conflict being expressed today in new forms in different places? For example, is ‘whistleblowing’ in banks a form of conflict?

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

7. Coordinating supply and demand in labour markets
Supervisor: Dr Tony Dobbins
T: +44(0)1248 388393 / E: a.dobbins@bangor.ac.uk
Supervisor: Prof. Sally Sambrook
T: +44(0)1248 382046/ E: sally.sambrook@bangor.ac.uk

What is the role of labour market institutions at multiple levels in different countries/regions in matching/coordinating or not coordinating supply (labour capability, employee training and skills) and demand (actual job opportunities)?

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
8. **Credit ratings**

**Supervisor:** Prof. Owain ap Gwilym  
T: +44 (0)1248 382176/ E: owain.apgwilym@bangor.ac.uk

**Supervisor:** Dr Rasha Alsakka  
T: +44 (0)1248 383571/ E: r.alsakka@bangor.ac.uk

**Supervisor:** Dr Gwion Williams  
T: +44 (0)1248 383959/ E: gwion.williams@bangor.ac.uk

The business school has a well-established research group on credit ratings, including several current PhD students. Members of the group have published widely in recognised international journals, especially on sovereign ratings. We welcome PhD research proposals in any area of credit rating research.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

9. **Employee voice and silence at work**

**Supervisor:** Dr Tony Dobbins  
T: +44(0)1248 388393 / E: a.dobbins@bangor.ac.uk

**Supervisor:** Prof. Sally Sambrook  
T: +44(0)1248 382046/ E: sally.sambrook@bangor.ac.uk

Employees often have ideas, information, and opinions for ways to improve work and work organizations, and employers may implement various mechanisms and institutions to facilitate expression of employee voice. Sometimes employees exercise voice and express their ideas, information, and opinions; but other times they engage in silence and withhold their ideas, information, and opinions. What are the various forms and expressions of employee voice and silence, and what conditions underpin them? Do they differ by country context?

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

10. **Impression management in a corporate reporting context**

**Supervisor:** Dr Doris Merkl-Davies  
T: +44 (0) 1248 382120 / E: d.m.merkl-davies@bangor.ac.uk

Impression management in a corporate reporting context is an interdisciplinary research area based on research in accounting, organisation studies, psychology, sociology, media studies, and linguistics. Impression management is concerned with organisational attempts to influence audiences’ perceptions of the organisation, its financial, social, or environmental performance, organisational changes (e.g., restructuring or reorganisation, privatisation or demutualisation, merger or
acquisition, etc.), organisational crises or public controversies (e.g., tax avoidance, product failure, accident, etc.), or idea (e.g., shareholder value, corporate citizenship, sustainable development, etc.). It entails the use of corporate narrative documents (e.g., annual reports, CSR reports, press releases, etc.) usually by enhancing desirable aspects of the organisation or by obfuscating less desirable aspects. If corporate communication is used for impression management purposes, it may result in unwarranted support of organisations and their activities by shareholders (capital misallocations), stakeholders, or by society at large. Research thus involves the analysis of corporate narrative documents for evidence of impression management and of audience responses to impression management (e.g., share price reactions, analyst recommendations, NGO responses, newspaper articles).

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

11. Managerial failure, voting and executive remuneration

Supervisor: Prof. Lynn Hodgkinson
T: +44 (0) 1248 382165 / E: abse09@bangor.ac.uk

Although there is some evidence that a non-binding vote doesn’t prevent less desirable remuneration packages being put in place, dissent may have moderated future packages. The UK government introduced an advisory vote on executive remuneration in 2002 enabling shareholders to register dissent. This legislation was amended in 2013 to enable shareholders to have a binding vote on companies’ remuneration policies at least every three years. According to Vince Cable the legislation was amended to improve the clarity of pay reports and pay-performance sensitivity. Gregory-Smith and Main (2013) suggest, however, that the binding vote could have a negative impact on pay-performance sensitivity as large dissent votes will require management to act and potentially disrupt the value-creating activity of the firm. The project will examine whether the binding vote impacts on firms’ value creating activities and pay-performance sensitivities.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
12. Market microstructure  
Supervisor: Prof. Owain ap Gwilym  
T: +44 (0) 01248 382176 / E: owain.apgwilym@bangor.ac.uk

I am interested in receiving PhD proposals in any area of market microstructure or the analysis of high frequency financial market data.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

13. Open innovation, entrepreneurship and strategy performance in SMEs  
Supervisor: Dr Azhdar Karami  
T: +44(0)1248 388350 / E: a.karami@bangor.ac.uk  
Supervisor: Prof. Kostas Nikolopoulos  
T: +44(0)1248 383796 / E: kostas@bangor.ac.uk

The adoption of International Financial Reporting Standard (IFRS) provides an interesting setting in assessing the impact of the financial reporting regime on both earnings quality and disclosure quality. Information asymmetry between firm managers and outside shareholders generates a demand for increased information disclosure and provides an incentive for firms to disclose, because the value of incremental information is greater in this environment. Similarly, firms with poor earnings quality provide more comprehensive disclosure, because the degree of information asymmetry between the firm and investors is higher in such firms. On the contrary, theoretical models show that, firms have incentives to disclose less information, as earnings quality decreases. That is, firms with poor earnings quality disclose less information because investors treat the disclosure of such firms as less credible.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

14. Political Economy and Financial Instability  
Supervisor: Dr. Rasha Alsakka  
T: +44(0)1248 383571 / E: r.alsakka@bangor.ac.uk  
Supervisor: Dr. Noemi Mantovan  
T: +44(0) 124838 8081 / E: n.mantovan@bangor.ac.uk

The recent financial crisis in developing economies has lifted the veil on the links between the stability of financial markets and political preferences. Financial instability has a strong effect on economies, both from an individual and from an institutional point of view. Citizens expect governments to respond to declining economies, high levels of credit risk and struggling financial markets. Governments
look for ways to better manage the economic and financial factors to foster stability, however politicians become more aware of social pressures, and they may tend to delay adjustments and reforms that may be seen as austere and undesirable in the eyes of their citizens. We would welcome PhD proposals aimed at analyzing the effects of credit risk and financial uncertainty on the happiness of citizens and the extremization of political preferences, the role of political dynamics in explaining financial crises and instability, and the reaction of financial markets to major political events and reforms.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

15. Risk in the employment relationship, non-standard employment and the 'flexible firm'

Supervisor: Dr Tony Dobbins
T: +44(0)1248 388393 / E: a.dobbins@bangor.ac.uk
Supervisor: Prof. Sally Sambrook
T: +44(0)1248 382046/ E: sally.sambrook@bangor.ac.uk

Examine the concept of the ‘flexible firm’ (split between core and periphery workers) and the distribution of risk in modern employment relationships in different country contexts. Who benefits most from flexible working practices like ‘zero hours contracts’? In the years since the initial debate about the ‘flexible firm model’ (Atkinson, 1986; Pollert, 1991), atypical and non-standard employment (NSE) has seemingly become an increasingly ‘standard’ organizational practice and experience for many workers worldwide. For example, flexible zero hours contracts have become common in many UK workplaces. One issue of contemporary debate is the extent to which NSE benefits employers and workers, and how risk is distributed. The dynamics and consequences of NSE against a backdrop of the changing world of work is an important research issue for work and employment relations scholars (Kalleberg, 2009).

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
16. Say on Pay

Supervisor: Prof. Lynn Hodgkinson
T: +44 (0) 1248 382165 / E: abse09@bangor.ac.uk

Supervisor: Dr. Gwion Williams
T: +44 (0) 1248 383959 / E: gwion.williams@bangor.ac.uk

Supervisor: Mr. Danial Hemmings
T: +44 (0) 1248 388162 / E: d.hemmings@bangor.ac.uk

The culture for large executive bonus packages poses questions over whether shareholders are getting value for money. In principle, ‘Say on Pay’ legislation provides an opportunity for shareholders to vote on whether they agree with a firm’s executive remuneration policies and outcomes. Although there is some evidence that a non-binding vote doesn’t prevent excessive remuneration packages being put in place, dissent may have moderated future remuneration policies. The UK government introduced an advisory vote on executive remuneration in 2002 enabling shareholders to register dissent. This legislation was amended in 2013 by the Enterprise and Regulatory Reform Act 2013.

The new regime has two main components:

- A directors’ remuneration policy, subject to a binding shareholder vote at least every three years.
- An expanded annual report on remuneration, subject to an annual advisory vote of shareholders.

This topical area of research questions whether and why this legislation is effective, or not.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

17. Social Marketing from a consumer perspective

Supervisor: Dr Louise Hassan
T: +44 (0) 01248 383280/ E: l.hassan@bangor.ac.uk

Supervisor: Prof. Edward Shiu
T: +44 (0) 01248 382046/ E: e.shiu@bangor.ac.uk

- Understanding the role played by brand-stretching in promoting an image of smoking
- The influence of e-cigarette advertising on smoking behaviour

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

Supervisor: Prof. John Thornton
T: +44 (0) 1248 388545 / E: j.thornton@bangor.ac.uk

Supervisor: Dr Aziz Jaafar
T: +44 (0) 1248 383226 / E: a.jaafar@bangor.ac.uk

The use of tax havens as a tax avoidance mechanism has come under increasing scrutiny from regulatory authorities and policymakers, especially in the context of the fiscal crisis that has afflicted many countries in recent years. The use of tax havens among multinationals is ubiquitous. For example, all but two of the 100 largest U.K. firms had affiliates in tax-haven jurisdictions, and 83 of the 100 largest publicly listed U.S. firms reported having subsidiaries in jurisdictions listed as tax havens or financial privacy jurisdictions. The European Commission estimates that around one trillion Euros is lost annually across the European Union member states mainly as a result of the exploitation of tax havens. This research project is aimed at assessing the propensity for a firm to use a tax haven, and whether this is different across public and private firms.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

19. Tax implications of transfer pricing

Supervisor: Dr Helen Rogers
T: +44 (0) 1248 382171 / E: h.rogers@bangor.ac.uk

Transfer pricing is the pricing of goods, intangibles or services that are transferred between related parties. There is scope for setting these in order to minimise tax and, over time, the phrase “transfer pricing” has increasingly been used as synonymous with “tax avoidance.” In order to counter tax avoidance, different countries have different tax rules, most of which are based on the arm’s length principle. This principle is set out in the OECD Guidelines on Transfer Pricing, but is vague and can be interpreted differently by different people in different contexts, giving rise to uncertainty as to whether the rules have been complied with.

Dr Helen Rogers is interested in supervising PhD research that considers transfer pricing from a tax perspective and this might include considering the different impact on a company’s tax accounting and management accounting if there is a change in transfer pricing policy. Research might also explore transfer pricing uncertainty and consider ways in which it can be reduced; this could include consideration of the recent OECD consultation on BEPS-related transfer pricing issues or a focus on some of the ways in which individual companies might seek to reduce uncertainty by negotiating with the relevant tax authorities.
20. The impact of employment regulations

**Supervisor:** Dr Tony Dobbins  
T: +44(0)1248 388393 / E: a.dobbins@bangor.ac.uk

**Supervisor:** Prof. Sally Sambrook  
T: +44(0)1248 382046 / E: sally.sambrook@bangor.ac.uk

What is the impact of employment regulations like national minimum wage laws, worker participation/rights laws, and so forth, in different countries?

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

21. The Impact of IFRS adoption on earnings quality and disclosure quality

**Supervisor:** Dr Aziz Jaafar  
T: +44 (0) 1248 383226 / E: a.jaafar@bangor.ac.uk

The adoption of International Financial Reporting Standard (IFRS) provides an interesting setting in assessing the impact of the financial reporting regime on both earnings quality and disclosure quality. Information asymmetry between firm managers and outside shareholders generates a demand for increased information disclosure and provides an incentive for firms to disclose, because the value of incremental information is greater in this environment. Similarly, firms with poor earnings quality provide more comprehensive disclosure, because the degree of information asymmetry between the firm and investors is higher in such firms. On the contrary, theoretical models show that, firms have incentives to disclose less information, as earnings quality decreases. That is, firms with poor earnings quality disclose less information because investors treat the disclosure of such firms as less credible.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
22. The implementation of dynamic structural estimation in international finance

**Supervisor:** Dr Noemi Mantovan  
T: +44(0)1248 388350/ E: n.mantovan@bangor.ac.uk  
**Supervisor:** Dr Rasha Alsakka  
T: +44(0)1248 383571/ E: r.alsakka@bangor.ac.uk

Recent research in leading finance and economics journals has developed a theoretical framework to study the behaviour of financial and investment institutions in international financial markets. New challenges lie in moving from simulating models to estimation. We are interested in supervising PhD projects that that bridge between theory and estimation applications, by developing a dynamic structural estimation that can be directly applied to the mathematical modelling of financial institutions’ performance.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

23. The New Shape of Banking: Implications

**Supervisor:** Prof. Santiago Carbo-Valverde  
T: +44(0)1248 388852 / E: s.carbo-valverde@bangor.ac.uk

Banking is a challenged industry. There are new competitors that will likely reduce the importance of the banking industry in the financial flows of an economy. Shadow banking has various competitive, regulatory and risk implications. Areas of interest in this context are: the future of securitization; the implications of low interest rates for banking business; the future of regulation European Banking Union issues; credit markets, retail payments.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.


**Supervisor:** Dr Koen P.R. Bartels  
T: +44 (0) 01248 388/ E: k.bartels@bangor.ac.uk

Western governments are currently attempting to further transform their welfare states in a harsh global political-economy. Based on a neo-liberal discourse, pressures and possibilities for social and democratic innovation are being increased, while not necessarily helping to overcome the shadow of hierarchy that stifles service delivery, problems solving, and innovation. The aim of this project is to investigate how
innovative practices can engender effective, legitimate, and sustainable social and democratic reforms of urban governance. More specifically, the project will engage with local politicians, managers, public professionals, and citizens who are trying to resolve intricate problems in a British deprived neighbourhood and the local organisational system. Making use of sophisticated interpretive and qualitative methods, including ethnography and action research, the PhD student will be actively involved in improving understandings of what renders local innovative practices successful as well as how these can be improved.

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PhD Opportunities

School of Biological Sciences

Useful links:

School website: www.bangor.ac.uk/biology
Research information: www.bangor.ac.uk/biology/research
Academic staff: www.bangor.ac.uk/biology/academic_staff

Specialisations:

Animal Physiology, Behaviour and Conservation with specialisations in:
- Environmental modulation of growth and protein turnover
- Morphological and physiological adaptations that underlie inter- and intra-specific differences in animal locomotor abilities
- Energetic costs involved in different behaviours, especially flight
- Use of miniature archival data loggers to measure GPS position, heart rate and accelerometry in free-ranging animals.
- Neuroendocrinology and neurogenetics of crustacean ecdysis
- Understanding variation in prey behaviour in response to predation risk and environmental change
- Invasive species control, conservation policy, antipredator behaviour, territoriality and prey preferences
- Behavioural ecology of threatened species
- Physiological adjustments of aquatic organisms to environmental change (temperature, oxygen levels, salinity and ocean acidification), and associated energetic costs

Biogeochemistry and Plant Science, with specialisations in:
- Biogeochemistry of iron, sulfur and carbon in extremely acidic environments
- Effects of climate change and eutrophication on drinking water quality
- Effects of climate change and eutrophication on high carbon storage intensity aquatic ecosystems (wetlands and lakes)
- Establishing microbial pathways and microbial contributions in cycling biogenic elements (e.g. carbon), in ruminants, soil and in marine systems
- Genetic modification of crop plants in order to increase disease resistance (e.g. potato and tomato)
PhD Opportunities

- Molecular approaches to reduce decomposition rates of peatland plants and therefore increase carbon sequestration rates
- Use of constructed wetland to purify wastewaters and increase habitat quality

**Cancer Biology and Neuroscience, with specialisations in:**
- Genome stability mediated by DNA repair mechanisms and by the E3 ubiquitin ligase CRL4\(^{Cdt2}\)
- The role of DNA repair in providing resistance to Topoisomerase poisons (e.g. Iринотекан, Еtoposide) and nucleoside analogues (e.g. Gemcitabine, Ara-C)
- Role and maintenance of cancer stem-like cells in colorectal tumours
- DNA Damage Responses – novel elements and variants of known regulators in human cells and fission yeast
- Crustacean neuroendocrinology and neurogenetics
- Hormonal control of arthropod ecdysis
- Using the central nervous system of the fruit fly, Drosophila, as a model to analyse the cellular and molecular mechanisms of nervous system development and disease

**Microbiology, Parasitology and Biotechnology, with specialisations in:**
- Metagenomic analysis of extreme marine environments and further microbial habitats rich in industrially-relevant enzymes, e.g. gastrointestinal tracts of plant biomass-depleting animals and on their prospecting for new enzymatic activities
- Genome and OMICS studies and applications of marine hydrocarbon-degrading bacteria
- Characterizing microbial polysaccharide (lignocellulose) decomposition in terrestrial, aquatic and managed environments and the biotechnological application of novel glycosyl hydrolase enzymes. Isolation and cultivation of novel cellulolytic bacterial strains
- Sources, ecology and fate of human microbial pathogens (bacterial and viral) in estuarine environments and their interactions with nutrients, suspended particulate material (flocs), sediments and shellfish
- Functional and genomic analysis of bacterial species associated with Acute Oak Decline
- Developing improved methods for quantifying the diversity and abundance microbial taxa in the environment
- Extremophile microbiology – focussing on the diversity and application of microbial life that thrives in extremely acidic environments
- Biomining – developing new “green” technologies for extracting metals from mineral ores

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PhD Opportunities

- Bioremediation of metal- and acid-contaminated environments, coupled with developing new approaches for recovering and recycling metals from wastes
- Parasitic and symbiotic mites and lice of humans, primates and other animals, especially follicular mites; biology, microbiology, co-evolution and genomics
- Endo- and ectosymbiotic bacteria of terrestrial and marine invertebrates; minimal genomes and their application in synthetic biology
- Molecular parasitology of Leishmannia and Toxoplasma

**Molecular Ecology and Evolution, with specialisations in:**

- Evolutionary biology and phylogenetics of fish
- Discovery and monitoring of species and community diversity using DNA barcoding, metabarcoding and environmental DNA analysis
- Population structure, genetic diversity and adaptation to changing environments, especially fish and large mammals
- Traceability and forensics, especially in relation to wildlife conservation and exploited fish
- Causes and biology of the late Pleistocene megafaunal extinctions.
- Paleogenetics and paleogenomics
- Development and application of next generation sequencing protocols for sequencing highly degraded DNA
- Investigation of the functional genomic basis of environmental niche adaptation
- Venom evolution: understanding the origin and evolution of venoms; evolutionary drivers of venom composition and underlying genetic mechanisms, relevance to snakebite treatment
- Speciation, natural selection, phylogeny, hybridization and other aspects of evolution in squamates, particularly island lizards, including both natural and invasive species
- Biogeography and systematics of venomous snakes and other reptiles, species delimitation
- Invasion genetics
- Honeybee health and population genetics
- Ecology of mites and forensic acarology
- Host-symbiont evolution
- Developing improved methods for quantifying the diversity and abundance microbial taxa in the environment
- Molecular microbial ecology of natural and managed environments
1. **A Molecular genetic approach to studying adaption and evolution**

**Supervisor:** Dr. Anita Malhotra  
**T:** +44 (0) 1248 383735/ **E:** a.malhotra@bangor.ac.uk

I offer a diverse range of PhD projects in evolutionary biology which are united by adopting a molecular genetic approach. These include molecular evolution, applied to understanding the evolutionary dynamics of venom toxins through genomic approaches. This has relevance for understanding the evolution of protein diversity in general, and in organising the search for toxins with potential practical applications ("bioprospecting"), as well as in treatment of the adverse effects of the bites of venomous animals on humans. Another area of interest is in the application of molecular phylogenetic techniques to systematics, population genetics and conservation genetics, again particularly applied to reptiles and amphibians, and also including the genetics of problematic invasive species. I also have a particular interest in the use of genetic tools to study pollinator ecology and would welcome proposals in this area.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

2. **Behaviour, ecology, evolution and genetics of Lake Malawi cichlids**

**Supervisor:** Prof. George Turner  
**T:** +44 (0) 1248 382349/ **E:** george.turner@bangor.ac.uk

Reproductive biology, behaviour, systematics, population genetics and conservation of tropical freshwater fishes, especially Tilapias and other cichlid fishes.

Adaptive radiation and speciation of fishes, especially the cichlid fishes from the African Great Lakes.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

3. **Cell cycle regulation, DNA repair and genome biology using fission yeast and human cell lines as model systems.**

**Supervisor:** Dr. Thomas Caspari  
**T:** +44 (0) 1248 382526/ **E:** t.caspari@bangor.ac.uk

My group researches novel variants of important DNA damage detection & checkpoint proteins (Rad9, Hus1, Cds1, Casein Kinase 1) in fission yeast (*Schizosaccharomyces pombe*) and human cells. We are also interested in the functional link between cell cycle regulation, DNA repair and the circadian clock.
(Period 1 and NPAS2) in humans. We use genetic, molecular, cell culture and biochemical methods to understand how these novel variants regulate DNA replication, cell cycle progression and the repair of DNA lesions. My international group has currently 7 members and we are part of two international training & exchange programs. All phd students are provided with excellent supervision and access to workshops and meetings. Advice on thesis writing and viva preparation are provided. All students have also access to the new study skills centre at Bangor University. Further information can be found at our group web page: http://genome-biology.bangor.ac.uk/

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

4. Climate change and wetlands

Supervisor: Prof. Chris Freeman
T: +44 (0) 1248 382353/ E: c.freeman@bangor.ac.uk

Concerns are being raised that by 2035, atmospheric CO\textsubscript{2} concentrations will exceed 450ppm and lead to dangerous rates of climate change. The greatest year on year increases in air temperature will be experienced in the high latitudes – an area dominated by peat accumulating wetlands. Organic wetland soils from temperate and boreal ecosystems represent a vast reservoir of carbon that plays a crucial role in the global carbon cycle. These soils are major sources and sinks of greenhouse gases including nitrous oxide (N\textsubscript{2}O), methane (CH\textsubscript{4}) and carbon dioxide (CO\textsubscript{2}). Although much is known about the biogeochemical regulation of their fluxes individually very little is understood about the interaction between organic matter nutrient relations (i.e. C, N, P stoichiometry), climate change and greenhouse gas fluxes in these carbon rich soils. Moreover, the regulatory roles of enzymes in these processes remains under researched. This information is needed to parameterise and constrain existing carbon-climate coupled models at the global scale. The work will build on our previous studies published in the journal Nature.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

5. Gene and Genome Evolution

Supervisor: Dr John Mulley
T: +44 (0) 1248 383492/ E: j.mulley@bangor.ac.uk

I welcome enquiries from prospective students interested in studying genes and genomes, especially with respect to the role of gene and genome duplication in the evolution of embryonic development. My research currently uses 'next-generation' approaches to sequence genomes and transcriptomes and a combination of wet-lab
and bioinformatics projects would therefore be available, utilising invertebrate and vertebrate models. Possible project areas could include:

- The evolution of Hox and ParaHox genes
- The role of gene duplication in snake venom evolution
- Pdx genes in pancreas development and function

I also welcome project suggestions from interested students.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

6. Genetic modification of crop plants

**Supervisor:** Dr. Anil Shirsat  
**T:** +44 (0) 1248 382323/2534 / **E:** a.h.shirsat@bangor.ac.uk

We are currently working on increasing the disease resistance of crop plants by overexpressing genes coding for cell wall proteins. Experiments in Arabidopsis have shown that this is a successful strategy and we are currently testing the validity of this idea by introducing cell wall protein genes into major crop species such as potato and tomato.

Key areas: Plant molecular biology, Agrobacterium, Plant transformation, Cell wall proteins, Disease resistance. Crop plants.

Molecular approaches to reduce the effects of global warming:

Peatlands comprise the second largest store of carbon on the planet - and sphagnum moss is the most common plant in peatlands. Decomposition of peatlands (which would cause release of stored carbon and accelerate global warming) is currently been prevented by the anaerobic condition of peatlands and the fact that Sphagnum secretes phenolic compounds which inhibit decomposition. We are currently investigating the synthesis of these phenolics using a molecular approach and looking to see if Sphagnum can be genetically modified to increase the synthesis of these phenolics.

Key areas: Global warming, Peatlands, Sphagnum, Phenolocs, Plant molecular biology, Moss transformation, Agrobacterium.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
7. Genetics, ecology, evolution and behaviour of tilapia and other cichlid fish

**Supervisor:** Prof. George Turner
**T:** +44 (0) 1248 382349/ **E:** george.turner@bangor.ac.uk

Tilapias are among the world’s most important food fishes, with a major and growing role in inland aquaculture. We are interested in studying these fishes in a variety of contexts, but particularly in relation to the identification of novel genetic resources in hotspots of diversity, such as Tanzania. We are working on major collaborative programmes to sequence the genomes of cichlid fishes and to relate genetic differences to phenotypic traits including morphology, growth, diet, colour, disease resistance and reproductive biology. We are also carrying out breeding, behavioural and systematic studies on cichlid fishes, including the unique adaptive radiations of Lake Malawi and the Tanzanian crater lakes, and participate in biodiversity surveys of African freshwaters.

*Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.*

8. Metal – microbe interactions

**Supervisor:** Prof. Barrie Johnson
**T:** +44 (0) 1248 382350/ **E:** d.b.johnson@bangor.ac.uk

Microbiology of extreme environments

Geomicrobiology

Biohydrometallurgy (bio-processing of minerals and bioremediation of metal-polluted environments).

*Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.*

9. Microbial polysaccharide degradation

**Supervisor:** Dr James MacDonald
**T:** +44 (0) 1248 383077/ **E:** j.mcdonald@bangor.ac.uk

Recent work has focused on the use of molecular techniques (PCR, qPCR, RT-qPCR, quantitative RNA hybridisation and cloning) to characterise those microbial communities that colonise and degrade cellulose, the most abundant carbon polymer on Earth, in terrestrial and aquatic environments, and in managed landfill sites.
Currently, we are using a combined molecular/cultivation-based approach to characterise cellulolytic microorganisms from these environments. The overarching aim of this work is to provide information on the saccharolytic enzyme systems of these microorganisms in an attempt to understand their role in carbon flow in natural environments, and also to identify enzymes that may be of benefit in biotechnological applications such as the production of second-generation biofuels.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

10. Molecular ecology and evaluation of aquatic taxa
Supervisor: Prof. Gary Carvalho
T: +44 (0) 1248 382100/ E: g.r.carvalho@bangor.ac.uk

Although most research projects incorporate DNA-based tools, research is aimed at the elucidation of fundamental aspects of a species' biology such as patterns of dispersal and gene flow, evolution of life histories and behaviour, response to environmental stress, and mechanisms of speciation, as well as the application of molecular tools to the management and conservation of exploited aquatic species from temperate, tropical and Antarctic marine and freshwater ecosystems. Recent work at Bangor has extended to include DNA barcoding of fishes, the use of second generation sequencing and transcriptomic technologies to examine communities of marine benthos and adaptive variation in the wild, and the integration of population genetic approaches to marine ecotoxicology.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

11. Origins and evolution of snake venoms AND/OR Systematics and biogeography of reptiles (especially venomous snakes)
Supervisor: Dr W. Wüster
T: +44 (0) 1248 382301/ E: w.wuster@bangor.ac.uk

My research interests span a wide array of topic on the biology and evolution of reptiles, particularly venomous snakes. Fields of particular interest in which I would be happy to supervise PhD students include:

- Studies of the systematics, phylogeography and biogeography of venomous snakes; species limits in complex groups of venomous snakes, generally using multilocus molecular genetic approaches as well as more traditional character systems
- Determinants of venom composition in snakes: venom composition is often exceedingly variable even within snake species. I am interested in
investigating the role of natural selection for diet as well as other factors in shaping patterns of variation in venom composition, and the genetic mechanisms responsible.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

12. Physiological and metabolic adjustments of aquatic organisms to environmental change  
Supervisor: Dr Nia Whiteley  
T: +44 (0) 1248 388080/ E: n.m.whiteley@bangor.ac.uk

Physiological and metabolic adjustments of aquatic organisms to environmental change. Physiological consequences of climate change including temperature rise, ocean acidification and reductions in salinity. Thermal responses in natural populations and relationship to life-history traits. Cold-water biology.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

13. Pollution control using wetland ecosystems  
Supervisor: Prof. Chris Freeman  
T: +44 (0) 1248 382353/ E: c.freeman@bangor.ac.uk

Natural and engineered wetlands are increasingly being used around the world for the treatment of pollution. Recent studies have demonstrated a significant remediation of pollutants including BOD, COD, suspended solids and nutrients to take place between the inflow and outflow water. More recently, work has been carried out to investigate their use in removing complex organic pollutants from a variety of effluent streams, including road and airport runway run-off. Wetlands are currently being applied as Landfill leachate and storm-water runoff treatment systems. This project would develop “enzymic optimisation” techniques to the treatment process in order to promote the development of a new generation of high performance wetland treatment systems.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
14. Quantifying and understanding biodiversity in relation to community dynamics, environmental change, ecological function and human health

Supervisor: Dr Simon Creer
T: +44 (0) 1248 382302/ E: s.creer@bangor.ac.uk

I am interested in using contemporary molecular tools to address diverse questions focusing on biodiversity, ecology and evolution. This is a particularly exciting time in the field of molecular ecology, since advances in DNA sequencing throughput have recently offered a paradigm shift in our ability to assess previously intractable functional and taxonomic biodiversity at an unprecedented scale, augmenting existing biodiversity fields and empowering others. Using such technologies, I am testing a range of hypotheses regarding the alpha and beta functional and taxonomic diversity of macro-, meio- and microbial communities (e.g. microbiomes) in space and time, based on genomic, community and environmental DNA (eDNA). Focal habitats have included estuarine, coastal and deep sea environments with an increasing focus now on freshwater, terrestrial, whole organisms and the aerial biosphere in order to understand the drivers of diversity in natural communities and also how diversity is linked with ecological function, trophic relationships, environmental and human health. Current additional activities include phylogenomics, population genetics, life history evolution, polyploidy, pollination genomics.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

15. The development and application of molecular biological and metagenomic techniques for microbial community analysis

Supervisor: Dr James MacDonald
T: +44 (0) 1248 383077/ E: j.mcdonald@bangor.ac.uk

This research is underpinned by the development and application of molecular methods to characterise these complex microbial communities. We are using 454 pyrosequencing to develop new metagenomic methods that circumvent the biases associated with PCR amplification and sequencing of phylogenetic markers such as the 16S ribosomal RNA gene.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
16. The ecology and persistence of pathogens in the environment  
**Supervisor:** [Dr James MacDonald](mailto:j.mcdonald@bangor.ac.uk)  
**T:** +44 (0) 1248 383077/ **E:** j.mcdonald@bangor.ac.uk

We have also utilised molecular methods to study the ecology and diversity of pathogens such as Shiga-toxigenic *Escherichia coli* (STEC) on a dairy farm site. Current projects are focussing on the transfer of bacterial and viral pathogens from catchment to coast, and the implications of climate change on pathogen transfer and persistence and the impact on human health.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

17. The influence of environmental conditions and wing kinematics on the flight performance of birds  
**Supervisor:** [Dr Charles Bishop](mailto:c.bishop@bangor.ac.uk)  
**T:** +44 (0) 1248 382315/ **E:** c.bishop@bangor.ac.uk

Many species of birds are known to perform seasonal and foraging flights lasting from many minutes to many hours in duration, covering substantial distances and/or negotiating physical barriers. The optimal strategy for making these flights will be strongly influenced by the environmental conditions encountered by the birds as a result of the geographical terrain that must be negotiated, the weather conditions that are encountered and the distance that must be travelled. In addition, individual birds will vary in their morphological, kinematic and physiological abilities and this will impact on their flight performance and energetics. Homing pigeons provide an excellent model for the detailed study of individual flight performance and the energetic strategies used by birds during flight.

This study will exploit state-of-the-art data logging technology to study the effects of a variety of experimental manipulations on the behaviour, energetics and flight performance of free-ranging homing pigeons (*Columba livia*). We will use small ECG and accelerometer data loggers along with GPS tags, in the monitoring of body movements and physiological variables on free-ranging animals, such as homing pigeons. Manipulations may include flying birds over water, lowland and through mountains; during headwinds and tailwinds of various strengths; and following manipulations of morphological variables such as wing and body mass.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
18. Orientation, Navigation and Spatial memory in vertebrates

Supervisor: Dr Richard Holland
T: +44 (0) 1248 382344 / E: r.holland@bangor.ac.uk

Various projects are available understanding how animals orient and navigate, from laboratory based small scale spatial memory experiments to understand the interaction between personality, age and sociality in fish spatial cognition, to field based experiments understanding how homing pigeons are able to learn routes using visual, magnetic and olfactory cues to understanding how migratory songbirds are able to navigate over large distances and return to the same breeding and winter area year after year.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
School of Chemistry

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PhD Opportunities

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- Vaccines
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- Biosensors
- Carbohydrate chemistry
- Computational chemistry
- Dye-sensitised solar cells
- Hydrogels
- Inorganic main group chemistry
- Inorganic nanoparticles
- Mass spectrometry
- Organic synthesis
- Photovoltaics
- Theoretical chemistry
1. **B NMR analysis of borates in non-aqueous solution**  
   **Supervisor:** [Dr Michael Beckett](mailto:m.a.beckett@bangor.ac.uk)  
   **T:** +44 (0) 1248 382734 / **E:** m.a.beckett@bangor.ac.uk  

   $^{11}$B NMR spectra of aqueous polyborates are complex and difficult to interpret with regards exact speciation present. Non-aqueous solutions of NMC polyborates and alkali-metal (with the use of crown ethers) tetraborates in non-aqueous solution are being prepared, and their spectra are being analysed by $^{11}$B NMR spectroscopy. This should help to explain and understand spectra obtained of polyborates in aqueous solutions.  

   Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

2. **Biodegradable hydrogels from novel synthetic polymers for tissue engineering and drug delivery**  
   **Supervisor:** [Dr Hongyun Tai](mailto:h.tai@bangor.ac.uk)  
   **T:** +44 (0) 1248 382383 / **E:** h.tai@bangor.ac.uk  

   This project will design and synthesize novel synthetic polymers using living/controlled polymerization methods. The novel polymers will be used for the preparation of biodegradable hydrogels.  

   Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

   **Supervisor:** [Dr Andrew Davies](mailto:r.a.davies@bangor.ac.uk)  
   **T:** +44 (0) 1248 383633 / **E:** r.a.davies@bangor.ac.uk  

   Computational Chemistry, Virtual Reality, Computer Graphics  

   One of the major research interests of this group is to model one of the fundamental interactions in nature – the hydrogen bond. A state of the art virtual reality based technique is used to create “feelable” molecules for educational purposes.  

   Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
4. **Computational studies on peptide fragmentation**  
**Supervisor:** Prof. Bela Paizs  
T: +44 (0) 1248 382734 / E: b.paizs@bangor.ac.uk

This project involves computational (modelling and quantum chemical) studies on protonated peptides and glycans, their fragmentation pathways and fragments with the aim of refining our understanding of MS/MS sequencing chemistries.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

5. **Coordination and supramolecular chemistry, molecular magnetism, Metal Organic Frameworks (MOFs) Ligand modification towards novel [M₇] (M = Co, Ni, Zn) pseudo metallocalix[6]arene solid state host-guest complexes**  
**Supervisor:** Dr Leigh F. Jones  
T: +44 (0) 1248 382391 / E: leigh.jones@bangor.ac.uk

This project will expand on recent work by the Jones group concerning a family of [M₇] (M = Co, Ni, Zn) pseudo metallocalix[6]arene complexes capable of exhibiting interesting solid state host-guest properties. More specifically, new analogous ligands will be designed and used towards premeditated guest inclusion within these metallocalix[6]arene hosts. Developing synthetic routes towards producing porous extended networks comprising such [M₇] building blocks will also be probed.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

6. **Design of flat oligothiophenes for electronic application**  
**Supervisor:** Prof. Igor F. Perepichka  
T: +44 (0) 1248 382386 / E: i.perepichka@bangor.ac.uk

Thiophene oligomers is a promising class of molecular semiconductors for electronics and optoelectronics (e.g. organic transistors and electron/hole transporting materials). Their electronic properties substantially affected by their structure in the solid state. Thus, flattening the conjugated chain substantially improve an overlap of pi-orbitals of neighbouring molecules and their pi-pi stacking, leading to higher charge delocalisation and transport in materials. In this project, novel flat oligothiophenes with controlled HOMO-LUMO energy levels will be developed, with potential applications of such materials in field effect transistors and molecular conductors.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
7. **Design, synthesis, characterization and property evaluations of water soluble responsive polymers**  
**Supervisor:** Dr Hongyun Tai  
T: +44 (0) 1248 382383 / E: h.tai@bangor.ac.uk

This project aims to develop novel water soluble pH and/or thermo-responsive polymers. The research will require to use modern polymer synthesis approaches and characterization techniques, the self-assembly behaviour and the responsive properties of the polymers will also be investigated.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

8. **Development of a synthetic route of the helminth glycan antigen LDNF (MSc and PhD level)**  
**Supervisor:** Dr Martina Lahmann  
T: +44 (0) 1248 382390 / E: m.lahmann@bangor.ac.uk

Helminth infections are worldwide very common and a serious problem especially in areas with little resources. Contact with human faeces usually via contaminated soil is a typical infection pathway. A small, antigenic carbohydrate structure displayed on the surface of the helminth reassembles a good target for the development of a vaccine against these parasitic diseases.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

9. **Development of molecular tools for the investigation of carbohydrate recognition domains**  
**Supervisor:** Dr Martina Lahmann  
T: +44 (0) 1248 382390 / E: m.lahmann@bangor.ac.uk

Adhesion of bacteria to human glycoconjugate receptors is a crucial step in the development of many diseases and is often mediated by carbohydrate-protein interactions. As it is still difficult to study these weak but influential interactions new techniques and methodologies are desired. One of our research projects aims to contribute with the development of tailor-made glycoconjugates as tools for the detailed investigation of these interactions on the molecular level. As model system, we focus on the binding of Helicobacter pylori which attaches itself to carbohydrate structures in the stomach lining.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
10. Elemental analysis of saliva  
**Supervisor:**  Dr Christopher Gwenin  
T: +44 (0) 1248 383741 / E: c.d.gwenin@bangor.ac.uk

The project involves the analysis of saliva from both stressed and relaxed individuals; in order to establish an indicator element from which to develop a sensor system.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

11. Environmental analysis  
**Supervisor:**  Dr Michael Beckett  
T: +44 (0) 1248 382734 / E: m.a.beckett@bangor.ac.uk

An on-going research project has been to measure boron concentrations in the local freshwater and marine environment - data is now available over the previous 10 years, with concentrations constant.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

12. Fluorescent and electroactive conjugated copolymers as sensors  
**Supervisor:**  Prof. Igor F. Perepichka  
T: +44 (0) 1248 382386 / E: i.perepichka@bangor.ac.uk

Polyfluorenes is one of the most promising class of light-emitting polymers with bright blue emission. Modifying their structure with properly chosen building blocks capable to bind efficiently and selectively different analytes (e.g. metal cations, anions, toxic or environmentally dangerous substances, etc), this project aims to develop new promising organic materials for sensors applications and study them in detection of traces of selected analytes.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

13. Investigating the Fe(III) oxide surface binding ability of pre-designed polydentate ligands towards sequestration  
**Supervisor:**  Dr Leigh F. Jones  
T: +44 (0) 1248 382391 / E: leigh.jones@bangor.ac.uk

This project entails investigating the efficacy of large polydentate ligands produced via Schiff base linkages of hydroxamic acid and phenolic aldehyde substrates towards the surface attachment at Fe(III) oxide surfaces using adsorption isotherm analysis.
PhD Opportunities

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

14. Investigations towards the binding site of the FedF receptor from E.coli (MSc and PhD-level)
Supervisor: Dr Martina Lahmann
T: +44 (0) 1248 382390 / E: m.lahmann@bangor.ac.uk

Adhesion of bacteria to human glycoconjugate receptors is a crucial step in the development of many diseases and is often mediated by carbohydrate-protein interactions. Blocking these bacterial receptors with competing sugars might be an alternative treatment, circumventing the use of antibiotics, but detailed knowledge about the bacterial receptors is crucial for the successful development of antiadhesive drugs. Sulfated sugars are common compounds of the linings of the intestinal tract and the FedF receptor, found on certain E. coli strains, binds to differently polysulfated disaccharides. In the crystal structure of FedF only one sulfate has been detected but there seems to be space for more. Before we can start to design inhibitors for the FedF receptor we need to answer the following question: Are the polysulfated disaccharides really the best substrates for FedF? Challenging FedF with synthetic substrates which will be prepared during this study may give an answer.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

15. Isolation and chemical modification of plant saponins (MSc and PhD level)
Supervisor: Dr Martina Lahmann
T: +44 (0) 1248 382390 / E: m.lahmann@bangor.ac.uk

Plants produce diverse and often complex molecules. Many of them are of high value due to their bioactivity either in their isolated or post-isolation modified form. They can also serve as platform chemicals. The aim of this project is to isolate the aglycon of a saponin and to perform chemical modifications. A crude saponin will be obtained by an established extraction process. Subsequently, the uniform aglycon will be gained via a chemical step. The quality assessed by various analytical techniques. The pure aglycon will then be attempted to be modified by chemical synthesis. The products of the chemical synthesis will be characterized using common analytical methods.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
16. **Keywords: organic, synthesis, nature product synthesis, heterocyclic chemistry, organic chemistry**  
**Supervisor:** Dr Patrick J. Murphy  
T: +44 (0) 1248 382392 / E: p.j.murphy@bangor.ac.uk

The research group has a longstanding interest in guanidine containing natural products and the development of synthetic methodology for their preparation. Examples are the total synthesis of several sponge metabolites as crabescindine 359, the batzelladines, and cylindrospermopsin alkaloids isolated from several species of cyanobacteria. Other guanidine containing biomolecules for example the unusual amino acid enduracididine isolated from the seeds of *Lonchocurpus sericeus* and nitensidines D and E isolated from the leaves of *Pterogyne nitens* which exhibits cytotoxicity towards HL-60 (human myeloblastic leukemia) and SF-245 (human glioblastoma) cells.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

17. **LasA protein in Pseudomonas Infection**  
**Supervisor:** Dr Lorrie Murphy  
T: +44 (0) 1248 382384 / E: l.m.murphy@bangor.ac.uk

*Pseudomonas aeruginosa* is a Gram-negative bacterium of increasing clinical relevance as an opportunist pathogen of immuno-compromised individuals where persistent Pseudomonas infection is a leading cause of mortality. LasA is a zinc-dependent protease that has been implicated in establishing Pseudomonas infection. Little structural or mechanistic information on this protein is available and experiments are aimed at establishing the likely catalytic mechanism, substrate specificity and the role in Pseudomonas infection.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

18. **Laser Driven Quantum Control**  
**Supervisor:** Dr Keith Hughes  
T: +44 (0) 1248 382379 / E: keith.hughes@bangor.ac.uk

Undoubtedly, the goal of chemistry is to control the outcome of a chemical reaction. Using ultrashort laser pulses it is possible to control a chemical reaction. Calculations have shown how quantum control of a chemical process can be achieved by manipulating a wave-function to steer the molecule to a specified target state. The project will be exclusively theoretical and computational, and will focus on developing efficient quantum control schemes in chemistry.
PhD Opportunities

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

19. **Lewis acidity measurement**  
**Supervisor:** Dr Michael Beckett  
T: +44 (0) 1248 382734 / E: m.a.beckett@bangor.ac.uk

Organoborates are being studied as potential Lewis acid catalysts, and $^{31}$P NMR spectroscopy is being used to measure the Lewis acidity of the organoborate species. This technique uses Et$_3$PO as a probe molecule, and reports Gutmann's AN numbers. The method is being referred to in the literature as the Gutmann-Beckett method for Lewis acidity measurement.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

20. **Light-emitting iridium complexes**  
**Supervisor:** Prof. Igor F. Perepichka  
T: +44 (0) 1248 382386 / E: i.perepichka@bangor.ac.uk

Neutral and charged iridium complexes with N^N and C^N ligands are efficient triplet emitters and are used as electroluminescent materials in organic light-emitting devices (OLED), e.g. in full-color displays and next generation lighting sources. Developing new materials requires new methods of their synthesis and deeper understanding the physical processes in these materials (photoexcitation, electron transfer etc). The project aims to synthesise and study novel class of iridium complexes basing on new ligands recently developed in Bangor.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

21. **Low bandgap conjugated polymers for plastic solar cells**  
**Supervisor:** Prof. Igor F. Perepichka  
T: +44 (0) 1248 382386 / E: i.perepichka@bangor.ac.uk

An emerging field of organic photovoltaics (next generation of solar cells) has made enormous progress in the last decade, approaching performance current silicon solar cells. Conjugated polymers used as a basis for such cells require proper chemical design and precise control of their structure. The project is toward next step forward in synthesis and developing novel low bandgap semiconductive polymers and deeper understanding their structure-property and structure-function properties.
22. **New routes to high quality, nanocrystalline thin films, charge transport in nanostructured films and devices, materials for energy generation and nanoscopic magnets**  
**Supervisor:** Dr John Thomas  
**T:** +44 (0) 1248 382383 / **E:** john.thomas@bangor.ac.uk

Research in Thomas’ group is focused on new routes to high quality nanocrystalline thin films, charge transport in nanostructured films and devices, materials for energy generation and nanoscopic magnets. The challenges are addressed using soft synthetic schemes frequently relying on the power of fluid interfaces to deposit and assemble new forms of materials. Inspiration is drawn from the ubiquitous role of interfaces in natural processes. Semiconductors featuring earth abundant elements with a potential to replace the ones in use at present are being explored.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

23. **Plant chemical compounds – Unravelling their diversity**  
**Supervisor:** Dr Vera Thoss  
**T:** +44 (0) 1248 383732 / **E:** vera.thoss@bangor.ac.uk

Plants are producing an exciting variety of chemical compounds. Thoss’ research is unravelling their diversity using various isolation protocols and a wide range of analytical techniques.

Research themes include:

*Plant extraction for biologically active compounds*  
*Environmental fate of distinct compounds in different ecosystem compartment (plant, soil, water, air)*

*Plant volatiles*

*Elemental analysis*

*Method developments for advanced chromatography (LC-MS and LC-NMR)*

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
24. **Plants as providers of platform chemicals**  
**Supervisor:** [Prof. Mark Baird](mailto:m.baird@bangor.ac.uk)  
T: +44 (0) 1248 382734 / E: m.baird@bangor.ac.uk  

Isolation and modification of significant components of under-used plants to replace petrochemicals.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

25. **Synthetic mycobacterial lipids**  
**Supervisor:** [Prof. Mark Baird](mailto:m.baird@bangor.ac.uk)  
T: +44 (0) 1248 382734 / E: m.baird@bangor.ac.uk  

Understanding their role in immune signalling and disease.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

26. **Porous materials from NMC pentaborates**  
**Supervisor:** [Dr Michael Beckett](mailto:m.a.beckett@bangor.ac.uk)  
T: +44 (0) 1248 382734 / E: m.a.beckett@bangor.ac.uk  

The synthesis and characterization of a series of organic cation (i.e non-metal cation, NMC) containing ionic borate species is being investigated with the aim of exploring their solid-state structures and investigating structure directing effects through cation-anion interactions. The synthesis and characterization of supramolecular pentaborate materials with well-defined channels and pores are being explored, as potential sorbents, catalysts, ion exchangers, and materials for hydrogen storage.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

27. **Quantum dynamical study of proton transfer in intra-molecular hydrogen bonded systems**  
**Thermal chemistry**  
**Supervisor:** [Dr Keith Hughes](mailto:keith.hughes@bangor.ac.uk)  
T: +44 (0) 1248 382379 / E: keith.hughes@bangor.ac.uk  

Proton transfer in hydrogen bonded systems is of enormous importance for many processes in Biology and Chemistry and a deeper understanding of it is essential for understanding the nature and behaviour of processes such as photosynthesis and enzyme catalysis. For intra-molecular hydrogen bonded systems, proton transfer between...
different isomers of a molecule is often influenced by quantum mechanical tunnelling. A computational study of the dynamics associated with such processes is proposed.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

28. **Studies of layered material**  
**Supervisor:** Dr Peter Holliman  
**T:** +44 (0) 1248 383635 / **E:** p.j.holliman@bangor.ac.uk

Dr Holliman's current research is focused on green/sustainable chemistry; particularly low cost photovoltaic technologies such as dye sensitized solar cells. Key work areas are new light absorbers, extending spectral response for high efficiency devices and fast and/or low temperature processing for scale-able manufacturing.

Other areas of interest include 'studies of layered materials' such as layered double hydroxides (LDHs) including their unusual electronic, optical and/or chemical characteristics and their ability to work as catalysts.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

29. **Sugar-Coated Clusters**  
**Supervisor:** Dr Leigh F. Jones  
**T:** +44 (0) 1248 382391 / **E:** leigh.jones@bangor.ac.uk

Carbohydrate based ligands will be used as scaffolding for the synthesis and solid (X-ray diffraction and magnetic studies) and solution (i.e. water stability) characterisation of novel paramagnetic cages.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

30. **Synthesis of glycoclusters intended as supporting therapy of E. coli infections (MSc and PhD level)**  
**Supervisor:** Dr Martina Lahmann  
**T:** +44 (0) 1248 382390 / **E:** m.lahmann@bangor.ac.uk

The majority of bladder infections are caused by the uropathogenic e.coli. In the early stages of a bladder infection, the bacterial receptor binds to the mannosyl residues exposed on the mucous layer of the bladder. A firm adhesion is necessary for the bacteria to avoid being swept away by the host's normal defence mechanism. A possible treatment of bladder infections, circumventing the use of antibiotics, is to block the
bacterial receptors. Several mannose derivatives have been shown to be very good ligands for the bacterial receptors. However, optimisation is still necessary. The goal of this project is to design, synthesise and test an improved ligand.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

31. **Synthesis of large magnetic cages and MOFs using in-situ ligand formation methodologies**  
**Supervisor:** Dr Leigh F. Jones  
T: +44 (0) 1248 382391 / E: leigh.jones@bangor.ac.uk

The Jones group have recently produced novel Cu(II) magnetic cages (i.e. [Cu_{10}], [Cu_{14}] and [Cu_{30}]) using large polydentate ligands deliberately synthesised in-situ via the Schiff base condensation of their two organic subcomponents. This project will expand and extrapolate these findings using other paramagnetic ions and different ligand subcomponents in a similarly strategic fashion. We will also look into the premeditated synthesis of Metal-Organic Frameworks (MOFs) using these design principles.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

32. **Tandem mass spectrometry (MS/MS)**  
**Supervisor:** Prof. Bela Paizs  
T: +44 (0) 1248 382734 / E: b.paizs@bangor.ac.uk

Tandem mass spectrometry (MS/MS) of proteolytic peptides is the main method to sequence proteins in proteomics. This project involves designing and synthesising peptide libraries for MS/MS experiments with the aim of refining our understanding of MS/MS sequencing chemistries.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

33. **The detection of phosphates in water**  
**Supervisor:** Dr Christopher Gwenin  
T: +44 (0) 1248 383741 / E: c.d.gwenin@bangor.ac.uk

The project involves the use of an electrochemical sensor for the quantitative determination of phosphates in drink and river water samples. (environmental).

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
34. **The development of a gold coating process for magnetic particles**  
**Supervisor:** Dr Christopher Gwenin  
T: +44 (0) 1248 383741 / E: c.d.gwenin@bangor.ac.uk

This project involves the chemical syntheses of producing stable magnetic colloids.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

35. **The genetic engineering of novel nitroeductases for use in a biosensor for explosive detection**  
**Supervisor:** Dr Christopher Gwenin  
T: +44 (0) 1248 383741 / E: c.d.gwenin@bangor.ac.uk

This project involves the modification of DNA to yield an enzyme capable of being immobilised with control of the orientation of the protein.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

36. **The role of Cytochrome c' in denitrification**  
**Supervisor:** Dr Lorrie Murphy  
T: +44 (0) 1248 382384 / E: l.m.murphy@bangor.ac.uk

Bacterial Cytochromes c' are an interesting class of metalloproteins whose physiological role is yet to be clearly established. They are found in photosynthetic, nitrogen fixing and denitrifying bacteria. In denitrifying bacteria the role of Cyt c' has been postulated as mediating the toxicity of nitric oxide. This project is focused on the production and characterisation of site directed mutants of Cyt c' in order to better understand this proteins’ role in denitrification.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

37. **Thermal chemistry**  
**Supervisor:** Dr Peter Holliman  
T: +44 (0) 1248 383635 / E: p.j.holliman@bangor.ac.uk

Dr Holliman's current research is focused on green/sustainable chemistry; particularly low cost photovoltaic technologies such as dye sensitized solar cells. Key work areas are new light absorbers, extending spectral response for high efficiency devices and fast and/or low temperature processing for scale-able manufacturing.

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Other work includes studies of the thermal chemistry including rates of heating, the manner in which energy is supplied to the system and the ceiling temperature and time which can all have profound effects on the materials produced.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

38. Zwitterionic and cationic borate/hydroxyborate anions

Supervisor: Dr Michael Beckett
T: +44 (0) 1248 382734 / E: m.a.beckett@bangor.ac.uk

Borate anions are found in nature combined with various metal cations as minerals with a fantastic diversity of solid-state borate anion structures. Condensation of hydroxyl ammonium cations with borate to form zwitterionic (or even cationic) species and the structure directing are being examined.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
PhD Opportunities

School of Computer Science

Useful Links

School webpage: www.bangor.ac.uk/cs
Research information: www.bangor.ac.uk/cs/research/computer_science
Academic staff: www.bangor.ac.uk/cs/Staff/staff

Specialisations:

- Artificial Intelligence and Intelligent Agents
- Communication Networks and Protocols
- Medical Visualization and Simulation
- Pattern Recognition/Classifiers

www.bangor.ac.uk
Details of the main research themes carried out by staff in the School of Computer Science are detailed below. PhD opportunities are available in all of these areas.

1. **Artificial Intelligence and Intelligent Agents, AI:IA**  
   **Supervisor:** [Dr William Teahan](mailto:wjteahan@gmail.com)  
   **Dr Llyr Ap-Cenydd**  
   **T:** +44 (0) 1248 382686 / **E:** llyr.ap.cenydd@bangor.ac.uk  

   This research theme addresses theoretical and applied research into artificial intelligence (AI) and intelligent autonomous agent systems, with specific focus on evolutionary algorithms, natural language processing and information retrieval. Four PhD and 1 MPhil student completed in the REF period and currently there are 6 PhD students with projects in: Chinese and Arabic Natural Language Processing; information retrieval for peer to peer networks and motion capture data; agent-based modelling for Malaria; and conversational agents for e-learning. We were the first to develop a framework (jGE) for using Grammatical Evolution (GE) to evolve Java programs (this was prior to GEVA being produced by the Dublin GE research group). jGE has been downloaded by researchers from the USA, UK, Netherlands, Poland, Brazil and Colombia. A paper published at IJCAI'11 describes a modification to GE that significantly outperforms other GE and Genetic Programming implementations on standard benchmarking tests.

   Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

2. **Complex real-time systems simulation**  
   **Supervisor:** [Dr Saad Mansoor](mailto:s.mansoor@bangor.ac.uk)  
   **T:** +44 (0) 1248 382716 / **E:** s.mansoor@bangor.ac.uk  

   Complex real-time systems simulation research with practical application at Europe’s largest pump storage facility. Understanding of the complex nature of the plant's dynamics can be gained by hardware-in-the-loop real-time simulations, leading to insights that enhance the plant's performance.

   Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
3. **Medical Graphics**  
**Supervisors:** Prof. Nigel John  
T: +44 (0) 1248 382686/ E: n.w.john@bangor.ac.uk  
Prof. Ik Soo Lim  
T: +44 (0) 1248 382686/ E: i.s.lim@bangor.ac.uk  
Prof. Franck Vidal  
T: +44 (0) 1248 382686/ E: f.vidal@bangor.ac.uk  
Prof. Llyr Ap Cenydd  
T: +44 (0) 1248 382686/ E: llyr.ap.cenydd@bangor.ac.uk

The Bangor team are at the forefront of research developments in the use of virtual environments for medical procedures training and skills acquisition. Through collaborations with colleagues at Imperial College and, Manchester, Liverpool and Leeds Universities, we have delivered innovative software combining real time computer graphics, haptics and physiological modelling into clinical areas spanning interventional radiology, radiotherapy treatment planning and neurosurgery. A successful pan-Wales proposal in 2011 established an Advanced Medical Imaging and Visualization Research Unit funded by a £1.2M grant from the Wales National Institute of Social Care and Health Research (NISCHR). The Unit is coordinated at Bangor and employs two PDRAs at each of Aberystwyth, Bangor, Cardiff and Swansea Universities to work directly with NHS hospitals and deliver visual computing solutions to enhance clinical practice.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

4. **Pattern Recognition and Machine Learning**  
**Supervisor:** Prof. Ludmila Kuncheva  
T: +44 (0) 1248 383661 / E: l.i.kuncheva@bangor.ac.uk

The aim of this research theme is to develop internationally leading research on classifier ensembles and their applications, through individual research (a second edition of a monograph is being prepared) and domestic and international collaborations. Encouraged by the results from a recent collaboration with a medical team from Swansea, we seek to expand the applied research of the (virtual) group into other health domains such as ageing, obesity and mental health.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
5. **Security and Water-Marking**  
**Supervisor:** Dr Ying Weng  
T: +44 (0) 1248 382682 / E: y.weng@bangor.ac.uk

This research is concerned with both theoretical and practical aspects of digital watermarking. Mathematical modelling is used for watermark encryption and video hashing. Several new algorithms have been developed to improve security issues in multimedia processing and analysis.

**Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.**

6. **Visual Analytics**  
**Supervisor:** Jonathan Roberts  
T: +44 (0) 1248 382725 / E: j.c.roberts@bangor.ac.uk

Visual Analytics is analytical reasoning facilitated by interactive visual interfaces. This subgroup focuses on the investigation of analytic methods and the development of visual analysis tools that display and interact with large datasets. Building on a strong foundation of research into multiple and multiform views, we are developing a lead in this area. For instance, Bangor was a founding member of the UK Visual Analytics Consortium (UKVAC), which partners academics from Middlesex University (lead), Bangor, Imperial, Oxford and University College London. The UKVAC is working with the support of the US Department of Homeland Security via the US National Visualization and Analytics Center at Pacific Northwest National Laboratory, Washington State, and in close collaboration with the UK Home Office.

**Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.**

7. **Visual Perception**  
**Supervisors:** Dr Rafal Mantiuk  
T: +44 (0) 1248 382698/E: mantiuk@bangor.ac.uk  
Dr Ik Soo Lim  
T: +44 (0) 1248 382686/ E: i.s.lim@bangor.ac.uk

We have established research into applied visual perception, especially in the context of new display technologies and high dynamic range (HDR) imaging. The sub-group investigates how the knowledge of the human visual system and perception can be incorporated within computer graphics and imaging algorithms. This includes designing and optimization of imaging algorithms that adapt to human visual performance and viewing conditions to deliver the best images given limited resources, such as computation time or display contrast. In 2012, Mantiuk was awarded an EPSRC First Grant to quantify image...
quality in computer graphics (EP/I006575/1). The grant led to the development of a new comprehensive image quality metric for high dynamic range scenes (HDR-VDP-2, source code released on Open Source basis), and the creation of a quality database for computer graphics artefacts (collaboration with the Max-Planck-Institute for Computer Science, Saarbruecken, Germany). The research outcomes include several high impact publications, including two ACM SIGGRAPH (ACM Transactions on Graphics) and two Eurographics (Computer Graphics Forum) papers, as well as several conference papers.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
PhD Opportunities

School of Electronic Engineering

Useful Links:

School webpage: www.bangor.ac.uk/eng
Research page:  www.bangor.ac.uk/eng/research
Staff page:  www.bangor.ac.uk/eng/Staff/staff

Specialisations:

Electrical Materials Science with specialisations in:

- Electronic and dielectric properties of weakly conducting materials
- Properties of metal, semiconductor and insulating surfaces
- Electrokinetic manipulation of bioparticles
- Lipid films in Langmuir monolayer and bilayer forms
- Metal dielectric and metal semiconductor interfaces
- Interaction of ultrasound with biological materials
- Hydrocarbon polymers
- Microfabrication
- Biological polymers, enzymes & cells
- Medical applications of ultrasound
- Lab-on-a-chip

Laser Micromachining and Laboratory-on-a-Chip with specialisations in:

- Electronic and dielectric properties of biological materials
- Electrokinetic manipulation of bioparticles
- Biological polymers, enzymes and cells
- Microfabrication of biofactory and laboratory-on-a-chip
- Medical therapeutics and diagnostics

Optical Communications with specialisations in:

- Advanced optical communications systems for long-haul core networks
- Optical networking and future all-optical networks
- Optical and electrical signal processing
PhD Opportunities

Organic Electronics with specialisations in:

- Synthesising new monomers and polymers for electronic device application
- Fabrication of polymer MISFETs, Schottky diodes, LEDs, electrical and optical characterisation of polymers and devices, AFM/EFM/Kelvin probe studies on fabricated devices.
Research Project Case Study

**Bangor University Researchers Pioneer Superfast Broadband Download Capability**

**Partner:** University of Electronic Science & Technology China

**Principal Investigator:** Prof. Jianming Tang, School of Electronic Engineering, Bangor University; email: j.tang@bangor.ac.uk

Consumer demand is driving the need for ever-faster download speeds from their internet providers: from HD and 3D TV, to streaming films, cloud computing, on-line gaming and shopping, the requirement for greater bandwidth has increased 70% year-on-year. The copper cables which make up the current networks cannot cope with this rising demand, and solutions to the blockages in the system are urgently required. Optical modems combined with additional digital signal processing intelligent features could be a key enabler for the realization of future smart optical networks.

Pioneering research at Bangor on the advanced communications technology termed Optical Orthogonal Frequency Division Multiplexing (OOFDM) has global implications. Using current optical internet cabling, OOFDM has proven its ability to increase broadband transmission by up to two thousand times the current speed and capacity: equivalent to downloading 20 feature length films in one second.

With the potential to be highly-cost effective and flexible, Bangor’s world-leading research into OOFDM has received significant international attention, and this has led to a number of collaborations with Universities and industry.

**Collaboration with the University of Electronic Science & Technology**

The University of Electronic Science & Technology China (UESTC) was established in 1956 in Chengdu, Sichuan Province, China. UESTC is world-renowned for its research into electronics and in 2001 it was selected as one of the leading 34 ‘Project 985’ institutions in China.

The highly successful research collaboration between Bangor University and UESTC has resulted in significant advances in both key optical access transmission techniques and network architectures, and the findings have been presented at the major international conference OFC2014, and published in academic journals.

Academic staff from both institutions have undertaken exchange visits, and in 2013 Bangor University provided training to visiting young researchers from UESTC.
Bangor University and UESTC will continue to collaborate, exploiting cutting-edge technology to address the key technical challenges faced by current optical access networks.

Professor Jianming Tang, Principal Investigator of the project said, “The fantastic technical achievements obtained through the research collaboration between Bangor and UESTC indicate that the considerably increased transmission performance of the OOFDM technique is practically feasible utilizing low-cost optical and electrical components in extremely simple network infrastructures. These achievements have significant value for practical implementation in next generation Passive Optical Networks.”

Following on from this very successful first phase of the collaboration with UESTC, joint research funding has recently been awarded to the partners by the National Natural Science Foundation of China. This new project will focus on exploiting the cutting-edge technologies developed by BU and UESTC to answer the sector challenges of inefficiency and inflexibility within optical networks. This joint research programme will continue for at least another five years, working towards a cost-effective solution to further increase network capacity.

PhD student Mingliang Deng said: “I really appreciate that I have such a precious opportunity to undertake research under the guidance of Prof. Tang and Dr. Giddings. I have studied how to be an excellent researcher whilst working with them at Bangor. This experience at Bangor offers me a fantastic chance to get in touch with the world’s top scientists and research in optical communications. On the other hand, it enriches my educational experience and social knowledge. I believe that this visit will also benefit my future career significantly.”
This project was funded by the Sino-UK Higher Education Research Partnership for PhD studies, managed by the British Council China on behalf of the Welsh Government.

For more information about optoelectronics research at Bangor University, please see: http://www.bangor.ac.uk/eng/research/optoelectronic_devices.php.en
1. Digital Signal Processing

**Supervisor:** Dr Roger Giddings  
T: +44 (0) 1248 382715 / E: r.p.giddings@bangor.ac.uk

Digital signal processing (DSP) has recently emerged as a highly promising technology for meeting the high demands placed on future optical networks such as high capacity, cost-efficiency, green networks and highly flexible networks. This research area is focused on the application of DSP in optical communications to solve the future network challenges. Our world-leading real-time DSP-based optical communications test bed will be fully utilised to explore areas such as: advanced modulation techniques for escalating the data capacity of a single optical wavelength, driving the improvement in power efficiency at both the optical transceiver and network level and enhancing optical network resource utilisation through network aware intelligent optical transceivers.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

2. Laser Micromachining and Bragg based sensors

**Supervisor:** Dr Xianfeng Chen  
T: +44 (0) 1248 382480 / E: x.chen@bangor.ac.uk

His research interests include advanced photonic sensors and devices, fibre grating technologies, optical biosensors, and fibre lasers. Recently, his research activities have expanded to the fields of Bio- Nano- photonics, Micro/Nanofabrication, Biosensing, and Optical communications.

Since 2000, he has authored and co-authored 2 patents (UK) and over 100 papers published in international reputable journals and the major international conferences.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

3. Medical Microwave Engineering

**Supervisor:** Prof. Chris Hancock  
T: +44 (0) 1248 382686 / E: c.hancock@bangor.ac.uk

Chris Hancock received the Ph.D degree in electronic engineering from Bangor University, U.K. in 1996. From 1997 to 2002, he was senior microwave engineer at Gyrus Medical Ltd. In 2003 he founded and was the CEO of MicroOncology Ltd (now Creo Medical Ltd) to develop his ideas based on dynamic impedance matching techniques and integrated RADAR measurement techniques using /Ku/ band energy for the treatment of breast tumours. In 2009, he was given a personal Chair in the Medical Microwave Systems Research Group at Bangor University. He is also the CTO and founder of Creo Medical Ltd. Prof. Hancock is a
Fellow of the IET and a Chartered Engineer, a Fellow of the Institute of Physics and a Chartered Physicist, and was awarded an Honorary Research Fellowship at UCL for his work on breast cancer treatment.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

4. **Microelectronic/Organic Engineering**  
   **Supervisor:** Dr Mohammed Mabrook  
   **T:** +44 (0) 1248 382686 / **E:** m.f.mabrook@bangor.ac.uk

   Dr Mabrook has over 15 years' experience in microelectronic engineering, conducting multidisciplinary projects in device fabrications and instrumentations. He carry out research in several areas of interest, mainly covering work on organic electronic devices, chemical sensors, food quality sensors, semiconductor thin film device fabrication and characterisation, and nanotechnology.

   Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

5. **Microelectronic/Organic Engineering**  
   **Supervisor:** Dr Jeff Kettle  
   **T:** +44 (0) 1248 382471 / **E:** j.kettle@bangor.ac.uk

   Jeff's expertise lies in key several areas: organic and inorganic semiconductor device fabrication, characterisation and modeling, both in industrial and academic environments. He has a particular interest in the reliability of Organic devices and photovoltaic devices. He published over 20 articles in peer review journals and has been invited to present at several major international conferences.

   Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

6. **Optical Communications**  
   **Supervisor:** Prof. Jianming Tang  
   **T:** +44 (0) 1248 382697/ **E:** j.tang@bangor.ac.uk

   The students will be integrated into a highly productive optical communications research team with word-wide reputation. The students may undertake cutting-edge researches in the following subjects: high-speed optical communications system designs and experimental demonstrations, advanced digital signal processing and its' implementation using FPGA, future optical network architectures and corresponding MAC layer protocols,
dynamic optical networking, as well as ultrafast optical dynamics of semiconductor laser devices.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

7. Optical Communications Networks
Supervisor: Dr Saad Mansoor
T: +44 (0) 1248 382716 / E: s.mansoor@bangor.ac.uk

This research involves using extensive numerical simulations to explore the transmission performance and other characteristics of optical networks. These models have been used to rigorously verify experimental results carried out by the Optical Electronic research group in the School of Electronic Engineering at Bangor University. Models have also been developed to investigate schemes for adaptive dynamic bandwidth allocation in optical orthogonal frequency division multiple access and passive optical networks.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

8. Optical Nanoscopy and Imaging
Supervisor: Dr Zengbo Wang
T: +44 (0) 1248 382474 / E: z.wang@bangor.ac.uk

His expertise lies in the fields of optical nanoscopy and imaging, nano-fabrication, nano-plasmonics/electronics, laser micro nano processing, laser cleaning and the applications. He has author/co-authored more than 90 publications (WOS H-index: 13), including high-impact papers in Nature and Physics Review Journals, and has delivered more than 20 invited talks in major international conferences. He is the main inventor of the world's first 50-nm resolution white-light nanoscope that could be potentially used for virus imaging in real time. The work, published in Nature Communications, has attracted huge public interests and media coverage including BBC, New York Times, Daily Mail, etc. It was awarded a first prize in a Royal Academy of Engineering (RAEng) poster competition event in nano-engineering, invited as a feature article in Laser Focus World, and honored by the RCUK as one of '50 big ideas for the future' in year 2011.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
9. Smart functional materials and their application

Supervisor: Dr Eva Campo
T: +44 (0) 1248 382474 / E: e.campo@bangor.ac.uk

Dr. Campo has funded the Laboratory for Matter Dynamics at Bangor University, under the Lectureship of Opto-Nano-Mechanics, where she will pursue her research interests in the realm of atomistic phenomena behind smart composites and behind growth of III-V's. She is also interested in the development of novel materials and devices in biomedicine. Research in the group aims at the study of technologically relevant materials such as smart composites and GaN. Both have been targeted as critical actors in policy-driven Energy directives. A preferred manufacturing method is electrospinning and combined techniques such as polymer derived ceramic approaches.

Dr Campo's personal web site: www.evacampo.com

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
PhD Opportunities

School of Environment, Natural Resources & Geography

Useful Links:
School website: www.bangor.ac.uk/senrgy
Research information: www.bangor.ac.uk/senrgy/research
Academic staff: www.bangor.ac.uk/senrgy/staff

Specialisations:

Agricultural Systems, with specialisations in:
- Sustainable Development
- Agricultural Ecology
- Trade-offs between output of land and the needs of local people
- Relationship between systems of food production and ecology of plants and animals
- Farm, forest and environmental valuation
- Accounting and Appraisal
- Physiology and agronomy of temperate and tropical cereals, root crops and oilseeds
- Peri-urban farming systems

Agroforestry, with specialisations in:
- Role of trees in the agricultural landscape
- Formal representation of local ecological knowledge
- Tree-crop-soil interactions
- Autecology and domestication of indigenous tree species

Biodiversity Conservation, with specialisations in:
- Impact and management of invasive species
- Biodiversity
- Conservation science
- Threatened species conservation
PhD Opportunities

Environmental and Soil Science, with specialisations in:
- Sustainable rural, peri-urban and urban environments
- Climate change
- Biogeochemistry
- Plant Ecophysiology
- Waste Management and Restoration

Forest Ecology and Management, with specialisations in:
- Ecophysiology of the impact and tolerance of heavy metals
- Plant Nutrition
- Mycorrhizas in forest ecosystems
- Impact of CO2
- Forest Genetics and tree breeding
- Forest inventory
- Conservation and restoration of forest eco-systems

Renewable Materials with specialisations in:
- Science of wood and plant fibres
- Natural fibre reinforced composites
- Use of plant-derived materials as chemical feedstock’s
- Wood ultrastructure and decay mechanisms
- Chemical Modification
- Preservation and flow
- Composite Properties
- Chemical Products from plants

Rivers and Catchments
People, Space and Place
Geospatial Analysis
Research Project Case Study

East African Farmers Reap the Benefits of Crop Breeding Programme

East African Partners: Uganda Martyrs University (UMU), Uganda; Masinde Muliro University of Science and Technology (MMUST), Kakamega, Kenya; and Kenyatta University (KU), Kenya.

Project Associates: Biosciences Eastern & Central Africa (BecA) and International Crops Research for the Semi-Arid Tropics (ICRISAT).

Principal Investigators: Prof. John Witcombe, Professorial Fellow; and Dr Katherine Steele, Lecturer in Sustainable Crop Production at the School of Environment, Natural Resources & Geography, Bangor University; email: k.a.steele@bangor.ac.uk

The CAPACITATE East Africa project (developing capacity for participatory and marker assisted plant breeding to mitigate low crop productivity and poor food security), was a three year project funded by the European Union African, Caribbean and Pacific (ACP) Science and Technology Transfer Programme, led by UMU. The goal of the project was to improve the capacity of crop research in East Africa, producing farmer-acceptable crop varieties and therefore enhancing food security.

Poverty and food security are major concerns that affect millions of people in East Africa. At the beginning of the CAPACITATE project, agricultural research in the region was failing to translate into better crop yields for sustained food security, and farmers were
struggling to adapt to climate change. This project aimed to tackle these issues by focusing on a proven approach: developing new crop varieties that provide greater scope for growers and end-users, and display drought and heat stress hardiness.

Previously, agricultural research in East Africa did not focus on crop varieties specifically adapted to the farmers’ needs. East African plant breeders were unfamiliar with new techniques in plant breeding such as Client-Oriented Breeding (COB), which have been shown by Bangor University researchers to be highly effective in accelerating variety development: increasing the uptake of new varieties by poor farmers in marginal environments.

The project successfully met its key aim: assisting farmers in adapting to climate change using COB methodologies to improve the yield, productivity and quality of their crops. By creating a network of researchers, breeders and farmers, research in this field is better co-ordinated; gaps in knowledge have been closed, and research publications have increased. Traditional barriers for farmers accessing current research have been removed; providing them with the knowledge they require to meet the challenges of water and heat stress on their crops; thus enhancing the uptake of modern varieties.

The impact of this project has resulted in both economic and societal benefits. An estimated 85 million smallholder farmers (a large proportion of whom are women), growing staple, high-value crops will profit from access to COB and a greater range of crop varieties exhibiting superior tolerance to disease and heat and water stress. The production of sustainable crops with more reliable yields will provide the farmers with better income security: alleviating poverty and poor nutrition.

A scientist from Uganda Martyrs University (right) discusses a bean variety trial with farmers in their field.
In addition to this, a ‘train the trainer’ programme was also conducted. Bangor University researchers held workshops on COB and Participatory Plant Breeding (PPB) in Kenya and Uganda. This has resulted in at least one hundred students each year benefitting from the programme at East African Universities.

Postgraduate students from Uganda and Kenya attended a research training course in the UK; topics included studying the resistance of *Phaseolus vulgaris* (the common bean), to *Pythium* root rot; analysis of the genetic diversity in pumpkins (*Cucurbita maxima*), and their resistance to powdery mildew.

Caroline Kambona, who completed her training in Bangor, March 2013 said, “I really appreciated the opportunity and thank my supervisors both in Kenya and at Bangor for being keen on me and helping me through the training as I did my masters project. I thank Dr. Katherine Steele for the opportunity to work in her Barley for food project and present part of it as my Master’s thesis in my graduating university (Kenyatta).”
Dr Katherine Steele said, “The project enabled researchers from four universities to meet, share ideas and work together for the first time. Some of the world’s most experienced crop scientists from the CGIAR Research Centres and Bangor University led training courses across the region. The training was put into practice through participatory trials in farmers’ fields. Everyone involved with the project has gained enthusiasm - as well as skills - to apply science in a way that can solve food security problems.”

For more information on crops and livestock research at Bangor University, please see: http://www.bangor.ac.uk/senrgy/research/research_groups/crops.php.en

Research Project Case Study

Reclaiming & Transforming Degraded Land in Indonesia

Consortium Partners:
UK: Aberystwyth University
Indonesia: Universitas Andalas, Universitas Bangka Belitung, Universitas Brawijaya, Universitas Diponegoro, Universitas Lampung, Universitas Pattimura, Universitas Sam Ratulangi, Tropenbos Indonesia, PT Riset Perkebunan Nusantara, SEAMEO BIOTROP, PT Bukit Asam, and IPB.

Principal Investigator: Prof. Morag McDonald, Head of the School of Environment, Natural Resources & Geography, Bangor University; email: m.mcdonald@bangor.ac.uk

Building on a significant background of strong collaboration with Indonesian institutions, Bangor University has been successful in securing a £10,000 grant from the British Council Indonesia to seed-fund research projects that will help return disused former mining sites into productive land. This project, in partnership with both Indonesian and UK Universities and commercial organisations aims to meet the many environmental challenges faced by Indonesia: including the improvement of soil and water quality, and the development of agroforestry techniques.

Over the last ten years, Indonesia has undergone rapid economic development. The growth of extractive industries; for example coal mining have significantly contributed to the economic development of the country. Environmental problems that can arise during, and particularly after mining has ceased can include soil and forest destruction, production of acid rock drainage, pollution of air, water and soil and the creation of harmful waste.
The principal goal of the consortium is to address these problems, and to develop and disseminate best-practice approaches that will benefit Indonesia and the region of South East Asia.

Initial outcomes include SENRGy staff (Professor Morag McDonald, Dr Paula Roberts and Dr Graham Bird), attending a workshop held at the Indonesian base of SEAMEO BIOTROP in Bogor, West Java in late March 2014. The workshop was preceded by a visit to the PT Bukit Asam coal mine at Tanjung Enim, a 6.4 billion tonne coal reserve in South Sumatra. The group were able to view some of environmental problems as well as the approaches taken by PT Bukit Asam to tackle these.

The Consortium Partners

(Back row, L-R) Dr Graham Bird (Bangor University), Dr Bill Perkins (Aberystwyth University).
(Middle row, L-R) Dr Rohny Maail (Universitas Pattimura), Dr Wilson Novarino (Universitas Andalas), Dr Melya Riniarti (Universitas Lampung), Dr Eva Utami (Universitas Bangka Belitung), Dr Tri Retnoningsih Soeprowati (Universitas Diponegoro), Prof. David Arnold Kaligis (Universitas Sam Ratulangi), Dr Edi Purwanto (Tropenbos Indonesia), Dr Reiny A. Tumbol (Universitas Sam Ratulangi), Dr Gede Wibawa (PT Riset Perkebunan Nusantara), Dr Didik Suprayogo (Universitas Brawijaya), Prof. Jesus Fernandez (SEAMEOBIOTROP), Mr Paulus Wendi Saputra (PT Bukit Asam).
(Front row, L-R) Prof. Morag McDonald (Bangor University), Ms Meinanada Chudahan (British Council), Prof. Iskander Siregar (IPB), Prof. Morag McDonald (Bangor University), Dr. Bambang Purwantara (SEAMEO BIOTROP), Mr. Muhammad Bagir (PT Bukit Asam), Dr Irdika Mansur (SEAMEO BIOTROP).

Visit to the PT Bukit Asam Coal Mine at Tanjung Enim
Prof. Morag McDonald noted that, “we’re delighted to be leading this research in collaboration with colleagues in Indonesia and the UK. The partnership gives us an opportunity to develop and share our expertise in the study, and reclamation of former industrial landscapes developed in the UK and Europe. Working with colleagues in Indonesia provides a fantastic opportunity to address the challenges posed to pollution and reclamation by tropical climates.”

For more information on forestry and agroforestry research at Bangor University please see: [http://www.bangor.ac.uk/senrgy/research/research_groups/forestry.php.en](http://www.bangor.ac.uk/senrgy/research/research_groups/forestry.php.en)
PhD Opportunities

1. **Antibiotic resistance in the environment**  
   **Supervisor:** Dr Prysor Williams  
   T: +44 (0) 1248 382637/ E: prysor.williams@bangor.ac.uk

   Antibiotic resistance is widely regarded as one of the most pressing challenges facing modern society, from both a public health and economic aspect. In the last ten years, antibiotic resistance in *Enterobacteriaceae* has risen very rapidly, particularly the prevalence of extended-spectrum-beta-lactamase genes. Societal changes such as population growth, urbanisation, and increased international travel are expected to increase the likelihood of the spread of such genotypes. Affected individuals excrete resistant bacterial strains and it is purported that these strains may then potentially enter the wider environment through sewage outflows. A number of PhD projects are available in this subject area. These would capitalise on the interdisciplinary nature of the research at Bangor University. Projects will draw upon epidemiology, environmental and medical microbiology (including molecular), healthcare sciences, environmental science, policy, and social science. The student would receive first-class training in a range of analytical techniques to study a topic of real global concern.

   Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

2. **Biosecurity of different management techniques for bio-wastes**  
   **Supervisor:** Dr Prysor Williams  
   T: +44 (0) 1248 382637/ E: prysor.williams@bangor.ac.uk

   Increasing volumes of bio-wastes are being generated due to the global growth in human population. Bio-wastes can contain biological (e.g. pathogenic micro-organisms) and chemical (e.g. antibiotics, heavy metals) hazards; and the safe disposal of large volumes of bio-wastes presents a considerable problem, especially from increasingly urbanised populations. However, bio-wastes can also be considered as resources as they contain valuable nutrients and a source of organic matter. This project will investigate the optimisation of management strategies for bio-wastes and may explore technologies such as composting, anaerobic digestion and lime stabilisation.

   Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

3. **Carbon Cycling**  
   **Supervisor:** Dr Andrew Smith  
   T: +44 (0) 1248 382297/ E: a.r.smith@bangor.ac.uk

   Forest occupy one third of the land surface of the Earth, and account for almost half of the carbon (C) stored in the terrestrial biosphere. Increasing the diversity of plantation
PhD Opportunities

forest stands may alter forests carbon balance though competitive or facilitative species interaction. Forests comprised of tree species selected for contrasting functional traits may provide improve resource use efficiency increasing ecosystem stability and the provision of ecosystem services such as carbon sequestration. Using the BangorDIVERSE experiment, this project aims to quantify the C pools and fluxes and produce a carbon balance for different species mixtures and inform government policy.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

4. **Combining client-orientated and molecular breeding methods for biotic/abiotic stress resistance in crops**
   Supervisor: Dr Katherine Steele
   T: +44 (0) 1248 383642/ E: k.a.steele@bangor.ac.uk

   The successful uptake of new crop varieties depends on the suitability of the end product to the target market – the farmers and end users. Projects are available that will involve the following crops: rice, barley, tomato and potato. Students will receive hands-on training in conventional breeding techniques, client-oriented approaches, quantitative trait locus analysis and marker-assisted selection. Data sets will inform practical breeding programmes to improve traits such as yield under stress, resistance to pathogens, agronomic traits and nutritional components. Breeding lines will be tested in field trials in target production environments. Split course projects with one year for fieldwork in another country are available.

   Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

5. **Completing the carbon balance of mangrove ecosystems**
   Supervisor: Dr Mark Rayment
   T: +44 (0) 1248 382337/ E: m.rayment@bangor.ac.uk

   Mangrove ecosystems provide a comprehensive array of ecosystem services, ranging from coastal protection and fisheries nursery habit, through pollution amelioration, to fuel wood and building timber provision. Overexploitation and land conversion, however, means that globally, mangrove cover has reduced by over one third in the previous 30 years.

   Intact mangrove ecosystems are amongst the most productive in the world, storing carbon at rates as high as or higher than terrestrial tropical rainforests. Recently however, direct measurements of productivity have revealed a significant disparity between the uptake of carbon by mangroves from the atmosphere, and the accumulation of carbon within the mangrove ecosystem itself. This residual term is most
likely accounted for by the export through tidal wash of particulate and dissolved organic carbon. Identifying the relative magnitudes, and the ultimate fate, of these carbon fractions, plus determining the net transport of dissolved inorganic carbon, is a priority area for research, particularly given the potential for using 'Blue' carbon as a source of carbon-credit based mangrove conservation.

Drawing upon and adding to existing datasets of net ecosystem carbon uptake and soil and above-ground carbon inventories, this project will seek to close the carbon balance for a number of mangrove ecosystems by quantifying the magnitudes of exported carbon fractions, and identifying the factors controlling these.

The ideal candidate will have a background in geosciences and strong quantitative skills. Ambition, enthusiasm and competence are more important than previous experience as technical training will be provided during the course of the PhD.

Please note that this project will require fieldwork in the tropics and will require an additional £2400 pa on top of the standard SENRGy fee.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

6. Control of carbon and nitrogen cycling in soil

Supervisor: Prof. Davey Jones
T: +44 (0) 1248 382579/ E: d.jones@bangor.ac.uk

Supervision of PhDs looking at carbon and soil organic matter dynamics in relation to sustainable land use (agriculture or forestry) and greenhouse gas emissions. In addition, topics covering aspects of nitrogen use efficiency in agriculture are also of interest as well as the microbiological control of nitrogen cycling processes. Topics related to soil classification and soil quality will also be considered as well as those linked to plant-microbial-soil interactions and rhizosphere ecology.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

7. Developing indicators of tropical forest sustainable management

Supervisor: Prof. John Healey
T: +44 (0) 1248 383703/ E: j.healey@bangor.ac.uk

Monitoring of tropical forests for all of the ecosystem services and biodiversity that policy requires them to deliver is too costly to be feasible. We need to develop a set of indicators that can be widely used and are reliable, and a methodology to integrate their results into an overall assessment of the sustainability of forest management. These are
PhD Opportunities

major challenges. Significant recent advances in forest ecosystem ecology and biogeochemistry, together with Life Cycle Assessment methodology, offer an exciting new approach, which a PhD project could significantly advance. Indicators will be developed and tested for climate change (greenhouse gas emissions); soil degradation; water quality and resource depletion, with a focus on soil organic matter and nutrient fluxes, soil-tree interactions and soil function. A new tropical forest Life Cycle Assessment model will be developed covering the whole product value chain (with respect to production of timber and other ecosystem service co-products). This will be used to compare the sustainability of alternative forest policy and management options and produce practical indicators for managers.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

8. Estimating the human welfare impacts of conservation and environmental protection

Supervisor: Dr Neal Hockley
T: +44 (0) 1248 382769/ E: n.hockley@bangor.ac.uk

I welcome enquiries from high calibre candidates able and willing to develop their own proposals for PhD research in this broad area. Please familiarise yourself with my research interests and the notes for prospective PhD students (both on my webpage above) before contacting me. Prospective students will need either funding or a proposal for obtaining funding (e.g. from the Commonwealth Scholarship Commission).

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

9. Evaluating resource efficiency and environmental impacts of food and energy production systems

Supervisor: Dr David Styles
Tel: +44 (0)1248 38 2502 / Email: d.styles@bangor.ac.uk

The efficiency of resource use and intensity of environmental impact can be quantitatively benchmarked across different production systems using life cycle assessment (LCA). In attributional LCA, resource use and environmental burdens can be expressed per e.g. kWh of electricity generated for energy systems, and per e.g. kg of food product, or kg of protein or kcal energy, for food systems. Recent work here at Bangor University has focussed on how LCA system boundaries can be expanded to account for indirect effects that arise when changes are made to food and bioenergy systems, especially in terms of indirect land use change associated with increased demand for animal feed or the displacement of food crop production, and the diversion...
of food waste from e.g. composting to anaerobic digestion facilities. Projects applying attributional LCA to novel production systems, or applying expanded-boundary LCA to consider wider effects of interventions to energy and food production systems, are welcome. These could look at, for example, regional or national scenarios of change in food systems (farm intensification), diet substitution of animal proteins with plant proteins, or bioenergy deployment.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

10. Forest ecosystem service provisioning in future drying climates

Supervisor: Prof. Morag McDonald
T: +44 (0) 1248 388076/ E: m.mcdonald@bangor.ac.uk

Tropical forests occur over a wide range of rainfall regimes that vary both in total precipitation and in seasonality. Both length and intensity of dry seasons can have important ecological consequences for tropical forests. As such, the vegetation patterns along environmental gradients have long been studied in ecology, but studies that link these patterns with ecosystem services are a new area for research. Information on the latter is of importance as it will contribute significantly to the understanding of changes in functioning along a rainfall gradient and more importantly it can be used as an indicator of the effects of climate change on tropical forest ecosystems. Both length and intensity of dry seasons are predicted to increase into the future which can have important consequences for the ecosystem services provided by forests. The project will look at vegetation patterns along precipitation gradients to see how a range of services are affected e.g. carbon storage, biodiversity and water recycling, to develop predictions consistent with the predicted range expansion of tropical dry forests into moist forest zones. A combination of field measurement, remote sensing, and modelling will examine options for ecosystem service restoration.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

11. Forest restoration where multiple factors limit the rate of tree establishment

Supervisor: Prof. John Healey
T: +44 (0) 1248 383703/ E: j.healey@bangor.ac.uk

Many degraded environments in tropical regions have multiple factors limiting the restoration of forest ecosystems, including soil condition, drought, shortage of tree propagules, competition from herbs and shrubs, fire and herbivory. Forest ecosystems do have resilience, a capacity to recover through succession. The project will test experimental interventions in a contrasting set of secondary or primary successions
designated to accelerate the natural recovery process. It will focus on the potential of pioneer woody species to facilitate the establishment of forest trees by counteracting the limiting factors listed above, and then how the successional transition to dominance by forest trees can be accelerated. The project will target sites degraded by past mining, agriculture and/or forest harvesting operations. Its key research questions are: 1) How do multiple factors interact in limiting recovery of degraded forest ecosystems? 2) How can pioneer trees facilitate the recovery process? 3) How can the recovery process best be accelerated towards the target outcomes? The project will provide evidence of how natural ecological resilience through succession can be harnessed to restore ecosystems of high value for biodiversity, and other provisioning and environmental services, as a cost-effective alternative to standard plantation forestry techniques.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

12. Impacts of land management on losses of diffuse pollutants

**Supervisor:** Prof. Dave Chadwick  
T: +44 (0) 1248 383569 / E: d.chadwick@bangor.ac.uk

Land management practices to facilitate the production of food, fibre and fuel can result in significant losses of nutrients, organic matter, sediment and pathogenic organisms to the environment. Quantifying sources and forms of these losses and understanding the processes that lead to emissions of e.g. greenhouse gases, or diffuse water pollutants such as nitrate and phosphorus are essential in developing cost-effective mitigation strategies. PhD topics addressing spatial and temporal variability in soil processes that result in diffuse pollution (to air and water) are of interest, as are studies on the development of mitigation strategies.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

13. In-situ conservation of wild forest food for health and livelihoods

**Supervisor:** Prof. Morag McDonald  
T: +44 (0) 1248 388076 / E: m.mcdonald@bangor.ac.uk

Wild forest foods are rich sources of macro- (carbohydrates, lipids and proteins) and micro-nutrients (vitamins and minerals), as well as dietary fibres and other important phytochemicals, but many species are in decline in anthropogenic landscapes which fragment forest habitats. This parallels emerging problems of obesity and associated chronic diseases as increasingly urbanized populations adopt diets with higher saturated fat and lower fruit and vegetable intakes than those consumed traditionally – ‘the nutrition transition’. Little is known on the contribution of wild forest foods to dietary intake and requirements of both rural and urban dwellers as well as their availability,
exploitation and management in production or ecological niches. Knowledge on these aspects is essential for understanding diet-health relationships and conservation/domestication of key indigenous fruit tree species for improved nutrition and biodiversity purposes. Key research questions could include: How do local people use and manage selected indigenous fruit trees? What is the role of indigenous fruits in diets and health? What are the barriers to fruit consumption in rural and urban areas? What is the nutritional composition and provenance variation of selected forest fruits? Which factors cause most variation in nutritional quality of the study fruits? How can we identify 'best' niches in the agricultural landscape for species propagation?

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

14. Is pathogen activity linked to infectivity?

Supervisor: Dr Prysor Williams
T: +44 (0) 1248 382637/ E: prysor.williams@bangor.ac.uk

It is known that the metabolic activity of pathogens such as E. coli O157 varies, depending on environmental conditions, the degree of stress, etc. Under unfavourable conditions, pathogens die, however it has been seen that some strains possess the ability to lower their metabolic activity as a mechanism to survive; subsequently increasing their metabolic activity when more favourable conditions occur. It is unclear, however, how changes in metabolic activity affect a pathogen's ability to infect. Using E. coli O157, this project will investigate the relationship between these factors and will increase our knowledge of pathogen ecology.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

15. Modelling farm management, exact topic depending on student's interest (e.g. production, climate change or biodiversity)

Supervisor: Dr James Gibbons
T: +44 (0) 1248 382461/ E: j.gibbons@bangor.ac.uk

Management decisions are taken at the farm level so modelling the impact of environmental or policy change must take account of farm level decisions. The proposed project will develop existing state of the art farm management models in the area of the student choice. The approach allows modelling single farms or larger areas as aggregates of individual farms that interact. This approach allows the investigation of a wide range of policy (e.g. effective policy for enhancing on farm biodiversity) or environmental impact (e.g. the effect of climatic change on farm production and enterprise mix) questions.
PhD Opportunities

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

16. Nutrient Cycling
Supervisor: Dr Paula Roberts
T: +44 (0) 1248 382976/ E: p.roberts@bangor.ac.uk

With soil sulphur (S) levels in the UK declining due to legislation restricting S atmospheric emissions and, simultaneously, an increase in demand for markets for recycled or treated organic waste. There is a need to develop an understanding of what contribution these wastes can make in relation to soil S and subsequently to crop production. The aims of this project are to evaluate the potential contribution organic wastes might make to soil fertility, in regard to S, to determine which type of organic waste can contribute and to what extent we can substitute inorganic S additions with these wastes without compromising yield.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

17. Optimising the management of bio-wastes
Supervisor: Dr Prysor Williams
T: +44 (0) 1248 382637/ E: prysor.williams@bangor.ac.uk

Increasing volumes of bio-wastes are being generated due to the global growth in human population. Bio-wastes can contain biological (e.g. pathogenic micro-organisms) and chemical (e.g. antibiotics, heavy metals) hazards; and the safe disposal of large volumes of bio-wastes presents a considerable problem, especially from increasingly urbanised populations. However, bio-wastes can also be considered as resources as they contain valuable nutrients and a source of organic matter. This project will investigate the optimisation of management strategies for bio-wastes and may explore technologies such as composting, anaerobic digestion and lime stabilisation. It will equip students with skills in a range of analytical techniques and may well include a field-scale trial on the school's research farm (Henfaes Research Station).

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

18. Pb isotopes as geochemical tracers: evaluating the influence within-sample heterogeneity on their robustness as geochemical tracers
Supervisor: Dr Graham Bird
T: +44 (0) 1248 383222/ E: g.bird@bangor.ac.uk
The release of potentially harmful trace metals, such as Pb into the environment has been a widely studied impact of industrial anthropogenic activity that will continue to have an impact on environmental and human health for the foreseeable future. It has become increasingly apparent that identifying the origin, or provenance, of contaminants is required to facilitate effective environmental management. Metal isotope signatures, notably of radiogenic Pb, have been acknowledged as having the ability to identify the source of such metals when present within a variety of media. However, commonly-adopted approaches to determining Pb isotopes in environmental (soil, sediment) samples, completely ignores potentially within-sample isotopic heterogeneity driven by sedimentologically-differentiated Pb content. This project will evaluate this and the implications for the use Pb isotopes as geochemical tracers and in source-apportionment mixing models.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

19. Phosphorus cycling in a mixed tree species stand  
Supervisor: Dr Andrew Smith  
T: +44 (0) 1248 382297/ E: a.r.smith@bangor.ac.uk

Phosphorus (P) is the second most limiting macronutrient for plant growth, its availability governed by a series of complex biogeochemical processes. In forests, a large part of the plant available P pool is organic P resulting from the input of both above- and below-ground detritus inputs. The replenishment of the plant available P pool in forest soils is usually determined by the cycling rate of organic P, which releases inorganic P for microbial or plant uptake. Smaller contributions to this pool occur through slow mineral weathering and mineralisation of increasingly recalcitrant organic residues. Several recent diversity experiments have demonstrated that ecological process rates can decrease with increasing diversity. The aim of this project is to examine the impact of tree species mixtures on P cycling using the BangorDIVERSE experiment.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

20. Prey preferences of large predators  
Supervisor: Dr Matt Hayward  
T: +44 (0) 1248 383642/ E: m.hayward@bangor.ac.uk

www.bangor.ac.uk
We have shown that Africa’s large predators each preferentially prey on a select group of species with limited overlap (see *Biol. Conserv* 139: 219-229). Using similar methods, this work needs extending to other large predators including jaguars, pumas, dholes, dingoes, jackals, caracals, coyotes, foxes and cats. Once the prey preferences of these species have been analysed, we can look at the effect of group hunting on predator diets; prey preferences in native vs introduced ranges; use ecological niche modelling to determine if preferred prey are better predictors of distribution than abiotic characteristics; test optimal foraging theory; predict the impact of climate change on predator diet and carrying capacity; and make predictions to test whether changes in predator communities occur following observed long-term changes in prey communities.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

21. Reducing the cost and adding value to animal by-products

**Supervisor:** Dr Prysor Williams  
**T:** +44 (0) 1248 382637/ **E:** prysor.williams@bangor.ac.uk

Animal by-products (ABPs) represent a huge waste stream. However, the options available for the processing (storage, disposal or secondary use) of ABPs vary significantly throughout the world, depending upon regulations. This project will explore the best options for reducing the costs of ABP disposal, or of ways to add value to ABPs and the wider meat industry. Depending upon the exact nature of the project, the work could involve microbiology, carbon footprinting and life cycle assessment, and policy. The work would benefit from the excellent links the supervisory team has with industry and policy-makers on a UK and European level.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

22. Root & Mycorrhizal Ecology

**Supervisor:** Dr Andrew Smith  
**T:** +44 (0) 1248 382297/ **E:** a.r.smith@bangor.ac.uk

Fine root production of forest ecosystems comprises around one third of global annual net primary productivity (NPP) in terrestrial ecosystems, highlighting the essential but unseen role of the below-ground component of trees in terrestrial ecology. Despite the importance of roots in nutrient uptake, carbon cycling, and tree stability little is known about the life-span, morphology and physiology of roots both in monoculture and mixed species stands. This project would use the BangorDIVERSE experiment to provide an opportunity to examine how inter- and intra-species interactions may alter the morphology, physiology, distribution of roots and their symbionts at different tree diversity levels.
PhD Opportunities

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

23. Soil Pollution
Supervisor: Dr Paula Roberts
T: +44 (0) 1248 382976/ E: p.roberts@bangor.ac.uk

Technological advances and application in the field of nano-particulate means that we are using several of these metals for an increasing range of common applications. The gap between technological understanding and evaluating environmental impact on disposal of nanoparticle material is very wide. On common element is nano-particulate silver, it is used increasingly as an antibacterial compound in everything from food packaging to sportswear. The aims of this project are to evaluate the effect of nano-Ag on soil microbial function, with particular focus on its potential antimicrobial effect of nano Ag on the soil N cycling.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

24. Step-change innovation for tracking landscape scale bee movements for pollination ecosystem services
Supervisor: Dr Paul Cross
T: +44 (0) 1248 382991/ E: paul.cross@bangor.ac.uk

This study will address the increasing need to develop a radio-telemetric tracking device that can be attached to the world's most economically beneficial insect: the honey bee. Effective radio-tracking of small insects in the field is constrained by transmitter size, short battery life (7-21 days), limited tracking range on flat ground (100-400 m: honey bees forage up to 3km), a transmitter weight (minimum 0.2g) which is heavier than a honey bee (90 mg), and finally the attachment of radio transmitters may affect the bee behaviour and incur significant energetic costs. Given the multiple threats posed to bees across the globe such as habitat loss, global introduction of invasive species such as the varroa mite and the potential long-term effects of environmental exposure to substance such as neonicotinoids, the need to develop effective radio-telemetric alternatives is of critical importance.

This study will explore the potential to develop a tracking system the covers the honey bees forage range (3km) by combining existing technologies with novel approaches such as the use of nanoparticles. The successful development of such a device will revolutionise how we monitor and understand the environment.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
25. The impact of climate change and predicted changes in river regime on the dynamics of metal fluxes within riverine environments

Supervisor: Dr Graham Bird
T: +44 (0) 1248 383222/ E: g.bird@bangor.ac.uk

The fluvial environment is the principal recipient and store of inputs of potentially harmful elements (PHEs), such as As, Cd and Pb, within the secondary environment. In particular, riverine sediments play a major role in the dispersal and storage of PHEs, which have been identified as having a deleterious impact upon aquatic and riparian ecosystems. There is a growing awareness of the need to consider fluxes of PHEs, as opposed simply to concentrations. However, discharge regimes in riverine environments (particularly in Europe) are changing, and in particular, increases in flood frequency and magnitude are predicted to accompany future climate change. However, to date there has been little work carried out on how these predictions of a change in the discharge regime of rivers will impact upon the fluxes of PHEs within aquatic ecosystems. This project aims to address this knowledge gap and employ sampling, analytical and modelling approaches to quantify how the riverine fluxes of solute and sediment-associated PHEs may respond to future changes in discharge regime. The project will focus on release and dispersal from point sources (e.g. abandoned metal mines) as well as diffuse floodplain stores, whose physical stability under changing discharge regimes is likely to be affected.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

26. Threatened species conservation

Supervisor: Dr Matt Hayward
T: +44 (0) 1248 383642/ E: m.hayward@bangor.ac.uk

I have worked on a range of threatened species and am happy to tailor research projects to a species of your interest. For example, I have worked on the conservation ecology of the quokka, the effect of bushmeat hunting on forest fauna, the reintroduction of large predators/marsupials/beavers, competition between large predators, the impact of invasive species, the value of fencing for conservation and assisted migration. If you are interested in something along these lines, please get in touch.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
27. Biophysical benefits of shelter on livestock productivity  
Supervisor: Dr Mark Rayment  
T: +44 (0) 1248 382337/ E: m.rayment@bangor.ac.uk

Sustainable intensification of food production requires “smart” farming systems that are more resilient than current practices. It is a central tenant of ecosystem theory that structural complexity confers resilience. In the case of livestock production, incorporating appropriately designed green infrastructure, such as tree crowns or shelterbelts, can modify, improve and create a diversity of microclimates (nanoclimates) with the potential to improve both productivity and animal welfare.

In simple terms, this means providing areas where livestock can move to avoid extreme conditions such as cold winds, excessive sun, water-logged soils, etc. The exact nature of the shelter(s) required, and the mechanism by which green infrastructure provides these, depends on local climate and weather variability.

This project aims to identify and characterize the extreme conditions faced in livestock production systems and to identify the form of green infrastructure required to mitigate these extremes.

Key research questions are: (i) what are the extreme conditions faced by livestock in any given location? (ii) what are productivity costs of these extremes? (iii) what physical/biological properties are required of trees planted for shelter? (iv) what are the costs of introducing the required green infrastructure?

The ideal candidate will have a background in science and strong quantitative skills. Ambition, enthusiasm and competence are more important than previous experience because technical training will be provided during the course of the PhD.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

28. Tree Species Community Ecology  
Supervisor: Dr Andrew Smith  
T: +44 (0) 1248 382297/ E: a.r.smith@bangor.ac.uk

Ecological theory suggests that increasing forest diversity will increase the resilience of forests to environmental change. However, specific tree species may have different ecophysiological requirements for optimum growth that has negative or positive impacts on productivity. Using the BangorDIVERSE experiment, an opportunity exists to examine how intra and inter-specific competition can impact tree mortality, allometry, productivity, and biomass allocation in monoculture and mixed species stands.
29. Tropical forest resilience and silviculture

Supervisor: Prof. John Healey
T: +44 (0) 1248 383703/ E: j.healey@bangor.ac.uk

Students who have access to permanent sample plots or other monitoring data from tropical forests that have been subject to logging, or other forms of human or natural disturbance, have a great opportunity to carry out PhD research of international importance. This can address international priority questions concerning: the sustainability of tropical forest timber production; the capacity of tropical forests to recover from impacts of different forms of logging (their resilience); and how this recovery is assisted by different silvicultural interventions. This is highly relevant to major international policy issues including reduced emissions from deforestation and forest degradation (REDD+); certification of forest management and policy to maintain tropical forests through the income of harvested timber combined with the protection of biodiversity and delivery of ecosystem services.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

30. Using geometric morphometrics to discriminate three honeybee subspecies in the UK: An assessment of the beneficial and detrimental traits of hybridization

Supervisor: Dr Paul Cross
T: +44 (0) 1248 382991/ E: paul.cross@bangor.ac.uk

The aim of this study will be to determine the purity of Apis melifera melifera in a region of Europe. This will involve sampling bees from hives and measuring wing characteristics. These will allow subspecies to be discriminated. This in turn will allow suitable mating areas containing drones that demonstrate characteristics consistent with A. m. melifera, to be identified through the use of GIS with a view to improving the adaptability of the bee to its environment and disease. Additional supplementary data will be collected on the bees’ behaviour, disease history, yields and beekeeper management etc.

The need for such a study stems from the recent declines in colony survival across Europe. A possible cause of these declines is that large scale migratory beekeeping and the trade in bee queens, coupled with the promiscuous mating system of honeybees, have exposed native honeybees to increasing introgressive hybridization with managed non-native subspecies, which may lead to the loss of valuable combinations of traits shaped by natural selection. Currently beekeepers discriminate European subspecies by
measuring only a few morphological characters. Discrimination could be significantly improved by increasing the number of wing measurements because, unlike other body parts, wings can be measured automatically.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

31. Using mapping populations to examine genetic and phenotypic variability in physiological, morphological and agronomic characteristics in spring barley

**Supervisor:** [Dr Katherine Steele](mailto:k.a.steele@bangor.ac.uk)
**T:** +44 (0) 1248 388655  
**E:** [k.a.steele@bangor.ac.uk](mailto:k.a.steele@bangor.ac.uk)

**Supervisor:** [Dr Robert Brook](mailto:r.m.brook@bangor.ac.uk)
**T:** +44 (0) 1248 382517  
**E:** [r.m.brook@bangor.ac.uk](mailto:r.m.brook@bangor.ac.uk)

At Bangor University we have generated two homozygous mapping populations of spring barley (*Hordeum vulgare* L) by wide crossing of heterozygous Asian landraces and homozygous European varieties, displaying segregation for traits such as hull-less (naked) and hulled grains, two or six row ears, long or short coleoptiles, white or black testa, high and low beta-glucan levels and differing degrees of resistance to common foliar diseases. These populations present opportunities for a plant breeder, geneticist, physiologist or agronomist to study expression and heritability and to map some of these traits. By negotiation, the project could be directed to suit the particular interests of applicants.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
PhD Opportunities

School of Healthcare Sciences

Useful Links:

School webpage: Healthcare Sciences - www.bangor.ac.uk/healthcaresciences/index.php.en
Staff page: www.bangor.ac.uk/healthcaresciences/staff/all.php.en

Research Centres:

- Centre for Health Economics and Medicines Evaluation (CHME)
- Dementia Services Development Centre (DSDC)
- North Wales Centre for Primary Care Research (NWPCPR)
- North Wales Organisation for Randomised Trials in Health (NWORTH)

Research Groups

- Implementation Research Programme (IMPLEMENT@Bangor)
- Experiencing and Managing Illness in Cultural Contexts - Centring patient and family perspectives in service development (EMIC)
- Bangor Evidence Synthesis Hub (BESH)

Bangor Institute for Health and Medical Research

Bangor University launched the Institute of Health and Medical Research in 2016 in order to build on our innovative research programme, providing an integrated platform for dedicated health-based research and postgraduate research work within the School of Healthcare Sciences. The new Bangor Institute for Health and Medical Research [BIHMR] advances an established foundation of research excellence: www.bangor.ac.uk/healthcaresciences/research/ref.php.en
PhD Opportunities

The expertise embedded in the BIHMR focuses on five core research groups, representing themed activity and staff:
www.bangor.ac.uk/healthcaresciences/research/groups.php.en These are the Dementia Services Development Unit (DSDU), Implement@BU, the North Wales Organisation for Randomised Trials in Health (NWORTH), the Centre for Health Economics and Medicines Evaluation (CHEME) and the North Wales Centre for Primary Care Research (NWCP CR). In this way, BIHMR provides a forum for a critical mass of academics from across different scientific and professional disciplines to work collaboratively, providing opportunities for interdisciplinary working in clinical and applied research. Particular areas of excellence that emerge from these groups focus on dementia, cancer and rehabilitation, as well as developing new methods for doing high quality research across a range of methodologies. Overall, the Institute facilitates interdisciplinary research that spans discovery in the laboratory through to research that solves complex health problems in the real world. In this way, BIHMR contributes to improvements in local health and healthcare, as well as making an impact across Wales, the United Kingdom and internationally.

Within the School of Healthcare Sciences the BIHMR offers a variety of exciting opportunities for engaging in a postgraduate research programme for PhD, MPhil or MSc by Research. It provides an excellent environment and training programme for postgraduate research students of health and medical research that enables personal and professional growth. The four research groups; Innovative Approaches and Methodologies, Ageing and Dementia, Rehabilitation and Cancer, represent a substantive reservoir of expertise and interests and potential areas of interest for postgraduate study is detailed in the 'Research Projects' tab, firstly representing internationally recognised expertise in innovative methodologies and approaches to health sciences relevant to a wide range of context, including Implementation science and complexity in trials, and secondly focused on the themed areas of dementia, rehabilitation and cancer.

www.bangor.ac.uk
1. **Ageing and Dementia Care**  
**Supervisor:** Prof. Bob Woods  
T: +44 (0) 1248 383719 / [b.woods@bangor.ac.uk](mailto:b.woods@bangor.ac.uk)

Dementia Services Development Unit (DSDU)

A range of projects are possible within the remit of Bangor’s Dementia Services Development Centre, which is active across a wide range of ageing and dementia research activities. These can be broadly categorised:

- dementia care (including Alzheimer’s disease, family care-giving and psychosocial interventions). Interventions that have been studied here with people with dementia include cognitive stimulation, life story books and creative arts interventions, with a view to understanding and enhancing quality of life.
- maintaining function and well-being in later life. Theory-driven analyses of the longitudinal cohort data from the CFAS Wales study, involving 3500 people aged 65 and over are of particular interest. What are the risk factors for lower well-being?

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

2. **Cancer in primary care**  
**Supervisor:** Prof. Clare Wilkinson  
T: +44 (0) 1978 726653 / E: [c.wilkinson@bangor.ac.uk](mailto:c.wilkinson@bangor.ac.uk)

North Wales Centre for Primary Care Research (NWCPCR)

People survive cancer for longer after treatment; but often suffer a raft of physical, psychological and social morbidity to the extent that this has become a new chronic disease area. PhD questions would involve designing and testing complex interventions for use in primary care settings to improve morbidity for cancer patients. Methods might include systematic reviews, qualitative interviews and pilot trials leading to pragmatic randomised trials in health service settings. The research could concentrate on various cancer.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
3. **Cancer in primary care**  
**Supervisor:** Prof. Richard Neal  
T: +44 (0) 1978 726651 / E: r.neal@bangor.ac.uk

North Wales Centre for Primary Care Research (NWCPCR)

Timely diagnosis of cancer is important as it may lead to earlier stage disease and more effective treatment. However it remains a challenge in many cancers. There remain many unanswered questions regarding

- The most effective ways to raise awareness of potential cancer symptoms, and empower patients to present these to their doctor
- The most effective ways of educating doctors and developing tools to facilitate diagnosis
- The most effective routes of referral and investigation

Methods may include systematic reviews, secondary analysis of datasets, qualitative interviews and pilot trials leading to pragmatic randomised trials in health service settings. The research may be specific to one cancer, a group of cancers, or cancer more generically.

Please note the research project opportunity detailed here is **NOT funded by the University**, candidates must secure their own funding to meet the costs of PhD study.

4. **Clinical trials**  
**Supervisor:** Professor Paul Brocklehurst  
T: +44 (0) 1248 383218 / E: p.brocklehurst@bangor.ac.uk

North Wales Organisation for Randomised Trials in Health (NWORTH)

My work is divided into two broad areas: trial methodology and dental public health. For the former, I am interested in ways of improving the implementation of research evidence generated from trials and how implementation research can improve the external validity and efficiency of trial design. In dental public health, most of my work to date has examined the potential for role-substitution in dentistry, looking at ways the dental work-force can be better designed to meet the public health challenges of the future. I am also involved in an evaluation of how different remuneration methods influence the behaviour of primary care clinicians in Northern Ireland. My final area of interest relates to how we manage the challenges of ageing on oral health and how we best design service provision for older people as they loose their independence.

Please note the research project opportunity detailed here is **NOT funded by the University**, candidates must secure their own funding to meet the costs of PhD study.
5. Clinical trials
   Supervisor: Dr. Zoë Hoare
   T: +44 (0) 1248 388840 / E: z.hoare@bangor.ac.uk

   North Wales Organisation for Randomised Trials in Health (NWORTH)

   My work and themes are based around the application of statistical methodology to pragmatic trials of complex interventions. This includes work around randomisation methodology, consideration of constructing composite outcome measures to reduce the issues of multiplicity within trials and methods to improve the efficiency of trials.

   Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

6. Dementia and family carers
   Supervisor: Prof. Rhiannon Tudor Edwards & Dr Carys Jones
   T: +44 (0) 1248 382483 / E: c.l.jones@bangor.ac.uk

   Centre for Health Economics and Medicines Evaluation (CHEME)

   Dementia is now one of the leading causes of morbidity in older age. Family carers provide informal care allowing people with dementia to stay in their own home as long as is feasible. The National Institute of Health and Care Excellence is realising that when undertaking economic evaluations of interventions for people with dementia, it is important to factor in the impact on those caring for them too. There is growing interest in how best to support informal carers of people with dementia, how to measure their health related quality of life, and where resources might best be placed in order to support them.

   Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

7. Exercise rehabilitation for chronic disease
   Supervisor: Dr Nefyn H Williams
   T: +44 (0) 1978 726074 / E: nefyn.williams@bangor.ac.uk

   North Wales Centre for Primary Care Research (NWCPCR)

   A large part of the disease burden managed in primary care is for chronic disease. Most patients with these conditions are physically deconditioned and addressing physical inactivity is an important part of their clinical management. However physical inactivity is neither assessed routinely nor addressed in a systematic fashion. Methods would fall into the MRC framework for evaluating complex interventions and would involve a
variety of research methods. Reviews of the literature which could be systematic or realist and involve mixed methods, meta-analysis or novel methods such as network meta-analysis. Developing the intervention could involve surveys, qualitative research such as semi-structured interviews or focus groups, or secondary analysis of existing datasets. Testing the intervention in pilot randomised controlled trials prior to a definitive RCT and concurrent economic evaluation.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

8. Health and well-being in later life

**Supervisor:** Dr Gill Windle

T: +44 (0) 1248 383968 / **g.windle@bangor.ac.uk**

Dementia Services Development Unit (DSDU)

In addition to the above, I have a special interest in resilience in later life, understanding how people can maintain well-being despite significant challenges, such as chronic illness, acquired disability and cognitive impairment. Questions to address include ‘Can resilience be promoted through an intervention, and if so, how? What strategies do people adopt to minimise the risk of serious health threats in later life? The second topic relates to creative/arts based interventions for people living with dementia. There are some significant challenges in how researchers design studies and measure outcomes associated with the potential positive impact these activities might have. There is a need for further theoretically informed research, to develop, adapt and test new approaches that can best capture any benefits.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

9. Health economics of Mindfulness

**Supervisor:** Prof. Rhiannon Tudor Edwards

T: +44 (0) 1248 383712 / E: **r.t.edwards@bangor.ac.uk**

Centre for Health Economics and Medicines Evaluation (CHEME)

Mindfulness Cognitive Behavioural Therapy (MBCT) has been found to be effective and cost-effective in reducing the frequency of relapse of depression, used in conjunction with anti-depressant medication. As a way of promoting resilience, Mindfulness is being offered now in workplaces, schools and for certain patient groups within the NHS, e.g. cancer patients. Through our links with the Bangor Centre for Mindfulness Research and Practice, we can offer PhD research projects on the cost-effectiveness of Mindfulness in different settings and with different groups of people.
PhD Opportunities

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

10. Implementation Science
Supervisor: Jo Rycroft-Malone, Implement@BU
T: +44 (0) 1248 383119 / E: j.rycroft-malone@bangor.ac.uk
Implement@BU

My research programme centres on investigating and developing the area of ‘Implementation and Improvement Science’. This field is of increasing importance across a range of disciplines and seeks to research the practice and methods for closing the gap between evidence and what occurs in practice. My research involves a substantive programme of work that explores the theory, practice and utility of implementation science and its potential to transform the implementation of complex evidence in a range of practice environments. I have expertise and projects that focus on advancing the field of implementation science, utilising mixed methods and qualitative research, including case study, ethnography and realist enquiry.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

11. Informal involvement in health among friends or family
Supervisor: Dr. Julia Hiscock
T: +44 (0) 1978 726649 / j.hiscock@bangor.ac.uk
Supervisor: Prof. Richard Neal
T: +44 (0) 1978 726651 / E: r.neal@bangor.ac.uk

North Wales Centre for Primary Care Research (NWCPCR)

Within medical sociology it is well known that on an everyday basis people interact informally about health with each other, totally outside of the formal health services. This informal role played by family and friends may be in providing support for the management or maintenance of others’ health. PhD questions could relate to social support, caring, the role of social networks in health, or other sociological questions about informal (lay) involvement in health among friends or family. Methods are likely to include qualitative methods. Data gathering could be through interviews or focus groups.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
12. Interventions for musculoskeletal problems  
**Supervisor:** Dr Nefyn H Williams  
T: +44 (0) 1978 726074/ E: nefyn.williams@bangor.ac.uk

North Wales Centre for Primary Care Research (NWCPCR)

Musculoskeletal problems are common, debilitating and often under treated particularly in primary care. Methods would fall into the MRC framework for evaluating complex interventions and would involve a variety of research methods. Reviews of the literature which could be systematic or realist and involve mixed methods, meta-analysis or novel methods such as network meta-analysis. Developing the intervention could involve surveys, qualitative research such as semi-structured interviews or focus groups, or secondary analysis of existing datasets. Testing the intervention in pilot randomised controlled trials prior to a definitive RCT and concurrent economic evaluation.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

13. Parental experiences of caregiving, mindfulness, first-hand accounts and other representations of long-term conditions and disability  
**Supervisor:** Dr Jaci Huws  
T: +44 (0) 1248 383155 / E: j.huws@bangor.ac.uk

My research interests include parental experiences of caring for a child with complex needs, mindfulness and, first-hand accounts and other representations of long-term conditions or disability. In particular my research centres on aspects of Health Psychology, Child Health (Health Sciences), Autism Spectrum Disorders, Autism Spectrum Treatment, Clinical and Research Applications of Complexity Sciences in Healthcare, and Psychology. Most of my research involves the use of qualitative methods and methodologies (Interpretative Phenomenological Analysis (IPA), Discourse Analysis, Grounded Theory), and I am an IPA methodology (UK) Regional/International Contact.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
14. Peer support and coaching

**Supervisor:** [Dr Sion Williams](mailto:sion.williams@bangor.ac.uk),
T: +44 (0) 1248 388451 / E: sion.williams@bangor.ac.uk

**Supervisor:** [Dr Chris Burton](mailto:c.burton@bangor.ac.uk)
T: +44 (0) 1248 382556 / E: c.burton@bangor.ac.uk

Implement@BU

Models of peer support and coaching are increasingly being developed within health and social care as led-led intervention. Our work focus on the development of peer support models in community and hospital contexts, with a particular interest in people living with the effects of stroke. Drawing on insights from transformational leadership theory and the principles of coaching we examine ways of developing theoretically-grounded and effective models of peer support and coaching intervention.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

15. Positive approaches towards mental health

**Supervisor:** Dr Marjorie Lloyd
T: +44 (0) 1248 383139 / E: m.lloyd@bangor.ac.uk

My research interest is in mental health and nursing and improving and developing services towards more recovery focused health promoting interventions. Mental health research often falls into the realm of narrative enquiry listening to the stories of people who use services and analysing them to improve nursing practice. Developing strong links between service users, their carers and education and practice is therefore an important part of any research project or service development in mental health service provision. My research methodology therefore follows an interpretive ontological approach using case based narrative methods.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

16. Statistical Methods and Health Economics alongside pragmatic trials

**Supervisor:** Prof. Dyfrig Hughes
T: +44 (0) 1248 382950 / E: d.a.hughes@bangor.ac.uk

**Supervisor:** Dr Catrin Plumpton
T: +44 (0) 1248 382857 / E: c.o.plumpton@bangor.ac.uk

Centre for Health Economics and Medicines Evaluation (CHEME)

Research opportunities include the development and application of methods concerning trial-based economic evaluations, including measures of health outcome, resource use data collection instruments, analysis and mechanism-based economic modelling.
17. Stroke Rehabilitation and implementation of evidence
Supervisor: Dr Chris Burton
T: +44 (0) 1248 382556 / E: c.burton@bangor.ac.uk

My work concentrates on the generation and use of evidence in health care, mostly in the field of stroke. I have a significant programme of research into stroke rehabilitation and life after stroke. Current funding for evidence generation supports a programme of research into the effectiveness of a range of therapeutic clinical interventions; the first discrete choice experiment of patient preferences for community; and the first empirical investigation of clinical decision-making at the interface of end of life care in acute stroke. Research into the use of evidence in clinical practice is pursued at organisational level, including the role of organisational partnerships as catalysts for implementation. I also have a particular interest in how individual clinicians can be enabled to support evidence use through novel interventions, including patient involvement and the use of aesthetics in education and training.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

18. Using routinely collected health service data for research
Supervisor: Dr Nefyn H Williams
T: +44 (0) 1978 726074 / E: nefyn.williams@bangor.ac.uk

North Wales Centre for Primary Care Research (NWCPGR)
Large amounts of data are routinely collected by health service staff on patients who are participating in trials. Such data gives added value to that collected from patient completed questionnaires. Methods of collecting this data are being developed but there is a need to review the use of these methods in trials and to develop them further to improve the quality of information obtained and to reduce the burden on trial participants. One example of this is the collection of routinely collected health service use data for use in economic evaluations alongside RCTs. Another example is in the collection of routine data to explore novel ways of delivering primary care in general medical practices run directly from the health board and using a mix of medical, nursing, pharmacy and therapy staff to provide general medical services.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
PhD Opportunities

School of Medical Sciences

Useful links:

School webpage: Medical Sciences - www.bangor.ac.uk/sms/
Staff page: www.bangor.ac.uk/sms/staff/.php.en#1

Specialisations:

- Rheumatic diseases
- Inflammatory arthritis
- Systemic lupus erythematosus
- Behavioural (cognitive) neurology
- Sensorimotor integration (on eye and limb movements)
- Higher order sensory processing
- Neuro-ophthalmology
- Neuro-rehabilitation
- Developing the use of Magnetic Resonance Imaging and Rendering
- Effects of antipsychotic medication on neutrophil morphology and oxidative stress
- Use of Quantitive Structural Activity Relations in cellular responses to antipsychotics
- History of Medicine
- Smell and taste pathophysiology, assessment and management
- Assessment of Endoscopic Sinus Surgery
- Transnasal fibreoptic flexible laryngo oesophagoscopy
- Dizziness assessment and treatment
- Catabolic effects of rheumatic diseases and effect on muscle mass and function
- Autoimmune rheumatic diseases - prognosis, and assessment of treatment
- Assessment of novel anti rheumatic treatment
- Respiratory medicine
- Orthopaedic surgery
- Sports and exercise medicine
- Cardiac imaging and intervention
- Cortical processes and cardiovascular output
- Cardiology and nuclear medicine
- Clinical research into the assessment and development of new anti-cancer drugs
- Assessment of the effects of chemotherapy

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PhD Opportunities

- Intensive care medicine
- Chronic disease patient care
- Diabetes and vascular disease
1. **Cancer cell metabolism**  
**Supervisor:** Dr Rita Cha  
**T:** +44 (0)1248 382865 / **E:** r.cha@bangor.ac.uk

A hallmark of cancer cells is uncontrolled growth, reproducing themselves over and over again within the body. We are investigating how cancer cells synthesize the building blocks necessary for generating a new cancer cell. Our long-term aim is to utilize the knowledge to find a way to stop cancer cell proliferation.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

2. **DNA repair in the model organism fission yeast**  
**Supervisor:** Dr Oliver Fleck  
**T:** +44 (0)1248 388189 / **E:** o.fleck@bangor.ac.uk

We are interested in genome stability, particularly nucleotide excision repair (NER), and mismatch repair (MMR), using the yeast *Schizosaccharomyces pombe* as model. Our PhD projects address the function of various MMR proteins in stability of repetitive DNA and of NER factors in repair of DNA adducts caused by chemotherapeutic agents. Both aspects are important for understanding of the mechanisms that can prevent certain types of cancer. In addition, the status of MMR and NER factors play a role as prognostic markers in cancer treatment.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

3. **Management of peripheral vascular disease / Management of diabetic foot disease / Management of Chronic wounds**  
**Supervisor:** Mr Dean Williams  
**T:** +44 (0) 1248 388787 **E:** dean.williams@bangor.ac.uk

Atherosclerosis, lower limb ulceration and diabetic foot disease are major causes of limb loss and mortality. Although there is a positive correlation between a multidisciplinary approach and its impact on preventing loss of limb, what is less clear is the specific areas that have influenced those outcomes. These related areas of interest have potentially major clinical implications.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
4. **Molecular characterisation of the roles of autoantigens in Chronic Myeloid Leukemia**  
   **Supervisor:** Dr David Pryce  
   **T:** +44 (0) 1248 382363 / **E:** d.w.pryce@bangor.ac.uk

Chronic myeloid leukaemia (CML) is a form of blood cancer, which according to global trends, is steadily increasing in both incidence and prevalence. The discovery of the tyrosine kinase inhibitors (TKIs) - highly specific drugs that inhibit CML progression - has profoundly reduced CML-dependent mortality, from an annual rate of 10-20%, to approximately 2%. However, several issues still remain with the clinical effectiveness of TKI-based therapies; mainly they are rarely curative, patients may experience severe side effects, but treatment withdrawal almost invariably leads to disease relapse, and they require a considerable financial commitment for long-term treatment. Research into enhancing current and developing new alternative treatment options is therefore vital to sustain long-term CML treatment strategies. The PhD research projects in my laboratory are focusing on the characterising the roles of ‘autoantigens’ in CML development and progression, with the aim of developing new biomarkers and/or immuno therapeutic targets for CML diagnosis, prognosis and treatment.

*Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.*

5. **Novel Regulators of Genome Stability**  
   **Supervisor:** Dr Chris Staples  
   **T:** +44 (0) 1248 388776 / **E:** c.staples@bangor.ac.uk

Genome maintenance and DNA repair are essential tumour-suppressing processes. Though many genome stability and DNA repair factors are extensively characterised, research in my lab has uncovered a number of completely unstudied proteins that prevent the accumulation of DNA damage in human cells including a novel DNA repair factor. My work focuses on figuring out what these factors are, what other proteins they bind to and how they protect the human genome. This in turn leads to more in-depth analysis of the roles of these proteins in cancer biology and studies determining their relevance to patient treatment regimes and ultimately survival.

*Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.*
6. Novel Roles of the DNA Damage Checkpoint Proteins in the Regulation of Glucose Metabolism and Diabetes

**Supervisor:** Dr Thomas Caspari  
T: +44 (0) 1248 382526 / E: t.caspari@bangor.ac.uk

Diabetes type II is a growing health concern in many countries. Exciting new work in my group revealed novel activities of the DNA damage checkpoint kinases ATR, ATM, Chk1 and Chk2 in the response to glucose limitation. This is also of high importance since these genome maintenance pathways act under low glucose concentrations in many cancers as malignant cells have up to 10-times less glucose available compared to healthy cells.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

7. Stem cell/germ cell genes in cancer: clinical and functional roles

**Supervisor:** Dr. Ramsay McFarlane  
T: +44 (0) 1248 382360 / E: r.macfarlane@bangor.ac.uk

The process of oncogenesis is a complex multifaceted process. Cells undergo changes to their genomic structure and the transcriptional landscape. We have identified a group of genes are normally only active in human stem cells and germ cell, but become activated in cancers. We believe that they have excellent clinical potential as drug targets and for patient stratification. We are currently focussing on a few of these to determine their function in cancer cells, stem cells with a particular interest in how they might control of genome dynamics.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

8. Stem cells and differentiation in normal and cancer cells of the gut

**Supervisor:** Dr. Jane Wakeman  
T: +44 (0)1248 382341 / E: j.a.wakeman@bangor.ac.uk

Normal homeostasis of adult intestinal epithelium and repair following tissue damage is maintained by a balance of stem and differentiated cells. Mutations in stem cells of the gut are known to cause cancer, as such it is important that we know and understand the processes required to form and maintain stem cells and cancerous stem cells of the gut. We are investigating the role of a small population of gut cells, known as enteroendocrine cells, which are marked by the presence of a transcription factor known as Brachyury. These cells are secretory cells that are critical for integrating nutrient sensing with metabolic responses, but may also have additional functions in regulating
intestinal stem cells or acting as reserve stem cells. Our work aims to understand the role of Brachyury in normal and cancer stem-like cells will serve as a platform for assessment of the molecular processes of intestinal homeostasis that underpins our understanding of human health, cancer and ageing.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

9. **The role of DNA repair mechanisms in resisting treatment with DNA damaging cancer drugs**

   **Supervisor:** Dr Edgar Hartsuiker  
   T: +44 (0) 1248 382350 / E: e.hartsuiker@bangor.ac.uk

DNA damaging cancer drugs are a mainstay of cancer therapy, but it remains unknown which DNA repair pathways contribute to cellular resistance against these drugs. We have identified and are currently characterising various repair mechanisms which resist treatment with topoisomerase poisons (e.g. Irinotecan) and nucleoside analogues (e.g. Gemcitabine).

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
PhD Opportunities

School of Ocean Sciences

Useful links:

School website: www.bangor.ac.uk/oceansciences
Research information: www.bangor.ac.uk/oceansciences/research/research
Academic staff: www.bangor.ac.uk/oceansciences/staff/php/stafflist1

Specialisations:

- Catchment and Coastal Processes
- Earth System Science and Climate Change
- Marine Ecosystems: Conservation and Resource Management
- Marine Environment and Evolutionary Biology
- Ocean Physics

www.bangor.ac.uk
Research Project Case Study

Green Energy, Weather Forecasts & Climate Change: Ocean Modelling is the Answer

**Partner:** State Key Laboratory of Marine Environmental Science at Xiamen University, China

**Principal Investigator:** Prof. Tom Rippeth, School of Ocean Sciences, Bangor University; email: **t.p.rippeth@bangor.ac.uk**

Modelling the turbulence in the oceans can tell us many things about our environment, and how we may use these findings to better support our management of the environment, such as where to site off-shore marine renewable energy plants.

The interaction of the oceans with other earth systems not only affects our weather, but the global cycling of Carbon, as the oceans act as a major sink for atmospheric Carbon. Rising temperatures and changes in the weather as a consequence of increasing atmospheric Carbon Dioxide (CO₂) are well documented, but did you know that approximately one third of the CO₂ is absorbed by the oceans? Whilst this is good news in that the air temperatures have not risen as rapidly as they could have, it does mean that seawater has become more acidic.

Ocean turbulence modelling at Bangor University accurately predicts the movement of heat, nutrients and pollutants in shelf seas (i.e. marginal seas adjacent to land), and it is critical that we understand how these factors affect the climate (for example the role of tides in driving ocean mixing in the polar oceans).

Inquisitive polar bears take a closer look at the research expedition

Our research has resulted in improved models for ocean mixing in the marine environment, and the data generated has made a significant contribution to the General
Ocean Turbulence Model (GOTM), which is regarded as the ‘gold standard’ in turbulence modelling, and is used by the UK Met Office for their short-range ocean and climate forecasting, and daily coastal sea and ecosystem forecasting. Direct impacts on the development of policy, European law enforcement and the growth of off-shore renewable energy (environmental impact assessments) have been seen; in addition to uses for search and rescue activities, ice forecasts and the biodiversity of shelf seas. Furthermore, the role of mixing in determining the strength of the ocean Carbon Dioxide sink has also been determined.

This research has attracted significant funding: £6M over six years, principally from RCUK grants, including the current NERC-supported CaNDyFloSS consortium.

In addition to this, Bangor University staff have authored a number books on ocean physics, which are standard texts for degree courses around the world.

**Collaboration with Xiamen University**

The State Key Laboratory of Marine Environmental Science at Xiamen University, China collaborates with Bangor University and partners on the PycnMix project: turbulent mixing in the pycnocline layer of seasonally stratified shelf seas. This project exploits state-of-the-art modelling techniques in order to better understand the processes responsible for mixing across the biogeochemical interface (known as the pycnocline layer), drawing nutrients up from the deeper layer of the ocean, and accounting for as much as 50% of the annual Carbon fixation in stratifying shelf seas. Given that they
account for 15-30% of the total oceanic primary production, and are a significant sink for atmospheric CO$_2$, continental shelf seas only occupy a tiny 7% of the global ocean area. It is expected that the results of the project will lead to significant advancement in the modelling of the annual cycle of stratification in shelf seas. This will lead to greater understanding of the role that the pycnocline layer plays in Carbon cycling.

Prof. Tom Rippeth in Arctic Ocean

Prof. Tom Rippeth said, “The collaboration with Xiamen University has resulted in the largest data base of ocean turbulence measurements in the world, and allows us to contrast the processes driving turbulence and mixing in the northwest European shelf seas (i.e. Irish Sea, North Sea etc) with those in the South and East China Sea systems”.

Li Jingnan, an Ocean Physics PhD student supervised by Prof. Tom Rippeth in Bangor University said, “The topic I am studying is how the wind influences the amount of carbon dioxide that continental shelf seas absorb from the atmosphere, especially in summer. Study in Bangor University is a great challenge to me. It forces me to study in a language environment I’m not familiar with. This brings lots of troubles while you are absorbing new knowledge and when you trying to explain your own thoughts to others. But it also gives me a strong push to let me jump out of my comfort zone. The biggest reason I like the School of Ocean Science is because I get lots of support here for my studies. Historically the school is a world-leader in the study of the Physical Oceanography in shelf seas, there are a lot of shelf sea oceanic experts concentrated in Bangor and I can get clear answers or advice for almost every question I ask. Besides, it’s also quite interesting to observe the different methods people use and different thoughts people have in ocean science study in different countries.”
PhD Opportunities

For more information about ocean physics research at Bangor University, please see:
http://www.bangor.ac.uk/oceansciences/research/php/research_group.php?group=5
1. **A 1,000 year seawater temperature reconstruction for the South Icelandic Shelf using stable isotopes from mollusc shells**

*Supervisor: Dr Paul Butler*  
T: +44 (0) 1248 382853 / E: p.g.butler@bangor.ac.uk  
*Supervisor: Prof. James Scourse*  
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Researchers at School of Ocean Sciences, Bangor University, have recently completed a seawater temperature reconstruction for the North Icelandic Shelf based on stable oxygen isotopes from the shell of the long-lived bivalve mollusc Arctica islandica. The shell material used for the analyses has been precisely dated because annual banding patterns in the shell can be cross dated using statistical techniques derived from tree-ring research. (This means that it is possible to assign precise calendar dates to fossil shells if their lifetimes overlap with those of live collected shells with a known date of death.

The site of the A. islandica population on the North Icelandic Shelf is oceanographically complex because two distinct water masses (Arctic Water and Atlantic Water) combine there, and the relative strength of these two water masses has been shown to have changed over the past 1,000 years (Wanamaker et al 2012, Nature Communications). The interaction of the two water masses (which have their own distinct isotopic signatures and distinct temperature characteristics) complicates the interpretation of the stable oxygen isotope record in the shells. To clarify the interpretation, we propose an equivalent isotope-based reconstruction for the South Icelandic Shelf, where Atlantic Water predominates. The studentship will involve (a) the construction of a 1,000 year chronology using annual growth increments in A. Islandica shells from the South Icelandic Shelf; (b) milling of samples from the shells for stable isotope analysis; (c) conversion of the stable oxygen isotope data to seawater temperatures using standard equations.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

2. **Anthropogenic impacts on coastal ecosystems: the synergistic effects of multiple stressors**

*Supervisor: Dr Stuart Jenkins*  
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Increasing pressure on coastal ecosystems from a range of anthropogenic impacts has led to increasing concern about changes at the individual, population and community levels, leading to significant negative changes in the functioning of ecosystems. Much research has addressed the role of particular stressors on community and ecosystem
change. However there is increasing realisation that focusing observational and experimental work on single stressors may underestimate impacts; multiple stressors which affect coastal ecosystems may interact in non-intuitive ways. This project will use the intertidal rocky shore habitat as a model system to understand the interactive nature of multiple stressors on community structure and ecosystem functioning using a field experimental approach.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

3. **Biology and population dynamics of commercially exploited fishes**  
**Supervisor:** Prof. Chris Richardson  
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**Supervisor:** Dr Ian McCarthy  
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Marine capture fisheries play a crucial role in providing a high quality protein source to an increasing global population. The demand for seafood is increasing but the FAO has recognised that the room for expansion in capture fisheries is limited and that science-based species-specific management plans are required in order to ensure that fisheries can continue to be exploited sustainably in the long-term. Underpinning the development of any fisheries management model is a comprehensive understanding of the population dynamics and biology of the target species to derive measures of age/size structure, growth, mortality and maturity. Such information is still lacking for many exploited species in the fisheries of developing nations. This could be provided for one or more target species through a programme of PhD research. An example of such an approach was the work conducted in the School on Argyrops spinfer (Journal of Applied Ichthyology 25(2009):559-564; Acta Ichthyologica et Piscatoria 41(2011):55-62) in Omani coastal waters.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

4. **Climatic buffering by structural habitat formed by macro algae**  
**Supervisor:** Dr Andrew Davies  
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Macro algae form extensive canopies in intertidal zones around the world. The structure that large species form are responsible for changing a variety of conditions such as reducing dessication for understory species, reducing drag and increasing sediment deposition. In this project, we will assess how macro algae can buffer surrounding areas from the effect of climatic extremes. For example, it is common to observe stands of macro algae freezing in winter, but the extent to which they buffer temperature in the
sediments and understories in unknown. This project will marry together electronic engineering for the design of high resolution temperature sensors that can be deployed for long periods within macroalgal stands, taxonomy and ecology.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

5. Context dependent effects of soft-sediment ecosystem engineers on biodiversity and ecosystem functioning

Supervisor: Dr Jan Hiddink
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Globally, bottom trawling is the main source of disturbance to the seabed. Bottom trawls kill a large fraction of the benthic invertebrates that live on the seabed. Benthic invertebrates in turn are very important for the biogeochemistry of the seabed, as they affect the cycling of nutrients. Particularly important are ecosystem engineers in marine sediments, such as lugworms and mud shrimps, which mix the sediment (= bioturbation) and pump water through the sediment (= bio-irrigation). Both enhance the penetration of oxygen into the seabed. This can result in enhanced levels of biodiversity and is therefore an example of facilitation, and can change the nutrient fluxes at the seabed. However, bioturbation can also have negative effects on other species living in the seabed as it disturbs and potentially buries them.

We are currently lacking an understanding of the importance of the effect bioengineers on biodiversity and biogeochemistry under different environmental conditions, relative to the natural and temporal variation. The effect of bioturbation and bio-irrigation on the biogeochemistry of the sediment is likely to depend on the ambient environmental conditions. In areas of high tidal currents over coarse, non-cohesive, sediments, sediments are likely to be oxygenated to a depth of several centimetres regardless of the presence of bioengineers, while oxygenation in areas of low tidal currents over muddy, cohesive, sediments is likely to depend on the presence of bioengineers. The aim of this project is to quantify the importance of soft-sediment ecosystem engineers on the biodiversity and biogeochemistry in muddy and sandy sediments.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

6. Coral Reef Resilience and Marine Protected Areas

Supervisor: Dr John Turner
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The resilience of corals reefs to major perturbations such as global climate change events is affected by localised anthropogenic impact. Therefore, established and
enforced Marine Protected Areas (MPAs) may help confer greater resilience on coral reefs. Studies investigating overall measures of reef health, including benthic biodiversity, reproduction, fish biomass in established MPAs around the world help in our understanding of resistance and recovery, provided that threats outside of the MPA are also assessed and regulated where necessary. Research focuses on making appropriate assessments to support management.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

7. Determining the age of decapod crustaceans

Supervisor: Prof. Chris Richardson
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Decapod crustaceans (crabs, lobsters and shrimps) are commercially important throughout the world. Stock assessment of crustaceans can be difficult since any growth rings deposited in their calcified exoskeleton are lost periodically during moulting. Demographic information has traditionally relied upon the analysis of length frequency distributions and the identification of distinct size classes of individuals within the populations. Recent work has reported the detection of growth bands in calcified regions of the eyestalk and gastric mill in shrimps, crabs, and lobsters.

This project will investigate the periodicity of growth lines in the eyestalk and gastric mill of larval, juvenile and adult shore crabs *Carcinus maenas* and lobsters *Homarus gammarus*. Using various growth stages of these crustaceans held under different experimental laboratory conditions the role of temperature, moulting and food on growth line formation in the eyestalk and gastric mill will be determined. This PhD would suit a student interested in studying the demography of crustacean populations, larval rearing and experimental techniques.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

8. Does fishing impact upon the provision of ecosystem services?

Supervisors: Prof. Michel Kaiser and Dr Jan Hiddink
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Demersal fishing activities have a number of wider ecosystem level impacts on marine ecosystems. Direct contact with the seabed leads to changes in biomass, production and habitat structure. Thus it is likely that the provision of ecosystem services is also changed. Understanding how these changes impact upon fish production would inform
better management such that it should be possible to trade off the changes incurred in ecosystem services with production and harvest of fish.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

9. Ecological responses to global warming - the role of phenotypic plasticity in marine benthic invertebrates

**Supervisor:** Dr Luis Gimenez  
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**Supervisor:** Dr Stuart Jenkins  
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The objective of this project is to understand how temperatures interact with resource supply to determine patterns of body size. Body size is a central life history trait, as it affects survival and fecundity of individuals and ultimately population persistence. Body size is negatively correlated with temperature in a number of marine organisms and many marine organisms experience important amounts of resource limitation at least in some critical part of their lives. In principle, food limitation should increase mismatches between metabolic demands and energy supply and so exacerbate the effect of high temperatures on body size. However, in organisms with complex life cycles, the nature of resource limitation can vary through ontogeny due to variations in physiology and habitat use. For instance in sessile organisms such as intertidal barnacles, food availability may limit growth during both larval and juvenile/adult lives, but space becomes a key resource during the benthic life. Thus, such organisms are good models to evaluate ontogenetic changes in the influence of resource supply and temperature on body size. This project therefore evaluates changes in body size occurring through adaptive plastic mechanisms or as the consequence of physiological constraints. This project has relevance in the context of climate change as it explore physiological and developmental mechanisms leading to changes in body size distribution of organisms as a consequence of warming.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

10. Factors which influence seasonally stratified Shelf Sea surface mixed layer depth

**Supervisor:** Dr Tom Rippeth  
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The surface of the ocean acts as a critical interface linking the atmosphere and the ocean, with sea surface values of temperature and pCO2 therefore key determinates of
the direction and magnitude of heat and carbon fluxes between the atmosphere and the ocean. A key parameter which helps determine the sea surface temperature and pCO2 is the depth of the surface mixed layer of the shelf seas. This parameter is poorly predicted using the current generation of numerical models.

The aim of this project is to improve the predictive capacity of shelf sea numerical models by improving the parameterisation of the vertical mixing processes determining the surface mixed layer depth.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

11. From glacial deposits to giant sediment waves: reconstructing sedimentary processes in the Irish Sea Basin after the retreat of the last British-Irish Ice Sheet

Supervisor: Dr Katrien Van Landeghem
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The Irish Sea was occupied by ice during the Last Glacial Maximum (LGM, 24 ka BP), leaving behind glacial sediments that have since been reworked by currents in the marine environment. The resulting complexity of the seabed is well preserved, with glacially carved trenches, ice-moulded drumlin fields, sand banks and unusually large sediment waves (reaching world-record-breaking heights of 36 m).

The PhD candidate will thus integrate marine geophysical (seismic and multibeam echosounder) and sediment granulometry with palaeo-hydrodynamic model outputs (generated by external third parties) to reconstruct the morphological and sedimentological history of the Irish Sea. The Irish Sea’s glacial legacy has various sedimentological and hydrodynamical components, and the aim is to understand the role of these various components in the subsequent evolution of the post-glacial seafloor.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
12. Growth performance of aquatic animals under culture

Supervisor: Dr Ian McCarthy
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Supervisor: Prof. Lewis Le Vay
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The demand for seafood as a high quality protein source is increasing with a growing global population. Seafood currently provides 3 billion people with 20% of their animal protein intake and per capita food fish intake is increasing. However, this demand cannot be met by increased capture fisheries production which has at around 90 million tonnes. It is clear that any future demand for seafood protein will be met through increased aquaculture production. Aquaculture production has risen in the last 3 decades (1980-2010) by almost 12 times, at an average annual rate of 8.8 per cent and currently stands at 64 million tonnes (2011) and is projected to overtake capture fisheries as the major source of food fish and a major contributor to food security. The School of Ocean Sciences has a long history of research into invertebrate and finfish aquaculture - both marine and freshwater, tropical and temperate, intensive and extensive production systems - and has expertise covering a wide range of research areas such as new species, developing/optimising culture techniques, diet development, feeding behaviour, growth performance, energetics, protein turnover, environmental impacts of aquaculture etc.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

13. How do waves interact with cohesive sea beds?

Supervisor: Dr Jaco Baas
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In the autumn of 2013, the international research project COHWAV investigated how waves interact with sea beds that contain mixtures of cohesive, “sticky” clay and cohesionless sand. Such beds are very common in nature, but surprisingly poorly studied and of fundamental importance for system-scale sediment transport modelling in the marine environment. This project was done on a near-field scale in a large wave facility at the University of Hull (“The Deep”). These laboratory experiments provided datasets that relate the properties of regular and irregular waves to the development of wave ripples on pure sand beds and on mixed sand- mud beds, using a state-of-art suite of instrumentation (e.g. acoustic bed profilers, ultrasonic velocity profilers, optical backscatter probes, and laser in-situ scattering and transmissometers). This PhD research project will have full access to the laboratory dataset with the aim to develop parameterisations that improve predictions of wave ripple growth and equilibrium size, as well as suspended sediment concentrations above these mixed-sediment bedforms.
The PhD student will work within an international research group, in which scientists from universities in France (Caen/Rouen), the Netherlands (Utrecht) and the UK (Bangor, Hull, NOC Liverpool, Southampton) combine their expertise to increase the understanding of wave-substrate interaction in general and wave-generated bedforms in particular. The student will have the opportunity to lead similar experiments, but on a smaller scale, in the School of Ocean Sciences at Bangor University. These experiments could be extended by investigating flow-bed interaction in combined waves and tidal currents.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

14. Hydrocarbon Reservoirs in Deep-Marine Sediments

Supervisor: Dr Jaco Baas
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Since the expansion of hydrocarbon exploration into the deep ocean (e.g. Gulf of Mexico, offshore West Africa, offshore Brazil) there has been an increased interest in the processes that transport sediment from terrestrial environments onto the continental margin, and in the architecture of large submarine fans in which this sediment is stored. Classical, simplistic models for the formation of turbidites and debris flow deposits have now been superseded by more realistic models that account for temporal and spatial variations in sediment gravity flow behaviour and for variations in the properties of sediment within these flows and within the underlying substrates (e.g. mixtures of cohesionless sand and cohesive mud). This is of fundamental importance in hydrocarbon reservoir analysis, because these models provide valuable information on the distribution of sand-prone and mud-prone lithofacies within deep-marine sedimentary sequences. In turn, this allows oil companies to make better predictions of the location of reservoir sands, source rocks, and baffles and barriers against the migration of hydrocarbons in sedimentary rocks.

This project combines laboratory studies and geological field studies to explore the dynamics and depositional products of sediment gravity flows that contain mixtures of cohesionless sand and cohesive clay. This is a research area that has seen rapid development and has prompted the interest of many oil companies, for example the companies that sponsor the work of the Turbidite Research Group (TRG Leeds), of which Dr Baas is an associate. Conceptual models of hybrid event beds (Haughton et al., 2009, Mar. Petrol. Geol.), transitional flow deposits (Baas et al. 2011, Sedimentology), and intrabed turbidites (Baas et al. 2014, Geology) will be tested in laboratory channels and in geological outcrops of deep-water basin sequences. This work builds upon several PhD and MSc projects in the past that have led to successful job applications in the hydrocarbon industry.
Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

15. Individual variation in behavioural or physiological performance

Supervisor: Dr Ian McCarthy
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Natural Selection operates on individuals but Science usually studies average responses. Although the value of understanding individual differences in performance was highlighted nearly 30 years ago by Bennett (1987), the common scientific approach has been to regard individual variation as 'noise' around some measurement of central tendency (e.g. mean, median) for the measured trait which is viewed as the more reliable / representative response. In fact, it is not uncommon to find that this average value does not actually exist within the group of individuals under study. In recent years the value of understanding the causes and consequence of inter-individual variation (IIV) in behavioural and physiological performance has been more widely recognised within the biological science community and is a growing area of research (e.g. Bell et al. 2009; Biro & Stamps, 2010; Réale et al., 2010; Careau & Garland, 2012). Consistent individual differences (CIDs) in physiology and behaviour drive individual fitness (i.e. survival and reproductive output) under variable environmental conditions and hence provide the framework through which natural selection can operate. Underlying this concept is the assumption that in order for selection to be able to operate, individuals will display repeatable levels of performance in fitness-related traits, i.e. they will maintain the same levels of performance and/or the same relative performance ranking over time compared to other individuals. This can result in selective mortality with surviving individuals exhibiting differential levels of performance in the pace of life continuum for that species in terms of growth, lifetime reproductive output and offspring quality.

The study of individual variation has been a central focus of my research activities since my PhD (1989-1992). This research has focussed on (1) describing individual variability in behavioural and physiological performance, e.g. differences in personality (aggression, feeding motivation), feeding behaviour, locomotor performance, metabolic rate and protein turnover, (2) quantifying repeatability/consistency of individual performance and (3) determining the ecological and life-history consequences of such variation. The aim of this project would be to develop a programme of research to investigate both intra-individual variation (i.e. repeatability/consistency of individual performance) and inter-individual variation (i.e. quantifying phenotypic variability within the population) for selected behavioural or physiological traits and to determine the life-history and fitness-related consequences of this observed variation.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

16. Late Holocene sea-levels and high magnitude storm events in NW Wales

**Supervisors:** Prof. James Scourse, Dr Dei Huws, Prof. Geoff Duller (IGES, Aberystwyth University). External Supervisor: Dr Charles Bristow (Birkbeck College, London). Case Partner: Countryside Council for Wales (Dr Rod Jones)

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Different generations of geophysical models of the response of the Earth's surface to isostatic loading and unloading by ice and water predict rather different responses in terms of relative sea-level change for the late Holocene in NW Wales. The models by Lambeck (1995,1996, unpublished) predict that relative sea-levels in the region have been below Ordnance Datum (OD) throughout the entire deglaciation and Holocene, whereas those by Peltier (e.g. 1994) predict a late Holocene highstand of up to + 2.5 m OD around 4000 cal years BP, falling to the present. These differences result from the ice load and mantle rheology terms used in the different models. Calibration of these models with observational geological data is therefore necessary in order to improve model descriptions of both ice loading and mantle rheology. Significant advances have been made in the last three years in producing a refined relative sea-level curve for NW Wales deriving from radiocarbon dating of multiple sea-level index points preserved in thick sequences of interbedded peats and estuarine sediments cored in the NE Menai Strait (Roberts et al., in press). Sea-level index points have been corrected for temporal changes in tidal amplitude through palaeotidal modelling output (Uehara et al., 2006). However, no reliable sea-level index points exist for the period between 4000 cal. years BP and the present, precisely the interval within which the Peltier model predicts a highstand; additional sea-level data are therefore required for this period. Pilot study data exist relating to coastal morphosedimentary sequences in western Anglesey and the mainland adjacent to the SW entrance to the Menai Strait (Morfa Dinlle) which can be interpreted either in terms of a late Holocene highstand or high magnitude storm events, or both. Pocket beaches and coastal embayments at Llandwyn Island and elsewhere on the west Anglesey coast are characterised by moribund vegetated boulder clay cliffs and vegetated backshore testifying to either a highstand or extreme storm events in the recent Holocene. Similarly, at Morfa Dinlle a sequence of gravel beach ridges above OD might relate to a highstand, storm events, or both (Jones, 1999).

The aim of this CASE Studentship will be to test the alternative hypotheses 1. that there was a Holocene sea-level highstand in NW Wales (Peltier hypothesis) or 2. that the
features can be explained in terms of erosion and deposition associated with extreme storm events without any highstand (Lambeck hypothesis). The data generated will also furnish evidence on the frequency of high magnitude storm events in NW Wales in the last few hundreds to thousands of years. The initial research phase will involve geomorphological mapping of the critical localities and survey by Leica 1200 GPS to define detailed elevations. This will be followed by geophysical survey to characterize sub-surface reflectors using ground penetrating radar (GPR). Sediment samples suitable for luminescence dating will be taken from open faces and in situ background radiation measured. The luminescence dates will constrain the chronology of the morphostratigraphic units. Given the time-consuming nature of luminescence dating, and the number of samples to be dated, we intend that in year 2 the student will undertake a significant component of the work in Aberystwyth; as such, this project falls within the Bangor–Aber Partnership and in particular the CCCR and C3W initiatives. Any materials suitable for radiocarbon dating will be measured via application to the NERC Radiocarbon Laboratory.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

17. Optimal exploitation of multiple marine renewable energy resources

Supervisor: Dr Simon Neil
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To reduce greenhouse gas emissions and aid sustainable development, there is an urgent need to support our electricity generating capacity through the development of low carbon technologies, particularly those generated from renewable sources. The ocean represents a vast and largely untapped energy resource, which could be exploited as a form of low carbon electricity generation. However, marine renewable energy is intermittent, from the semi-diurnal and lunar nature of tidal currents, through to the seasonal and inter-annual nature of wave energy. Therefore, if marine energy is to provide firm power generation to the electricity network, it will be necessary to optimise its development by prioritising sites which are complementary in phase with one-another over a variety of timescales. In this project, you will develop a state-of-the-art coupled high resolution wave-tide model of the northwest European shelf seas – a world-leading marine energy resource – and apply swarm optimisation algorithms to the model outputs to generate optimal roadmaps of marine renewable energy for the UK and Europe beyond 2020. You will examine the sensitivity of the optimised roadmaps to different levels of marine energy and grid infrastructure investment, and determine how the roadmaps will vary for different scenarios of sea-level rise and future changes in weather patterns. By prioritising sites for marine renewable energy investment, results from this project will inform policy on how best to ensure cost-effective investment in the electricity grid, particularly as many of the key wave and tidal energy sites are
remote from major demand in the southeast, and hence subject to significant transmission losses and potential blackouts.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

18. Plankton phenology in response to inter-year variations in the timing of seasonal cycles of primary production

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In marine temperate systems primary production cycles seasonally and are usually characterised by a main peak in spring. Recruitment of many organisms depends on key life history stages matching these peaks of production. However, the timing, breadth and magnitude of these peaks may change from year to year leading to variations in the level of match/mismatch between organisms and its food. This project will examine the interrelationships between seasonal patterns of distribution of zooplankton (e.g. copepods, larval stages of benthic crustaceans), primary producers (e.g. diatoms) physical conditions of the water column and weather conditions. This work will be based on five years of weekly samples collected by the School of Ocean Sciences, at the Menai Straits as well as in subsequent collections done during the project.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

19. Simulating tsunami generation, propagation and inundation using Smoothed Particle Hydrodynamics (SPH)

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A recent study from a Japanese government-appointed team of scientists has estimated that 90 towns and cities in Japan must now consider how to withstand a tsunami impact higher than 10 m, and 23 of these have been advised to prepare for a tsunami which exceeds 20 m (Cyranoski, 2012). However, in terms of balancing risk against cost, it is important to know how water elevations will vary within these populated areas. Models of tsunami propagation and inundation are based on shallow-water equations formulated on Eulerian grids, with simplifications used to estimate overland flow. Such grid-based methods cannot simulate the complexity of multiple free-surfaces and the
highly non-linear fluid dynamics of tsunamis which propagate far inland. For example, models of tsunami inundation cannot simulate two-phase fluid/sediment interaction, and such grid-based methods have difficulties in dealing with moving boundaries and sharp changes in topography (e.g. river channels and structures). With recent advances in high performance computing, one of the most exciting opportunities in the research field of fluid mechanics is the computationally expensive Lagrangian numerical method of Smoothed Particle Hydrodynamics (SPH). SPH was originally developed in the field of astrophysics, but its natural ability to capture large deformations and moving boundaries has led to its subsequent application to a wide range of fluid phenomena. In this project, SPH will be used to simulate tsunami generation, propagation and inundation, including coastal impact, overland bore propagation, two-phase fluid/sediment flow, and subsequent land drainage. This novel and exciting application of SPH to such a globally significant aspect of fluid dynamics has implications for risk reduction in tsunami hotspots.


Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

**20. The future of vulnerable deep-sea ecosystems in a changing climate**

**Supervisor:** Dr Andrew Davies

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Very little is known about organisms that are found in the deep sea. What is becoming clear is that they are under threat from climate change and anthropogenic impact, leading to calls for improved management of deep-sea habitats using tools such as networks of marine protected areas. However, at present, it is not possible to adopt such tools with any degree of confidence, because fundamental information on the distribution of many deep-sea organisms is lacking. Using state-of-the-art approaches, this studentship will develop comprehensive deep-sea climatology's that will be used to model suitable habitat for deep-sea ecosystem engineers. The proposed project represents an important step towards establishing the geographic distributions of these important organisms, predicting the influence of climate change on their distribution and determining how human impact extends over their habitat. This information will enhance our knowledge and facilitate effective international conservation and management of the deep sea.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

**21. The Impact of seasonal Arctic Sea ice loss on air-sea fluxes of heat and momentum**
PhD Opportunities

Supervisor: Dr Tom Rippeth
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This PhD project proposes to address the question of how sea-ice and its absence affects the transfer of heat and momentum between the atmosphere and Arctic Ocean, with a particular emphasis on the dynamics of the Arctic Ocean polar mixed-layer. This question will be addressed using a combination of field observations and simple one-dimensional numerical modelling. The field observations were taken along the Eurasian sector of the Arctic Ocean and comprise hydrographic and microstructure turbulence data collected by the Bangor group and collaborators in recent years. The modelling component will utilise the General Ocean Turbulence Model (GOTM) turbulence closure model to simulate the vertical mixing and turbulent dissipation generated by boundary shear stresses under both ice and open water.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

22. Tide-ocean circulation feedback in a warming climate

Supervisor: Dr Mattias Green
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The climate controlling meridional overturning circulation (MOC) is sustained, if not controlled, by a continuous input of mechanical energy from wind (via eddies and direct upwelling) and tides (via abyssal internal waves). Since the generation of internal waves are dependent on both the tidal amplitudes and the vertical stratification there is a potential for future climate change to subtly modify the strength of the MOC by changing the tides, with potential feedback effects on the stratification itself.

Here we want to evaluate this potential feedback by the use of an existing climate model (OSUVis) and an established tidal model (OTIS) with an internal wave drag parameterisation to estimate the changes in abyssal mixing due to the changes in stratification in combination with future sea-level rise (SLR). Further experiments will look at extreme situations, e.g., impacts of halving or doubling the tidal amplitudes and extreme SLR and global warming, to obtain a probable range of future effects.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
23. Understanding the transport of sand and mud in rivers and seas

Supervisor: Dr Jaco Baas
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Fine-grained cohesive sediment (clay, mud) is common in the natural environment, but it has not received as much attention as coarser-grained cohesionless sediment (sand, gravel). In fact, mixtures of sand and mud make up the vast majority of all sediment on Earth, but reliable models describing their dynamic behaviour in terms of erosion, transport and deposition are very rare. Such models are needed urgently to better predict the environmental impact of, for example, river floods, coastal floods, coastal erosion, siltation of harbours and navigation channels, and marine renewable energy schemes. The research project COHBED, in which 6 UK universities collaborate, has collected a large dataset on mixed cohesive sediment based on a unique combination of novel laboratory and field techniques. COHBED focuses on the development of sedimentary bedforms (dunes and ripples) in mixtures of sand and mud, but it also studies the biological processes that influence the movement of these sediments.

This PhD research project centres on the analysis of readily available, high-quality laboratory and field data, but there are also opportunities to collect new laboratory and field data. The student will benefit from the wide range of physical sedimentological and biological expertise within COHBED, including measurement techniques (e.g. Multibeam echo sounding, acoustic velocity profiling, acoustic suspended sediment concentration and size profiling, flock characterisation, and physical and biological sediment geotechnics). This project is well suited for students with a multidisciplinary interest that includes geophysics, sedimentology, microbiology and hydraulic engineering.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

24. Zooplankton faecal pellet characteristics and contribution to elemental fluxes on the shelf seas

Supervisor: Dr Stephanie Wilson
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This project is part of the larger CArbon/Nutrient DYnamics and FLuxes Of the Shelf System (CANDYFLOSS) program. CANDYFLOSS will ask the question: How do shelf seas contribute to the global removal of CO2 from the atmosphere and the storage of carbon and nutrients in the ocean interior? The continental shelf regions of the ocean are highly productive and with only 5% of the global ocean area, support up to 20% of the world’s primary production. This region therefore plays an important role in the global carbon cycle. Zooplankton also play an important role in the cycling of carbon and nutrients in the pelagic environment by feeding on phytoplankton and aggregates and packaging
them into faecal pellets which can be recycled in the water column by bacteria and other plankton or exported to depth. Zooplankton themselves are also sources of nutrition for higher trophic levels such as fish, whales, and seabirds.

The aim of this project is to look at the role zooplankton play in the global carbon cycle on the continental shelf. The role of the student will be to participate in approximately 4 research cruises in the Celtic Sea during 2014 to observe and record zooplankton faecal pellets within sediment trap samples from a marine snow catcher device as well as collect live zooplankton for incubation and enumeration experiments. The student will then quantify the potential POC flux of the major zooplankton species and calculate the contribution zooplankton make to POC flux in this region using both microscopy and image analysing techniques.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
PhD Opportunities

School of Psychology

Useful links:

School website: www.bangor.ac.uk/psychology
Research information: www.bangor.ac.uk/psychology/research
Academic staff: www.bangor.ac.uk/psychology/people/faculty-research

Research Groups:

Perception, Action and Memory: www.bangor.ac.uk/psychology/research/pam
Language, Bilingualism and Cognitive Development: www.bangor.ac.uk/psychology/research/lbcd
Social Neuroscience: www.bangor.ac.uk/psychology/research/social_neuroscience
Clinical, Health and Behavioural Psychology: www.bangor.ac.uk/psychology/research/chbp

www.bangor.ac.uk
1. **Asymmetries in sensorimotor control AND / OR Handedness: what’s the brain connection?**  
**Supervisor:** Dr David Carey  
**T: +44 (0) 1248 388700 / E: d.carey@bangor.ac.uk**

Asymmetries in sensorimotor control

Many studies have documented subtle and not so subtle differences in movements made by the dominant versus non-dominant hand, and/or into the right or left side of space. Projects in my lab could investigate these asymmetries, using techniques gleaned from cognitive psychology as well as paradigms from studies of sensorimotor control.


**Carey, D.P. & Otto-de Haart, E.G. (2001). Hemispatial differences in visually**

**Handedness: what’s the brain connection?**

Are left handers unusual? What is the relationship between handedness and the side of the brain dominant for speech? Are their attentional asymmetries that mirror those of speech in right handers and left handers? Projects in my lab often attempt to classify people using behavioural and sensorimotor techniques.


**Buckingham, G., Main, J.C., & Carey, D.P (2011) Asymmetries in motor attention during bimanual reaching: Left and right handers compared. Cortex, 47, 432-440.**

PhD Opportunities


Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

2. **Attentional and social effects of paralinguistic aspects of voice**
   Supervisor: [Dr Patricia Bestelmeyer](mailto:p.bestelmeyer@bangor.ac.uk)
   T: +44 (0) 1248 383488 / E: p.bestelmeyer@bangor.ac.uk

Dr. Bestelmeyer works on auditory perception and is most interested in the attentional and social effects of paralinguistic aspects of voice such as affect, attractiveness or different native English accents on listeners. She uses behavioural tests and fMRI to evaluate and refine voice perception models that try to explain how we can extract and react to the complex information carried by a person's voice.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

3. **Bangor Literacy Lab**
   Supervisor: [Dr Marketa Caravolas](mailto:m.caravolas@bangor.ac.uk)
   T: +44 (0) 1248 388566 / E: m.caravolas@bangor.ac.uk

Dr Caravolas's research interests include modeling early literacy development, reading and spelling processes in different languages, dyslexia in different languages, diagnosis of dyslexia in adulthood, and language and literacy interventions for struggling readers in bilingual education. Much of her research uses longitudinal and multi-(language)-group designs in studies seeking to uncover universals and language-specific factors in learning to read, spell and write. The interested student would undertake novel research in one of these areas, or, would contribute to existing literacy basic and applied research programmes.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
4. **Children’s health and wellbeing: How to inspire and empower children to eat healthy diets and be more active in their daily lives**  

**Supervisor:** Prof. Pauline Horne  
**T:** +44(0) 1248 382212 / E: p.j.horne@bangor.ac.uk

According to the World Health Organisation, child obesity has reached epidemic proportions worldwide and is the biggest public health challenge of the 21st century. To counteract the influences of obesogenic environments, powerful behaviour change interventions need to be delivered at scale to reverse the rising tide of obesity and its negative consequences for human health and wellbeing.

The Food Dudes Healthy Eating programme for 3-11 year old children in primary schools is based on the unique combination of 3 core learning principles [3 “R”s]: Repeated tasting incentivised by Role Modelling and Reinforcement. Over the past 25 years, our research group at Bangor has developed versions of the programme for roll out regionally (UK) and nationally (Eire), producing large and lasting increases in children’s consumption of fruit and vegetables, and displacement of foods high in fat and sugar from their diets. In more recent variants of the programme, maintenance of children’s healthy food choices has been further supported by environmental “nudges” (using the principles of “choice architecture”) in school lunch canteens.

Complementary to the Food Dudes Healthy Eating programme, Dynamic Dudes is a behavioural intervention to increase children’s daily physical activity. Currently under development, there is one version for the early years (3-4 year olds) and another for 5-11 year olds. Based on principles similar to those that underpin the Food Dudes programme, the Dynamic Dudes intervention also aims to increase intrinsic reinforcement for children’s physical activity through improvements in their physical literacy skills. Following successful pilot trials, we are now seeking funding to refine and trial both the early years and main primary school versions of this activity intervention.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

5. **Cognitive strategies and experiential factors that shape how we perceive and interact with others**  

**Supervisor:** Dr Emily Cross  
**T:** +44 (0) 1248 383274 / E: e.cross@bangor.ac.uk

Research with Dr. Cross in the Social Brain in Action Lab aims to delineate the cognitive strategies and experiential factors that shape the neural processes that link action with perception, and sculpt how we perceive and interact with other agents in social settings. Her team systematically examines these questions with paradigms that draw upon a
PhD Opportunities

diverse range of complex actions and stimuli, including dance, acrobatics, robotics, music and knot tying. The overarching objective of these studies is to evaluate how an observer's physical constraints or social expectations influence how they perceive and predict complex actions performed by human and non-human agents. This research incorporates expert populations, longitudinal training studies, computer animation, functional magnetic resonance imaging, transcranial magnetic stimulation and psychophysics to better understand how we perceive and interact with different agents and actions.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

6. Consumer Psychology: Brands, Retail, Emotions, Social Media, and that Jazz
Supervisor: Prof James Intriligator
T: +44 (0) 1248 383630 / E: j.intriligator@bangor.ac.uk

The field of "consumer psychology" sits at the intersection of psychology, marketing, and business. Research within this domain covers a huge range of topics such as: marketing, branding, advertising, behaviour-change, workplace issues, environmentalism. Bangor University is home to Europe's most renowned Masters programme in "Consumer Psychology and Business". Working on a range of theoretical and applied topics, Bangor Psychology staff work with both local companies and with some of the world's leading brands (such as Cadbury, Unilever, and Mars).

PhD research within Professor Intriligator’s lab covers all aspects of consumer psychology. Recent PhD students have examined such issues as: The use of digital signs in retail and the workplace, the influence of aromas in retail, digital devices and nature, behaviour change and energy usage, brand loyalty, emotion-based decision making, the impact of faces and other emotional stimuli in web pages, social media and marketing, etc.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
7. Coping with chronic disabling conditions: the interdependence of caregiver and patient beliefs in illness centrality and self-efficacy for coping

Supervisor: Prof Val Morrison
T: +44 (0) 1248 382485 / E: v.morrison@bangor.ac.uk

Research in health psychology has demonstrated the predictive utility of patient illness and treatment cognitions and expectancies in terms of a range of physical, functional, emotional and social outcomes. Drawing from self-regulatory and sociocognitive theory, existing research has predominantly treated patients and their family/friend caregivers as holding independent, rather than interdependent, beliefs and expectations. Too often also, research has ignored mediating processes of change in these illness and treatment-related cognitions, and the extent to which this change better explains outcomes such as mood, rehabilitation or medication adherence, physical and social functioning. Joining Val Morrison’s research group, any new PhD student would be required to address the dynamic nature of illness responses and their interacting effects on outcomes, with the unit of analysis being both the individual patient or caregiver, as well as the dyad. Working in collaboration with healthcare practitioners or the voluntary sector across a range of adult clinical populations including potentially those affected by a cancer, Multiple Sclerosis, stroke, arthritis, or surgical populations, empirical studies will likely address the concepts of illness centrality, illness representations, self-efficacy, and both proactive and reactive coping. There is the potential for mixed methods research i.e the use of quantitative and qualitative methods can combine to elicit useful data.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

8. Development of Functional Magnetic Resonance Spectroscopy (fMRS) - directly measuring neurotransmission

Supervisor: Dr Paul Mullins
T: +44 (0) 1248 383631 / E: p.mullins@bangor.ac.uk

My research is currently directed along two lines: 1) The study of neurotransmitters and their interplay in normal functioning and disease, and 2) cerebral blood flow and how it changes in response to external and internal stimuli. These two research strands overlap in several cases and I am also interested in studying the interplay between both.

To study neurotransmission I use magnetic resonance spectroscopy (MRS), and particularly the technique of functional magnetic resonance spectroscopy (fMRS), which allows us to measure neurotransmitter dynamics in real time. Members of my lab have shown that it is possible to measure dynamics of the excitatory neurotransmitter Glutamate with a temporal resolution of a few seconds, and that these measures can be
Some of the questions we hope to approach next are

1. What is the exact timing of the glutamatergic response function?
2. What is GABA’s role in repetition suppression in the LOC?
3. What about network recruitment/repetitionenhancement?

Recent work on cerebral blood flow in Hypoxia has revealed some interesting results regarding regions of the brain normally considered to be highly active at rest – the so called default mode network. Working with colleagues at the School of Sport health and Exercise Sciences we would like to extend these findings into other areas of metabolic stress and deficit – and further investigate how cerebral blood flow in these regions may be affected.

Projects in this area will introduce the students to MRI techniques for measuring cerebral blood flow (e.g Arterial spin labeling), physiologic measurements, behavioural testing and neural metabolism, as well as image analysis, experimental design, Matlab, FSL and SPM.

I expect my PhD students to be somewhat self-sufficient and very self-driven, having said that I would be very involved with these two particular projects and would provide the basic training required for the student to complete their thesis. In addition to the knowledge about the role of Glutamate and GABA in neurotransmission and neural processes underlying cognition, the PhD student on either of these projects would gain several employable skills: safe operation of an MRI scanner (Phillips 3T); experience in applying advanced imaging and spectroscopy techniques; instruction in MRI Physics, experimental design and image and spectroscopy analysis. I have several national and international collaborations, allowing the student to be exposed to research from other labs if desired. There would also be opportunities to be involved in teaching on the Masters in NeuroImaging program.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
9. Dissecting the functional organization of spatial working memory through behavioural and physiological measures in healthy and brain injured participants

Supervisor: Dr Giovanni d’Avossa
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Recent work in my lab suggests that spatial working memory relies on both local representations encoding the precise location of the elements in a visual scene as well as global representations of the scene configuration.

The existence of multiple representations for spatial working memory is in keeping with physiological data, which suggest that both lower and higher tiers of the visual cortical processing hierarchy are involved in spatial working memory, albeit in rather different ways. While the former brain regions show little or no sustained activity during maintenance of information in memory, the latter regions show instead sustained signals whose amplitude is modulated by the memory load.

Currently, we are investigating how these two levels of representation interact by examining the effects on spatial recall of visual landmarks, which are stable features of a visual environment, but whose location does not have to be remembered vs. items whose location has to be remembered. This and additional work is carried out in both healthy and brain injured participants using behavioural and physiological measures (BOLD and ERP). Overall the project provides an excellent opportunity, to those students interested in spatial cognition and its neuropsychology, to probe the organization of spatial representations in the brain.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

10. Dynamics of human learning and memory

Supervisor: Dr Stephan Boehm
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My research interests are human learning/memory and its dynamics, and I utilize both behavioural methods as well as event-related brain potentials. The overarching objective of the research is (1) to delineate the cognitive architecture and the neural underpinnings of human learning and memory and (2) to explore and describe the flexibility of how different forms of memory are invoked and how they interact. One major research focus is on advancing models of learning and memory describing the cognitive architecture of memory, in particular priming (for example for familiar faces and objects). The second research focus is on teasing apart contributions from different forms of memory co-occurring at the same point in time, investigating their interactions.
and evaluating the conditions under which these interactions occur. Examples of this research are the dissociation and interaction of implicit (non-declarative) and explicit (declarative) forms of memory like priming and episodic memory, the influence of semantic memory on priming, and the relationship of priming with perception and consciousness (awareness).

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

11. Electro-cortical correlates of intra-subject variability

Supervisor: Dr Christoph Klein
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Elevated intra-subject variability of reaction times (ISV), a measure of fluctuations in performance on cognitive tasks, is a promising behavioural endophenotype for several psychiatric conditions. It is associated with schizophrenia, bipolar disorder, frontal lobe injury, and attention-deficit/hyperactivity disorder. Such trial-to-trial variability in performance has been identified as a possible measure of neural noise, either generally or specifically as an index of catecholaminergically-mediated prefrontal noise, but may also reflect ultra-slow endogenous brain oscillations. ISV, of course, is always studied in the context of a particular task. Working memory is a domain of cognition which is theoretically important in both catecholaminergic transmission and ISV.

This PhD project will experimentally investigate the electro-cortical correlates of ISV employing PCA- or ICA-based single-trial analyses of event-related potentials (ERP) and EEG frequency bands of multi-channel EEG recordings. We will aim to study ISV in the context of tasks sensitive to pre-frontal cortex functioning such as working memory tasks or tests of executive functioning to test and experimentally dissociate rival models of ISV associating the phenomenon with neural noise, endogenous brain fluctuations as well as general versus specific properties of the brain. Potential extensions of the project may include the molecular-genetic underpinnings of ISV (e.g., through dopaminergic neurotransmission) and/or the investigation of increased ISV in specific psychiatric populations (ADHD or schizophrenia).


Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
12. Emotions and amnesia

**Supervisor:** Prof. Oliver Turnbull  
T: +44 (0) 1248 383670 / E: o.turnbull@bangor.ac.uk

Patients with profound anterograde amnesia (such as that following hippocampal damage) show preservation of emotion-related learning, across substantial periods of time (i.e. several weeks). There is a vast literature on episodic memory systems, and their (hippocampally-mediated) biological underpinnings. There has also been a substantial literature on other memory systems, such as semantic or procedural skills, that are *independent* of episodic memory. However, the role for *emotion*-based learning systems, the role of emotion-mediated memory, has been far less investigated.

The study will address the under-investigated issue of how emotions are modified in the patchy and distorted recall of amnesic patients. In particular, the study seeks to establish whether specific classes of emotion are (1) better recalled, (2) whether specific emotions prime each other, and (3) whether these patterns of memory error relate to pre-morbid personality. All of these issue bear on important emotion-related questions, especially on the relationship between emotions, and how these are developed and maintained throughout the life-span. The topic has substantial clinical implications – perhaps most obviously in relation to dementia.

*Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.*

13. Evaluating the effectiveness of various literacy and numeracy interventions

**Supervisor:** Dr Carl Hughes  
T: +44 (0) 1248 383278 / E: j.c.hughes@bangor.ac.uk

Many children and adults struggle to learn basic literacy and numeracy skills, which has a significant impact on their overall academic attainment, employability, and access to modern society.

We have been conducting a number of research projects in school across North Wales and beyond, to evaluate the effects of various literacy and numeracy interventions based on behavioural principles (including Direct Instruction, Precision Teaching, and Fluency-based instruction, and Internet based reading programmes).

Research opportunities in this area include; investigating approaches to reading and numeracy instruction for children in mainstream schools, as well as for children with various learning difficulties in special schools; investigating interventions to increase the basic skills of children and adolescents at risk of offending; investigating the use and
effects of internet-based reading programmes; and investigating teacher behaviours and educational contexts relevant to implementation and dissemination of effective practices.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

14. How to Tell the Brain What to Do: Influences of Verbal Commands on Sustained Concentration in Older Adults

Supervisor: Dr Paloma Mari-Beffa
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The main purpose of this research project is to study the way in which verbal instructions promote concentration on task goals. Being able to concentrate on a task (and avoid distraction) is fundamental to achieving our goals. The consequences of losing task control can range from minor slips of actions to devastating dysfunctional behaviour. Despite its central role in human adaptation to life, it is nevertheless one of the most vulnerable of all cognitive functions. Developmentally, such ability could be considered non-existent new born infants. Peak performance is achieved at about 20 years old shortly before it starts declining after 29 years of age. Later deterioration is variable but generally progressive, establishing it as the best predictor of cognitive dysfunction in older people. In this project we study mechanisms to boost this cognitive control in older people, therefore, our results can be critical to identify interventions to preserve cognitive functions in general. More specifically, it could be used to improve mental health and mental well-being later in life.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

15. Impact of mindfulness training on attention, emotion regulation and conceptual processing in the context of well-being across the life-span

Supervisor: Dr Dusana Dorjee
T: +44 (0) 1248 388842 / E: d.dorjee@bangor.ac.uk

My research investigates how mindfulness training modifies behavioural, physiological and neurocognitive processes relevant to well-being and development across the life-span. In this context, my current studies on mindfulness training in schools, mechanisms of mindfulness in healthy adults, and mindfulness in aging examine the impact of mindfulness training on cognitive control, emotion regulation, and conceptual processing relevant to well-being. I am particularly interested in possible preventive effects of mindfulness on mental and physical health. Potential Ph.D. projects on topics in this area would integrate behavioural, self-report and electrophysiological methods,
particularly event-related brain potentials (ERPs). More information about research conducted in my lab can be found at: http://mindfulbrain.bangor.ac.uk

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

16. Interdisciplinary approach to haptic perception and tool use

Supervisor: Dr Simon Watt
T: +44 (0) 1248 388252 / E: s.watt@bangor.ac.uk
Supervisor: Prof Paul Downing
T: +44 (0) 1248 382159 / E: p.downing@bangor.ac.uk

We use psychophysics and fMRI to investigate cross-modal integration, particularly in the visual / haptic domain. The overarching question behind the project concerns how the brain combines signals from different sensory modalities, considering that they are assembled from fundamentally different units. For example, in the case of size judgements, the modality-specific signals that specify an objects’ size in vision are not directly comparable to those specified by haptics. Yet we routinely use these signals together in everyday action – and psychophysical studies show we do this near-optimally.

We are using fMRI with advanced experimental designs in order to begin to understand the basis for this ability. E.g. what are the regions that compute haptic size; do they use a local or distributed code to do so; how do their responses depend on the particular effectors used? A particular focus of interest for the thesis could be around tool use, which presents further interesting problems for multisensory integration. This is because the mapping between visual and haptic inputs systematically varies depending on the type of tool used. A further puzzle is that people are often adept at switching between tools, apparently handling changes in visuo-motor mappings with relative ease. The basis for this ability is poorly understood.

The two supervisors offer a unique combination of world-leading expertise in psychophysics of cross-modal integration (Watt) and fMRI studies on body and action representations (Downing). The project would suit students from a variety of backgrounds and with a variety of career interests (e.g. basic neuroscience, robotics)

An MSc in Psychology, Neuroscience, Vision Science, or related disciplines is a requirement. Some programming skills e.g. in Matlab would be highly desirable.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
17. Reading fluency / Dyslexia / Bilingualism

Supervisor: Dr Manon Jones
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1. Developmental dyslexia affects approximately 10% of the population, and is a problem that persists into adulthood. Many adults with dyslexia adapt to their reading difficulty to some extent, but a problem in reading fluency persists. In recent years, research efforts have focused on the perceptual and cognitive factors that enable reading fluency in normally developing readers, and cause fluency deficits in dyslexia. However, we do not yet have a full understanding of the processes underpinning fluency in these groups.

The proposed study will use experimental methods to investigate the concept of ‘automaticity’ in reading fluency: the current assumption that slower reading involves slower access to and lower activation levels of lexical codes. The study will specifically seek to address the following aspects of dyslexia: 1) the evidence for impaired automaticity in text reading as opposed to impaired lexical inhibition, 2) the respective roles of visual and phonological processing in these deficits, and 3) qualitative differences in automaticity as a function of age.

2. Popular accounts of bilingualism claim that to have two languages is to “possess a second soul”. Recent findings from the burgeoning literature on linguistic relativity suggest that basic perceptual and cognitive processes can be influenced by the properties of different languages, but much less work has been conducted on language and its effect on higher order semantic conceptualizations such as opinion and belief.

The proposed study will use experimental methods to assess 1) the extent to which language of input affects processing effort and offline ratings of belief in response to culturally biased and non-culturally biased statements, 2) how this relationship is modulated by other factors, including emotional responses, degree of language proficiency in the L1 and L2 etc., 3) how ‘superficial’ characteristics of the input (accent, intonation etc.) can affect participant response.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

18. Social and cognitive neuroscience

Supervisor: Dr Richard Ramsey
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A highly-motivated and creative student with strong written and oral communication skills, and preferably experience with human neuroscience techniques (fMRI, TMS, EEG) is required for this position.
PhD Opportunities

The project is part of ongoing research in the Social Brain in Action Laboratory (SoBA Lab), which explores the cognitive and brain systems that underpin our ability to understand the actions and mental states of other people.

A key aim of the project will be to address novel questions in social neuroscience using a combination of behavioural measures (e.g., reaction times and error rates) and state-of-the-art functional brain imaging techniques (e.g., repetition suppression, multi-voxel pattern analysis and connectivity analysis). Using these methods, the successful candidate will be encouraged to develop a theme of research that examines how neural circuits in the human brain make sense of the dynamic and complex social information that we experience in everyday life. Example research topics include: action / person perception, observational learning, perspective taking, theory-of-mind and imitation. Applicants with research interests in other areas of social neuroscience are also strongly encouraged to apply.

The SoBA Lab is an international research group housed in the School of Psychology at Bangor University, which offers access to outstanding facilities for Social / Cognitive Neuroscience. For more details, see: www.soba-lab.com.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

19. Social perception and neurodevelopmental disorders

Supervisor: Dr Kami Koldewyn
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PhD students working in the Developmental Social Vision lab will explore several aspects of social perception - including face and body perception, biological motion perception, animacy perception and the perception of social interaction both across the lifespan and in neurodevelopmental disorders. Students will be encouraged to develop projects using behavioural and eye-tracking paradigms as well as both functional MRI and transcranial magnetic stimulation to examine the cognitive and brain systems that underpin our ability to perceive and understand other people and the interactions between them. Students will be encouraged to identify novel questions and design innovative studies in social perception as well as explore new ways of combining behavioural and brain data.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
20. Testing the Zero Control Theory  
**Supervisor:** Prof. Guillaume Thierry  
T: +44 (0) 1248 388348 / E: g.thierry@bangor.ac.uk

Fifteen years of research have led me to considering seriously the idea that there is no such thing as free choice and that the human brain makes decisions in a wholly deterministic fashion, based on a large number of unconscious and elaborate processes that escape conscious awareness. Conscious awareness of the self may thus be considered an emergent property of a highly complex biological system (our body and brain) interacting with a highly complex environment (the world around us). As an emergent property, conscious awareness would then have little do with deciding what we do and how we do it. Freedom of choice (often referred to as ‘free will’) would then be mere illusion: We would become aware of a decision when it has already been made by the unconscious and, in the process of becoming aware, we would be led to believe that we made the decision, but never did.

My new research programme will aim to test this staggering hypothesis which I propose to call the Zero Control Theory by

1. investigating random generation in humans (i.e., testing whether random generation is actually possible);

2. tracking down the fate of information (verbal or nonverbal) that has been inadvertently processed by the brain and seeing how such information can guide future decision-making;

3. exploring the concept of decision priming (i.e., determine whether a mandatory or seemingly free/optional decision has a differential priming effect on an upcoming decision made shortly thereafter);

This research will seek to build of a bridge between Cognitive Neuroscience, Psychology and Philosophy of life.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

21. The Centre for evidence Based Early Intervention School of Psychology  
**Supervisor:** Prof Judy M Hutchings  
T: +44 (0) 1248 383625 / E: j.hutchings@bangor.ac.uk

The Centre for evidence Based Early Intervention School of Psychology currently has four PhD students supervised by Professor Hutchings

www.bangor.ac.uk
1. Evaluation of the one-to-one Enhancing Parenting Skills parenting programme. This RCT project is evaluating a parenting programme developed by Prof Hutchings and delivered by Health Visitors to high-risk pre-school children. The intervention comprises three stages, assessment, case analysis and intervention based on principles derived from applied behavioural analysis. This PhD is funded for three years from 1st January 2014 and is funded by a former Bangor student.

2. Development of a web based parenting programme that teachers core behavioural principles and is based on Prof Hutchings Little Parent Handbook. The content was developed in the 1990s as part of a larger RCT of a CAMHS based intervention for parents of children with conduct disorder. This PhD, also part funded by the former Bangor student and part funded by the Children’s Early Intervention Trust Charity and is funded from July 2014 – June 2017.

3. One funded PhD student is evaluating the Finnish school based KiVa bullying prevention programme that has both whole school and targeted components and aims to influence the behavior of bystanders. Following from a Master's thesis with a pilot group of schools this thesis is looking at the impact of broader role out of this programme across schools in Wales and is funded from October 2013 – September 2016, partly by the BIG Lottery and partly by the Children’s Early Intervention Trust charity.

4. A newly funded KESS PhD scholarship is reviewing the training and support needs of foster carers and will be evaluating interventions to support them. This funding commenced in December 2015 and will be completed in November 2018. A number of behaviourally based training options are being reviewed including web-based, one to one and group based programmes.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

22. The human face as a biomarker of social traits  
Supervisor: Prof. Rob Ward  
T: +44 (0) 1248 383601 / E: r.ward@bangor.ac.uk

I am interested in evolutionary perspectives on human behaviour. Much of this work investigates to what extent the human face is a reliable signal for a person's social traits. We find that many aspects of personality can be accurately identified solely from neutral face images. That is, to some extent, people with similar looking-faces behave in similar ways (Jones, Kramer, & Ward 2012). Although trait identification can be surprisingly accurate, it can also be misleading and produce potential social harm (Scott, Jones, Kramer, & Ward, 2013).
We hypothesise is that at least some of the correlation we find between appearance and behaviour is driven by the influence of sex hormones on morphological and behavioural development. Further, the visual effect of these hormonal signals may be part of an evolved signal system for nonverbal communication (Kramer, King, and Ward, 2011). There is much here to understand; however, cross-cultural investigations of face characteristics, their associated social traits, and the ability to perceive and understand these signals, will be crucial for testing our hypotheses.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

23. The left bias in perceived light source  
**Supervisor:** Dr Ayelet Sapir  
T: +44 (0) 1248 388734 / E: a.sapir@bangor.ac.uk

When we interpret a shaded picture as a three-dimensional scene, our visual system uses various depth cues. One such cue is shading, which can make a two-dimensional shaded circle look like a three-dimensional convex bump or concave cavity, depending on where the light source is presumed to be. Often the position of the light is unknown and we need to guess it in order to resolve a convex-concave ambiguity. Initially, psychologists have suggested that the visual system assumes that light comes from above and argued that this assumption is ecologically justified because our everyday light source (the sun) is overhead. Later on, it was found that people’s preferred lighting direction is not directly overhead, but rather shifted to the left. This is intriguing because the sun is not to the left any more than it is to the right; therefore there must be another factor contributing to this light source assumption. In previous experiments in our lab we found that the left bias is related to innate hemispheric lateralization, but it can be altered by lifetime experience. The aim of the present proposed study is to further explore why people assume the light source is coming from the left. We will test different populations, from children to older adults, and may use imaging techniques to explore the neural correlates of the left bias in assumed light source.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

24. The neuroscience of human hand function  
**Supervisor:** Dr Ken Valyear  
T: +44 (0) 1248 382623 / E: k.valyear@bangor.ac.uk

The purpose of the research in my lab is to better understand the brain-behavioural relationships that underlie human hand function. We focus our attention on manual behaviours that are essential for human activities of daily living, such as grasping and tool use. While our research primarily serves the advancement of basic science, we
believe that a better understanding of how the brain controls the hand will promote new and improved, evidence-based rehabilitation interventions for individuals with movement problems. Several overlapping lines of research are ongoing, including work on action selection and performance, tool use, and the effects of injuries to the peripheral nervous system on the functional organization of the central nervous system. New PhD candidates will lead a novel research project in one of these areas, typically involving a combination of behavioural, functional MRI, and neuromodulatory methods (i.e. transcranial magnetic stimulation; transcranial direct current stimulation). There may also be opportunities for testing special-case patients, and to interface the research with specific clinical populations (e.g., stroke survivors) for the purpose of promoting rehabilitation. The student will have opportunities to develop and steer the work according to their own interests.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

25. The orthographic lexicon and sound-spelling translation in bilinguals

Supervisor: Dr George Houghton
T: +44 (0) 1248 382692 / E: g.houghton@bangor.ac.uk

Supervisor: Dr Marie-Josephe Tainturier
T: +44 (0) 1248 382714 / E: m.j.tainturier@bangor.ac.uk

This project will develop and test models of the organization of the orthopaedic (reading and spelling) lexicon and the process of sound-spelling (and spelling-sound) translation in fluent Welsh-English bilinguals. The central question is how the brain simultaneously represents two different orthographic systems which partially overlap. Both the experimental and modelling work will be developed from the ongoing research of the supervisors. The project would particularly suit a candidate with some knowledge of computer programming who wishes to develop skills in computational cognitive modeling.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

26. Understanding key learning processes and their application to support health and wellbeing in typically developing children and special populations

Supervisor: Dr. Mihela Erjavec
T: +44 (0) 1248 383107 / E: m.erjavec@bangor.ac.uk

I am interested in determinants of early learning, development of imitation and language, and social context and interactions that contribute to these processes.
supervise postgraduate research projects that improve our understanding of these processes and their interactions. This research is conducted under carefully controlled conditions in our excellent facilities at the University Nursery and Childcare Centre, Tir Na n’Og, and in local nurseries and schools (see http://playlab.bangor.ac.uk).

My second research stream involves applications of this knowledge in behaviour change interventions that can optimise outcomes for children of all levels of ability. Variables of interest include healthy eating and exercise; improving the choice architecture of school environments; offering tangible incentives for making healthy choices; gamification; the use of media and online tools; and new technologies that can promote behaviour change (see http://caer.bangor.ac.uk).

Finally, I am interested in improving the effectiveness of child health and wellbeing interventions and in applying them in other cultural contexts; across a variety of ages and abilities; nationally and internationally.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

27. Vocabulary optimization in human language production
Supervisor: Dr Gary Oppenheim
T: +44 (0) 1248 388838 / E: g.m.oppenheim@bangor.ac.uk

The average adult speaker knows around 40,000 words, but is able to find a single appropriate word in less than a second, often speaking at a rate of 2-3 words per second in normal conversation. The Language Production Lab (http://bangor.ac.uk/~pss238/lab) uses human language production as a tool to understand how the mind works, and one of our current lines of work focuses the idea that speakers are constantly reshaping their vocabularies to enable such fluent production. We have developed a computational model of speech production implements such a learning algorithm, so our current efforts focus on extending and refining the model, and collecting new behavioural data to test both the core ideas behind the model and its implementational details. The successful candidate will be encouraged to develop novel (related) questions and explore innovative ways of combining computational models and behavioural data to uncover how our minds support successful language use.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
Useful links:

School website: www.bangor.ac.uk/so/
Research information: http://www.bangor.ac.uk/so/research/index.php.en
Academic staff: http://www.bangor.ac.uk/so/staff/index.php.en

Specialisations:

Health, Social Care, Welfare and Wellbeing with specialisations in:

- Ageing and later life
- Mental health and psychiatry
- Health inequalities
- Housing and social exclusion
- Health and the citizen consumer
- Lifestyles in consumer society

Community, Cultures, Language and Identities with specialisations in:

- The shaping of European identities
- Local food cultures
- Civil society in Wales
- The use of technological aids in coping with medical conditions and emergencies
- Cultural changes in post-Soviet societies
- The impact of migration on rural Wales
- Welsh language socialization in the family
- Use of national identity categories in television news
- Comparative study of the university as an interactional accomplishment
- The negotiation of ethnic identities
Crime, Criminal Justice and Society with specialisations in:

- Support for the police
- Political violence and terrorism
- Media and public opinion
- Begging in North Africa and South Asia
- Popular legal culture
- Violence in intimate relationships
- Rural criminology
- Postcolonial societies, crime and deviance
- Theoretical criminology
- Criminal justice systems
- Lay participation in the administration of justice

Research Centres and Units

Wales Kidney Research Unit:
WKRU aims to deliver an All-Wales strategy for the study of diagnosis, prevention, treatment and social context of kidney disease.

National Centre for Population Health and Wellbeing Research (NCPHWR), an all Wales Research Centre:
kidneyresearchunit.wales/

Centre for Mental Health and Society (CFMHAS):
www.cfmhas.org.uk/

Wales Institute of Social & Economic Research, Data & Methods (WISERD):
www.bangor.ac.uk/so/research/WISERD/wiserd.php.en
1. **Citizen experience with legal institutions**  
**Supervisor:** Professor Stefan Machura  
**T:** +44 (0) 1248 382214/ **E:** s.machura@bangor.ac.uk

People may form their opinion on legal institutions, officials and policies based on a plethora of sources. Empirical research and social science theory help in understanding the complexities involved. It is known that personal experience, family and friends, education and media may form individual views. The support for a key policy, or for a very prominent leader, but also criticism based on negative outcomes received, can affect levels of trust and legitimacy attributed to institutions. As an example, see: Dalton, Ian, Jones, Victoria M.L, Machura, Stefan, Ngaihte, Henry, Norton, Thomas P., and Pritchard, Maria (2009), Speeding, the Chief Constable and Trust in North Wales Police. Papers from the British Criminology Conference, 9, 92-110 [open access journal], or Machura, Stefan, Thomas Love and Adam Dwight (2014). Law Students’ Trust in the Courts and the Police. *International Journal of Law, Crime and Justice*, 42, 287-305.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

2. **Ethnic majorities and the nation in comparative perspective**  
**Supervisor:** Dr Robin Mann  
**T:** +44 (0) 1248 382232/ **E:** r.mann@bangor.ac.uk

There is an increasing call for sociological studies of national identities which can go beyond a 'single country' focus. The danger is of believing that what we observe about national identity, say in Britain, is universally or generally true as opposed to a product of place- and history-specific factors. At the same time there are identifiable similarities and differences in regimes of democracy, citizenship and state formation which make comparative analyses possible. The availability of cross-national and international data sets, both quantitative and qualitative, also provides new opportunities for comparative analysis. The aim of this project would be to develop comparative empirical approaches to the study of ethnic majorities and national identity within established liberal democracies, particular those which focus on the national attachments and sentiments of ordinary citizens. Why is it that, across a range of liberal democracies, the nation has come to be seen as in crisis? Can similarly global influences and local responses be identified? The project is open in terms of its empirical and methodological focus, but could involve comparisons of contemporary identity formations across parts of Europe; or parts of the English speaking world such as between Britain, Australia, Canada and New Zealand. The project is related to Dr Mann’s ongoing research on national identity, ethnic majority and resentment.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
3. Lay participation in the administration of justice
Supervisor: Dr Stefan Machura
T: +44 (0) 1248 382214 / E: s.machura@bangor.ac.uk

Most legal systems employ citizens as judges, either in mixed courts with professional judges, in juries, as single lay decision-maker (or mediator), or in a group of lay judges. They deal with a variety of legal cases, administrative, criminal and civil cases. Occasionally, lay participation is considered a defining element of the legal and political culture. Only in some countries, there is a strong tradition of social science research whereas there is little literature for many countries and on many dimensions of the topic. Applications are welcome which combine empirical and theoretical work, taking into consideration the prevailing legal culture and local practice. As an example of the kind of research expected, see: Machura, Stefan (2007). Lay Assessors of German Administrative Courts: Fairness, Power Distance Orientation and Deliberation Activity. Journal of Empirical Legal Studies, 4, 331-362. Or: Machura, Stefan, and Litvinova, Olga (2007). Lay Judges in Rostov Province. In Feldbrugge, Ferdinand (ed.), Russia, Europe, and the Rule of Law, Leiden: Martinus Nijhoff Publishers, pp. 109-127.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

4. Local forms of civil society in societies in transition
Supervisor: Prof. Howard Davis and Dr Robin Mann
T: +44 (0) 1248 382123/ E: h.h.davis@bangor.ac.uk

The concept of civil society has emerged in the early 21st century as a contested term but one that broadly signifies a realm of dialogue and human relations that is connected to, but separate from, the state, markets and private life. An important gap in our knowledge is the impact of social change on local forms of civil society and civil society organisations and what this means for social cohesion and well-being. It is of particular interest to know how civil society is developing in the context of rapid modernization, the aftermath of conflicts, or where individuals are confronted by economic crisis, institutional turbulence and growing inequality. The project will explore how individuals, communities, and civil society organisations respond to these forces. It is particularly well suited to empirical research on civic participation in society at local and regional levels in contexts of rapid development, nation-building, devolved government and new political regimes. The project is open to mixed, comparative and multi-method sociological research. The project is related to current research on civic participation in Wales in WISERD, the Wales Institute of Social & Economic Research, Data & Methods http://www.wiserd.ac.uk/

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
5. **Media representations of law, legal institutions and legal personnel**  
**Supervisor:** Professor Stefan Machura  
**T:** +44 (0) 1248 382214/ **E:** s.machura@bangor.ac.uk

In our age, people tend to be informed by TV, film and other media which 'cultivate' their views (George Gerbner). But media theory also takes into account purposeful choices made by the audience and the mix which results from personal experience, media, education and other sources. What people think about the courts, lawyers, the police and other legal institutions makes no exception. Based on careful analysis of media content and awareness of applicable social science theory, empirical research may deepen our understanding of what goes on. Prospective students might want to see the following publications for examples of current research: Machura, Stefan, and Kammertöns, Annette (2010). Deterred From Going to Court? A Survey at German Schools on Media Influences. Entertainment and Sports Law Journal, 8(2) [open access journal]. Or, as a content analysis: Machura, Stefan, and Llewelyn Davies (2013). 'Law is an Odd Thing' – Liberalism and Law in the TV-series 'The Good Wife'. Kriminologisches Journal, 45:279-294.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

6. **New speakers' use of minority languages post education**  
**Supervisor:** Dr Rhian Sian Hodges  
**T:** +44 (0) 1248 382758/ **E:** r.s.hodges@bangor.ac.uk

Minority language education is a key language revitalisation strategy worldwide. Education drives the language policy and language planning agenda for governments on a global scale. However, a key concern and paradox emerges in the field of language planning worldwide which is the difference between language ability and language use. Not all minority language speakers choose to use their language as part of their daily lives. Education systems worldwide create 'new' minority languages speakers who possess a full spectrum of language competence skills but do not necessarily use their language daily for a number of complex reasons. The aim of this research project is to analyse and interpret the motivations and language use of 'new' minority speakers beyond the education system. How do minority language speakers define themselves in terms of language hierarchy, language ownership, language legitimacy and power relationships? This research aims to provide an in-depth analysis of 'new' minority speakers and assess the usefulness of minority language education as a key language revitalisation strategy.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
7. **Perceptions of crime and criminal justice; policing and penal policy**  
*Supervisor: Dr Martina Feilzer*  
T: +44 (0) 1248 388171/ E: m.feilzer@bangor.ac.uk

PhD topics in any area of policing and penal policy are welcome but I would particularly invite proposals on specific aspects of perceptions of crime and criminal justice. I am particularly interested in the relationship between the public and criminal justice at local, national, and international level; the relationship between the media and public opinion of criminal justice, as well as human rights; developments in penal policy, in particular in the area of probation and prisons; and comparative and historical research in criminal justice. In terms of research methods, my focus is on the development of mixed methods research and the secondary analysis and visualisation of existing datasets.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

8. **Social Theory**  
*Supervisor: Dr Marcel Stoetzler*  
T: +44 (0) 1248 382758/ E: m.stoetzler@bangor.ac.uk

PhD projects in any area of social theory are welcome. I am particularly interested in comparative and historical studies of social and sociological theory, which would often involve examining how different theoretical traditions relate the concepts of society, individual, state, culture, economy to each other. Questions of identity and agency will often be central, as well as the role of social movements in the changing dynamics of modern history and society.

PhD projects in any area of race, gender, nation and ethnicity studies are also welcome. I am interested in theoretical projects as well as theoretically informed empirical studies especially of the interrelations of these categories (and others) as in 'intersectionality' theory or the various traditions of Marxist and Critical Theory.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

9. **Sociologies of Everyday Life/The Interaction Order**  
*Supervisor: Dr Roger Slack*  
T: +44 (0) 1248 383888/ E: r.slack@bangor.ac.uk

PhD projects in the areas of social interaction are welcome. I am interested in ethnomethodology, conversation analysis, symbolic interactionism. Particular interests in advice giving in medical settings, the use of new technology in interaction analysis,
computer supported co-operative work (CSCW), workplace studies, and reflexivity in ethnomethodology. I also have interests in the philosophy of social science (especially Wittgenstein, Ryle, and Austin) and visual sociology.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
PhD Opportunities

Schools of Sports, Health and Exercise Science

Useful links:

School website: www.bangor.ac.uk/sport/
Research information: http://www.bangor.ac.uk/sport/research/.php.en
Academic staff: http://www.bangor.ac.uk/sport/staff/.php.en

Specialisations:

Psychology of High level Performance, with specialisations in:
- Personality
- Risk taking
- Mental resilience
- Stress and Anxiety
- Psychological skills
- Leadership
- Attention
- Skill Acquisition
- Motor Control and Learning
- Sensorimotor processes and emotion
- Psychophysiology of performance

Human performance and health in 'extreme' environments and conditions, with specialisations in:
- Thermal stress
- High altitude physiology
- Dehydration and markers of hydration status
- Energy restriction
- Sleep deprivation
- Immune response to exercise
Health, Exercise and Rehabilitation, with specialisations in:

- Exercise rehabilitation for arthritic conditions
- Influence of nutrition and exercise on metabolism and endocrine regulation
- Obesity and diabetes
- Motivation and self-regulation with respect to exercise and other health behaviours
- Role of implicit cognition in exercise and eating behaviours
- Causes and treatments of muscle wasting associated with chronic disease
- Exercise rehabilitation for rheumatic, kidney & cardiac diseases
- Cardiovascular physiology in health and disease
PhD Opportunities

1. **Assessments of endothelial function in patient populations**
   **Supervisor:** Dr Aamer Sandoo
   T: +44 (0) 1248 383486 / E: a.sandoo@bangor.ac.uk

   Dr Aamer Sandoo is a cardiovascular physiologist specialising in clinical research involving patients with autoimmune disease, breast cancer and cardiovascular disease. Aamer has considerable expertise in several non-invasive assessments of vascular function and morphology in the microvessels (laser Doppler imaging with iontophoresis) and the large vessels (pulse wave analysis, flow-mediated dilatation and carotid artery intima-media thickness using ultrasound) and has extensively utilised these techniques in clinical populations. Aamer is always looking for determined, motivated individuals with a strong interest in cardiovascular physiology/pathology and who enjoy working with clinical populations in order to help with research projects as part of self-funded MRes or PhD programs. To be eligible for consideration for such opportunities, students must have achieved a First Class or Upper Second Class Honours in exercise physiology, clinical physiology or other relevant health science degrees or possess a Masters in these subjects and be able to pay their own tuition fees. If you are an international student, you must be able to demonstrate proficiency in written and spoken English and this must exceed common English language test thresholds. If you would be interested in this opportunity then please email Aamer directly.

   Google Scholar: [https://scholar.google.co.uk/citations?user=5lRCnz4AAAAJ&hl=en](https://scholar.google.co.uk/citations?user=5lRCnz4AAAAJ&hl=en)

   Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

2. **Cardiovascular control mechanisms in health and disease**
   **Supervisor:** Dr Jonathan Moore
   T: +44 (0) 1248 383645 / E: j.p.moore@bangor.ac.uk

   My research focuses on investigating cardiovascular control mechanisms in health and disease. My main contributions have addressed: reflexes from the heart and lungs; the effects of lifelong hypoxia and hypocapnia on cardiovascular control; and, the effect of hypoxia on microvascular reactivity.

   Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
3. **Chronic disease and muscle mass**  
**Supervisor:** [Prof. Andrew Lemmey](mailto:a.b.lemmey@bangor.ac.uk)  
**T:** +44 (0) 1248 383932 / **E:** [a.b.lemmey@bangor.ac.uk](mailto:a.b.lemmey@bangor.ac.uk)

Prof Andrew Lemmey has long-standing research links with the local NHS (primarily the Rheumatology, Renal, and Orthopaedic Departments). The work of his group focuses on the effects that chronic diseases such as rheumatoid arthritis (RA), osteoarthritis and chronic renal failure (CRF) have on body composition (i.e. muscle wasting and increased fatness); in turn, how these adverse changes in body composition affect physical function and the ability to perform daily tasks; and finally, the efficacy of different strategies for restoring muscle and reducing fat (e.g. exercise, anabolic steroids, disease-modifying drugs, nutrition). The research findings of this group, in relation to the beneficial effects exercise has on patients with RA and CRF, have changed the treatment offered by Health Boards in Wales and England. Prof Lemmey's international standing regarding exercise for arthritis is evident in his authorship of the *Arthritis* chapters in the world’s leading clinical exercise physiology texts: *Clinical Exercise Physiology*, 3rd edition (Human Kinetics) and the upcoming edition of the American College of Sports Medicine text, *ACSM’s Guidelines for Exercise Testing and Prescription*, 10th edition (Lippincott, Williams & Wilkins).

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

4. **Effects of nutrition and environmental stress**  
**Supervisor:** [Dr Samuel Oliver](mailto:s.j.oliver@bangor.ac.uk)  
**T:** +44 (0) 1248 383965 / **E:** [s.j.oliver@bangor.ac.uk](mailto:s.j.oliver@bangor.ac.uk)

Dr Samuel Oliver is Deputy Head of School (Impact) in the School of Sport, Health and Exercise Sciences and a founder member of the Extremes Research Group. Sam has published extensively on the topic of exercise and environmental physiology. Sam’s research interest is examining the interaction of exercise or environmental stress (e.g. altitude, heat, cold, dehydration, nutrient restriction and sleep loss) on human performance and health. To date, Sam has supervised 5 PhD students including international students. This research is conducted in our state-of-the-art environmental chambers or the great outdoors. Indeed, we have just returned from a multinational medical research expedition to the Himalayas. For more information about current and previous research projects please visit the Extremes Research Group website ([http://extremes.bangor.ac.uk](http://extremes.bangor.ac.uk)).

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
5. **Examining the psychology of high level performance**  
**Supervisor:** [Dr Stuart Beattie](mailto:s.j.beattie@bangor.ac.uk)  
T: +44 (0) 1248 383963 / E: s.j.beattie@bangor.ac.uk

Topics include: Mental Toughness and resilient behaviours and personality; self-confidence/efficacy performance relationships; anxiety, psychophysiological and performance relationships; performance catastrophes; self-discrepancies in self-report inventories; goal setting, goal importance and self-efficacy relationships. Research projects are available in the following fields:

- Using personality theories in explaining mentally tough behaviours
- Examining the within and between subject effects of the self-efficacy and performance relationship
- Examining moderators to the within and between person effect in the self-efficacy and performance relationship
- Examining personality characteristics as a predictor of psychophysiological responses to
- Performance catastrophes within an engagement/disengagement framework

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

6. **Exercise immunology; Performance physiology in 'extreme' conditions**  
**Supervisor:** [Prof Neil Walsh](mailto:n.walsh@bangor.ac.uk)  
T: +44 (0) 1248 383480/ E: n.walsh@bangor.ac.uk

Neil is currently Director of the Extremes Research Group [http://extremes.bangor.ac.uk](http://extremes.bangor.ac.uk). He is the Physiology Editor for the Journal of Sports Sciences, is a BASES accredited researcher in Physiology and contributes as a guest writer for Runners’ World. Neil has published many journal articles, is a co-author of a textbook in *Exercise Immunology* (2013) and led a position statement with the world’s leaders on this topic for the journal, *Exercise Immunology Review*. Neil’s team has recently developed a novel skin patch test to assess immune function in laboratory, clinical and field settings. He has also published landmark papers showing that saliva (2004) and now tear fluid (2011) can be used to identify hydration status. Neil’s very recent work, funded by the MOD, UK, has shown the benefits of preventing nutritional deficits in soldiers under heavy training for both immune health and exercise performance. Neil is interested in hearing from potential PhD students in the topics outlined herewith.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
7. **Health and Performance in 'Extreme' Conditions**  
   **Supervisor:** [Extremes Research Group](http://www.bangor.ac.uk)  
   
   The Extremes Research Group takes a multi-disciplinary approach to understanding human performance and health in 'extreme' natural and artificial environments and conditions. The group’s research foci are on human responses and adaptations to a range of stressors including: thermal, altitude, dehydration, energy restriction, sleep deprivation, psychological, and prolonged exercise. Previous research conducted by the group has utilised both laboratory and field environments to study human responses and adaptations to a range of stressors. Typically research has investigated underlying mechanisms and novel methods to optimise human performance and health. These research findings have been implemented by organisations including the Ministry of Defence (Army) and Medical Expeditions. Students interested in these are encouraged to view the group’s website and contact a member of the group.  
   
   Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

8. **Health, Exercise, and Rehabilitation**  
   **Supervisor:** Health, Exercise and Rehabilitation Group  
   
   The Health, Exercise, and Rehabilitation Group is a multidisciplinary group of researchers concerned with the influence of exercise and nutrition on life-long wellbeing and health. The group has strong links with clinical practitioners addressing chronic disease and obesity. Areas of research include the physiological and psychological factors that influence eating behaviours and associated diseases such as obesity and diabetes. For example, the group is investigating the influence of nutrition and exercise on metabolism and endocrine regulation, as well as the roles that motivation and implicit cognitive processes play in eating and exercise behaviours. The group’s research on rheumatic, kidney and cardiac diseases has been instrumental in the development of rehabilitation approaches that diminish disability in chronic disease. Related research topics include exercise rehabilitation; causes and treatments for muscle loss in chronic disease; and cardiovascular physiology in health and disease. Interested students are encouraged to view the group's website for more information and contact details.

   Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

9. **Influence of nutrition and exercise on metabolism and endocrine regulation**  
   **Supervisor:** Dr Hans-Peter Kubis  
   T: +44 (0) 1248 388261 / E: h.kubis@bangor.ac.uk
The body metabolism responds to stressors like exercise or certain nutrients (e.g. high sugar intake) with short and long term adaptations. These adaptations can be health promoting (increased fitness), or deleterious for health as in the case of obesity and type 2 diabetes. My group is investigating the mechanisms of skeletal muscle adaptation to various nutritional factors and exercise. Moreover, we investigate how eating behaviour is regulated in response to exercise on endocrine and perceptual levels. Additionally, we are working on the development of weight loss programs for overweight / obese people and investigating obesity related morbidities like obstructive sleep apnoea in collaboration with Ysbyty Gwynedd hospital. PhD applicants are welcome to excel in all fields of interest.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

10. Motivation and implicit cognitive processes in exercise and health behaviours
Supervisor: Dr David Markland
T: +44 (0) 1248 383487 / E: d.a.markland@bangor.ac.uk

Research projects may be available in the following areas: motivation and self-regulation, and in particular the application of self-determination theory to exercise and other health behaviours; the role of implicit cognition in exercise and eating behaviours.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

11. Motor Control and Learning / Skill Acquisition
Supervisor: Dr Vicky Gottwald
T: +44 (0) 1248 382824 / E: v.m.gottwald@bangor.ac.uk

General topics of interest: effects of an internal versus external focus of attention on performance; anxious performance; movement planning and control under optimal and sub-optimal performance.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

12. Motor control and the attainment of expertise
Supervisor: Gavin Lawrence
T: +44 (0) 1248 388283/ E: g.p.lawrence@bangor.ac.uk

My research encompasses two broad areas, the control and planning of goal directed movements, and the attainment of expertise. Research projects may be available in the
following areas: The planning and execution of target directed movement; visual feedback processing; prescription/delivery of feedback and instructions; focus of attention; anxiety and performance.

For more information or to view some of my recent publications please visit http://www.bangor.ac.uk/sport/staff-gl.php

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.


**Supervisor:** Dr Andy Cooke
**T:** +44 (0) 1248 38 8250 / **E:** a.m.cooke@bangor.ac.uk

Research projects could focus on one or a combination of the following areas:
Psychophysiological responses to competition / stress; Psychophysiological mechanisms underpinning motor performance; Expert and novice differences in psychophysiological response patterns underpinning motor preparation; Biofeedback / Neurofeedback training.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

14. Performance Psychology

**Supervisor:** Prof Tim Woodman
**T:** +44 (0) 1248 383494/ **E:** t.woodman@bangor.ac.uk

Professor Woodman is the Head of the School of Sport, Health and Exercise Sciences. He has supervised eight PhD students (including international students) to completion, all within the PhD registration period. Professor Woodman has published extensively in peer-reviewed international journals on the topic of personality and performance psychology and he is frequently asked to lead workshops with directors of multinational companies for his expertise in high-performance environments. He is also the Associate Editor of *The Sport Psychologist* and on the editorial board of *Psychology of Sport and Exercise*. Professor Woodman’s current research interests encompass the global area of performance psychology, including personality, leadership, stress, and performance, as well as other stress-related areas such as body image and high-risk environments. He would welcome students interested in these areas. Given his multicultural background and experience, Professor Woodman fully understands the challenges of being an international student.

*Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.*
15. Personality and individual differences, and high level performance

Supervisor: Dr Ross Roberts
T: +44 (0) 1248 388137 / E: ross.roberts@bangor.ac.uk

My research interests are centred on the impact of personality and individual differences in performance contexts. In particular, I am interested in understanding how and why some individuals perform well in certain circumstances and others do not. In addition, I am also exploring personality in relation to group functioning and group performance. I am also keen to explore the potential trade-off between performing well under pressure and one’s health, and whether personality has an effect on this. For some people, performing well under pressure might have beneficial effects on their physical and mental well-being, but for others such sustained high level performance in the face of pressure might be particularly damaging. I would be interested in discussing PhD topics in the above areas. While sport is an obvious medium to examine these research questions, they are also applicable to a number of performance domains (e.g., business, military etc.) and so I would be happy to hear from potential students who have interests in performance that do not necessarily relate to sport.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

16. Psychological processes underpinning high level performance

Supervisor: Institute for the Psychology of Elite Performance

The Institute for the Psychology of Elite Performance (IPEP) is housed within the School of Sport, Health and Exercise Sciences. It was formally established in 2000 and now contains one of the largest concentrations of performance focused psychology researchers anywhere in the world. The group has strong links with a number of external organisations both nationally and internationally in a variety of performance domains including sport, business, and the military and regularly secures funding from these organisations to conduct research. The research foci of the group is wide, but current research avenues include personality, risk taking, mental resilience, psychological skills, attention, sensorimotor processes and emotion, visual processes underlying movement control, and psychophysiology of performance. The group is collaborative and many researchers work together on specific projects in order to pool expertise. Students interested in topics covered by IPEP are encouraged to view the IPEP website and contact the group at:
http://ipep.bangor.ac.uk/contact.php.en?menu=5&catid=8059&subid=0

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
17. Psychology of performance: Self-talk and group dynamics  
**Supervisor:** Dr James Hardy  
T: +44 (0) 1248 383493 / E: j.t.hardy@bangor.ac.uk

Research projects are available in understanding how self-talk influences sporting performance as well as the examination of group dynamic related issues in sports teams.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

18. Rehabilitation of Musculoskeletal Disorders with Exercise Science  
**Supervisor:** ReMeDES Group

This group uses techniques usually associated with exercise science to assess and treat patients with chronic diseases. The principal research foci of ReMeDES are to assess the impact adverse body composition changes (loss of muscle, and increased fat mass) have on physical function, disability, and health in various conditions characterised by muscle wasting (on-going and completed studies feature patients with rheumatoid arthritis, osteoarthritis, total hip replacement surgery, ankylosing spondylitis, systemic lupus erythematosus, fibromyalgia, chronic renal failure, and prostate cancer), and to evaluate the efficacy of interventions (e.g. exercise, anabolic agents, anti-cytokine therapy, nutritional supplementation) aimed at restoring muscle mass, attenuating fat mass, improving functional capacity, and reducing risk of cardio-vascular disease.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

19. Rehabilitation; High altitude physiology  
**Supervisor:** Dr Jamie Macdonald  
T: +44 1248 383272 / E: j.h.macdonald@bangor.ac.uk

Research projects are available in two distinct areas: ii) Rehabilitation of patients with chronic kidney disease; ii) High altitude physiology.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

20. Sport and educational psychology  
**Supervisor:** Prof. Nichola Callow  
T: +44(0) 1248 383491 / E: n.callow@bangor.ac.uk

My research interests span sport and educational psychology. Areas in which I would be particularly keen to supervise PhD students include:
PhD Opportunities

- Cognitive and motivational effects of imagery on sport performance
- Transformational leadership in different context (sport, expeditions, education)

For further information please visit [http://www.bangor.ac.uk/sport/staff-nc.php](http://www.bangor.ac.uk/sport/staff-nc.php)

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.

21. The influence of motor actions on emotional responses

**Supervisor:** Dr Amy Hayes

T: +44 (0) 1248 383964 / E: a.hayes@bangor.ac.uk

My research investigates interactions between perception, action and emotion. I am particularly interested in how the quality of our motor actions influences our emotional responses to a situation. Recent projects have examined the role that motor fluency plays in modulating emotional responses. Research projects may be available in the following topic areas: the relationship between motor actions and emotion; the role of kinaesthetic processes in emotion; the emotional consequences of movement imagery. Other topics of perception and motor control are also possible, including the role of attention in the perception of dynamic scenes.

Please note the research project opportunity detailed here is NOT funded by the University, candidates must secure their own funding to meet the costs of PhD study.
IMPORTANT INFORMATION

Bangor University makes all reasonable efforts to ensure that the information in this Directory is correct at the time of printing (July 2016).

This edition of the University’s PhD Directory describes the topics which the University intends to offer during the 2016/17 academic year. Every effort has been made to ensure that the information contained in this directory is helpful, fair and accurate at the time of printing. However, this information is subject to change over time.

The University makes all reasonable efforts to provide the courses, tuition and learning support, research opportunities and other services and facilities with reasonable care and skill and in the way described in this directory. However, the University cannot guarantee the provision of any course or facility. Some circumstances, such as staff changes, resource limitations and other factors over which the University has no control, such as industrial action or a change in the law or the level of demand for a particular programme or module (please note that this list is non-exhaustive), may result in the University having to withdraw or change aspects of the programmes, modules and/or student services and/or facilities detailed in the directory. This could include, but not necessarily be limited to, programme/module content, staffing, the location where the programme/module is taught or the manner of teaching delivery, and the facilities provided to deliver or support the programme.

Where circumstances demand an unavoidable change or where it is necessary for the University to discontinue a programme of study, the University will take all reasonable steps to minimise the effect and all proposed changes will be notified to potential applicants who have registered an interest in the relevant programme at the earliest possible opportunity as well as being reflected on the University’s website. An individual will be entitled to withdraw from the course by telling the University in writing within a reasonable time of being informed of the change.

In addition, any changes between the directory and the proposed course and services will be notified to applicants at the time of making an offer. Prospective applicants are encouraged to check our website at www.bangor.ac.uk for the most up-to-date information.

The willingness of the University to consider an application is no guarantee of acceptance. Students are admitted to the University on the basis that the information they provide on their application form is complete and correct.

Should you become a student of the University, this notice shall be a term of any contract between you and the University. Any offer of a place at the University shall be subject to the student enrolment conditions and the University’s rules and regulations as amended from time to time. A copy of the University’s current terms and conditions can be found online at www.bangor.ac.uk/terms-and-conditions or obtained in writing from the Academic Registrar, Bangor University, Bangor, Gwynedd, LL57 2DG.