



PRIFYSGOL
ABERYSTWYTH
UNIVERSITY

**Research and
Innovation Strategy
2019-24**

Front Cover: Fractal clock

The Fractal Clock is the work of Richard Downing, a lecturer in the Department of Theatre, Film and Television Studies. Over the course of 60 minutes, a total of 81 rotating triangles of glass make a delicate journey of shifting patterns towards a moment of resolution, offering a mesmerising re-encounter with time, space, place and perspective.

For further information, please visit:

<https://www.aber.ac.uk/en/news/archive/2018/04/title-212203-en.html>

or search 'Fractal Clock Aberystwyth University'.



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"Nid Byd, Byd Heb Wybodaeth"^{**}

Research and innovation are the lifeblood of our institution. They deepen our knowledge and understanding, inform our learning and teaching, and deliver real benefits to everyday lives in Wales and the wider world.

I am therefore delighted to share with you our Research and Innovation Strategy, which clearly sets out our objectives, aims and ambitions for 2019-2024.

Led by our Pro Vice-Chancellor for Research, Knowledge Exchange and Innovation, Professor Colin McInnes, this document underpins our five-year Strategic Plan for the University as a whole and provides a focused roadmap for our research community. It will guide us as we build on our historic strengths to tackle contemporary challenges and work collaboratively across academia, business and society to help make our world a better place.



Professor Elizabeth Treasure
Vice-Chancellor

"A world without knowledge is no world at all"^{**}

Why research matters

Research matters. It informs our teaching and enhances the learning experience. Students are taught by staff who shape our understanding of the world in which we live and who are pushing back the frontiers of what we know.

Our research also benefits society. It has an impact upon the economy, on improving the environment, on public policy and upon cultural life in Wales and beyond. It is outward looking, engaging with communities. And through commercial partnerships, it helps to develop new products and techniques.

But above all, research is a quest for knowledge. As a species we are curious – about the world in which we live, about other worlds whether real or imagined, and about ideas. And it is our role as a University to pursue this in a rigorous and non-partisan manner.

This Research and Innovation Strategy outlines what we mean when we say that Aberystwyth is a research-led university. It details the principles that underpin how we pursue research. It identifies a series of actions which will help to develop our research over the next five years. And it articulates how we will further develop a research environment that is ambitious, outward-looking, engaged and inclusive.

Professor Colin McInnes
Pro Vice-Chancellor for Research,
Knowledge Exchange and Innovation

Our research strategy

Aberystwyth is a research-led University.

This means that:

- Research is a pattern of behavior, embedded in what we do.
- Research and teaching are mutually reinforcing. They work with each other at individual, Departmental, Faculty and University levels to deliver a coherent academic experience for staff and students.
- Research implications should be considered in teaching developments, and vice versa.
- Research is not an isolated activity undertaken within the University, but contributes to the society in which we live.
- Researchers should be provided by the University with the space and time for undertaking research.

The aim of this strategy is to develop a strong, outward-facing research culture as an enabler for success – to meet the objectives outlined in the University’s Strategic Plan, to improve the quality of our research, to develop new research partnerships and attract new researchers (including research students), to have an impact for the betterment of society in Wales and globally, and to increase research income including grant capture.

There is no one initiative which can realise this, rather we shall work with a clear sense of purpose – to develop a strong, vibrant culture where research is valued by all staff and students. This will require leadership within the University and engagement by all staff. It will involve collaborations across the University and with external stakeholders, and developing both an awareness of and a capacity to shape research agendas in funding bodies.



Key principles

Five key principles will underpin this development:

1. Ambition

We will actively encourage ambitious, entrepreneurial research that challenges existing approaches and generates new knowledge. We will not fear failure, but will expect staff to engage critically and responsibly with established thinking in order to progress substantially our understanding of the world in which we live and contribute to its betterment. We will seek to increase current, and explore new sources of research income as an enabler for successful research with impact.

2. Confidence

We will work to ensure that staff and students across the University understand that research matters and are confident in the role of research as central to the University's mission. We will support research, impact, innovation and knowledge exchange in Welsh. We will celebrate and reward research, including knowledge creation, impact, innovation and knowledge exchange.

3. Integration

We will ensure that research and teaching work together in an integrated academic approach. We will work to involve professional services in improving the research environment, ensuring that they contribute to the development of a strong research culture through a better understanding of the role, significance and requirements of research.

4. Inclusivity

We will ensure that all staff engaged in research are equal members of the research community, with equal opportunities and treated with dignity, respect and courtesy. We will work with protected groups to ensure that their research talents are developed and nurtured in a way that is equitable and fair.

5. Collaboration

We will work with bodies in Wales, the UK and globally to set research agendas. We will work with the wider community, in Wales and globally, exploring new forms of dialogue and engagement. We will work with external partners, in Wales and globally, both in generating research and in passing on the benefits of our research.



Research in action:

Dr Andrea Hammel

Reader, Department of Modern Languages

My research focuses on the 10.000 unaccompanied child refugees who fled from Central Europe to the UK on the so-called Kindertransport. Their families were persecuted by the National Socialist dictatorship whose race laws defined them as Jewish.

As most countries, including the UK, had very restrictive immigration policies, many families decided to take the opportunity for their children to flee without them when the UK government relaxed its compulsory visa policy for children in November 1938.

Studying the history of refugees to the UK enables us to learn important lessons for today's young refugees. The former Kindertransportees suffered separation, trauma, and difficulties adapting to a new language and culture. While some migrated further, many lived in the UK for the rest of their lives. This gives us the opportunity to examine their experiences in longitudinal studies, informing diverse fields ranging from Holocaust education to migration policy.

www.aber.ac.uk/modernlangs



Research in action: Dr Neil Mac Parthaláin

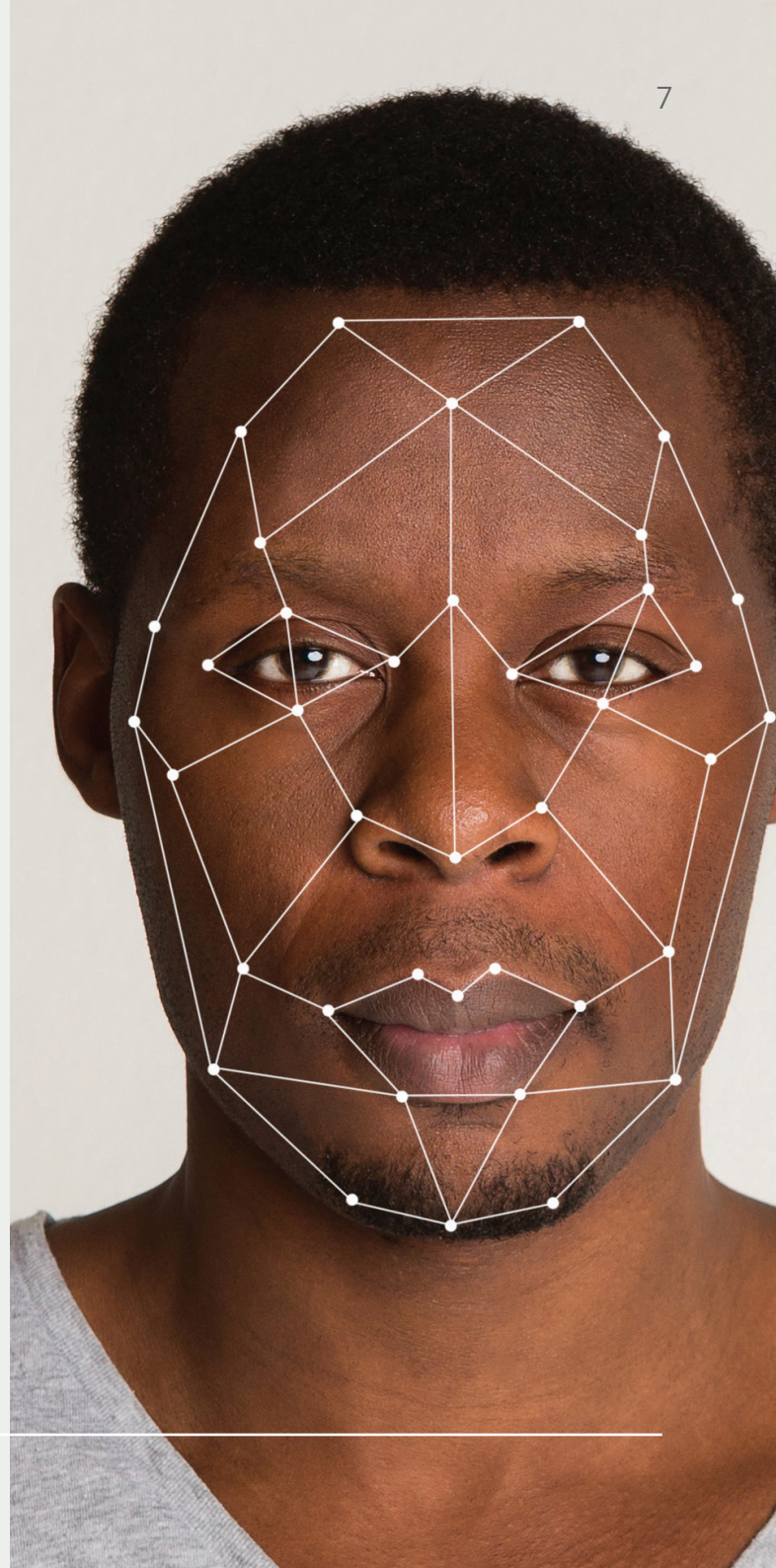
Lecturer, Department of Computer Science

My work focuses on trying to automatically predict the six basic human emotions – namely happiness, sadness, fear, disgust, surprise, and anger – from the expressions of human faces on video.

The automated system is successful in doing so, and compares with human observers whom it agrees with 88% of the time. The expressions for which the automated systems does not score well are expressions on which human observers also disagree. Automated systems make it more efficient to do tasks previously performed manually by people, mainly to gather facial expression information related to a specific context where participants have consented to share such information.

Emotion recognition can be used in society for a large number of reasons. For example, instead of filling out a long survey about how you feel about different segments of an educational video or advertisement, you may give permission to have a camera watch your face and to note when expressions such as happiness, surprise, disgust, or anger are demonstrated.

www.aber.ac.uk/cs





Research in action: Professor Bryn Hubbard

Director Centre for Glaciology, Department of Geography & Earth Sciences

Research at the Centre for Glaciology focuses on investigating and explaining changes in Earth's glaciers and ice sheets.

Collaborating with colleagues internationally and using the latest technology, we work to improve understanding of the response of Earth's ice masses to environmental changes. For example, climate change is causing an increase in periods of warm föhn winds around the fringes of Antarctica, leading to a significant rise in surface temperatures on the continent's ice shelves.

Meteorological and snow-temperature measurements taken on Larsen C Ice Shelf revealed periods when surface temperatures rose from typical values of $-25\text{ }^{\circ}\text{C}$ to as high as $+15\text{ }^{\circ}\text{C}$ even in the dark Antarctic winter.

These föhn events last several days, with the meltwater they produce refreezing within near-surface snow. This creates impermeable ice layers that result in the formation of surface ponds and rivers which influence the stability of all of Antarctica's ice shelves.

Importantly, our research has revealed that föhn-driven melting occurs just as strongly in the dark Antarctic winter as it does in the light Antarctic summer.

www.aber.ac.uk/dges



Research in action:

Dr Huw Lewis, Dr Elin Royles, Dr Catrin Wyn Edwards

Department of International Politics

Our research is located in the interdisciplinary field of language policy studies.

Recent work has focused on analysing policy interventions by European sub-state governments aimed at revitalising regional and minority languages.

In looking at language revitalisation strategies, key findings include the importance of taking greater account of the implications of social changes such as the increase in levels of personal mobility, the rise in networked forms of social interaction and the decline in significance of local and territorially-based communities.

A balance also needs to be struck between the challenge of increasing the absolute number of minority language speakers and increasing social use of the language.

Findings arising from the research have been shared widely with public officials and policy makers, and they informed and influenced the policy discussions leading to the formulation of the Welsh Government's latest national language strategy, *Cymraeg 2050: A Million Welsh Speakers*, published in July 2017. The research continues to inform work on language policy here in Wales as well as in other European cases.

www.aber.ac.uk/interpol



Action Plan: Phase One (2019-2020)

Action number	Action	Principle addressed
1	We will ensure that each Faculty has an appropriate structure to ensure that high quality research is supported and promoted.	1. Ambition 2. Confidence
2	We will revisit workload allocation tariffs to ensure that tariffs for roles are properly calculated and do not inadvertently encroach on research time.	1. Ambition 2. Confidence 3. Integration 4. Inclusivity
3	We will improve the communication of research successes, including those of PGR students, both within AU and externally.	1. Ambition 2. Confidence 4. Inclusivity 5. Collaboration
4	We will introduce a research induction programme for new academic staff and a briefing session for new staff in professional services.	2. Confidence 3. Integration 5. Collaboration
5	We will introduce a weeklong, themed, Festival of Research to showcase our research and engage with local communities.	1. Ambition 2. Confidence 5. Collaboration
6	We will clarify the role of leaders in research, ensure that they are more proactive in the support of research internally, that they engage in shaping research agendas externally and that they are positioned to assist in horizon scanning for new opportunities.	1. Ambition 2. Confidence
7	We will consolidate and promote funding opportunities for research on Wales or in the Welsh language; and we will examine ways of encouraging and supporting research through the medium of Welsh.	2. Confidence
8	We will complete the build phase and enter the operational phase of AIEC and VetHub1; and we will complete phase one of the National Spectrum Centre.	3. Integration
9	We will develop a policy on the responsible use of research metrics and provide Departments with a basket of longitudinal metrics on their research performance.	1. Ambition 4. Integration

Phase One (2019-2020)

Action number	Action	Principle addressed
11	We will develop guidance for staff on how to optimise the timetable to balance teaching and research commitments; and we will explore means of protecting research time through the use of the timetable.	2. Confidence 3. Integration 4. Inclusivity
12	We will pursue UKRI funding for a major research infrastructure project in the Arts, Humanities and Social Sciences.	4. Inclusivity
13	We will develop, through RB&I, greater support for innovation, consultancy and business engagement; a 'fast track' facility for small grants requiring a fast turnaround; and, in partnership with academic colleagues, improved horizon scanning of research initiatives.	1. Ambition 3. Integration
14	We will complete a policy for due diligence in research collaboration overseas.	3. Integration
15	We will revise our impact support scheme to incorporate innovation.	3. Integration

Action Plan: Phase Two (2021-2024)

Action number	Action	Principle addressed
16	We will establish new training in networking for researchers and in mentoring of research staff.	1. Ambition
17	We will introduce Open Days for potential Research Fellows.	1. Ambition
18	We will improve our monitoring of, and HR support for, Equality, Diversity & Inclusion in research.	4. Inclusivity
19	We will introduce a new strategy for the support of inter-disciplinary research centres (IRCs).	1. Ambition 2. Confidence
20	We will review the relationship between the teaching programme and research.	3. Integration
21	We will continue the development of the National Spectrum Centre.	3. Integration
22	We will work with the National Library of Wales and Royal Commission for Ancient and Historical Monuments in Wales to develop a Research Park for the Arts, Humanities and Social Sciences on Penglais.	1. Ambition 3. Integration
23	We will introduce performance expectations for research staff at different career stages and appropriate for their disciplinary areas, including for grant applications, innovation and impact; and we will incorporate these into promotions criteria.	1. Ambition 4. Inclusivity
24	We will expand the role of the Graduate School to provide training and mentoring for Research Fellows and Early Career Researchers. The Graduate School will also provide, or coordinate, training sessions in new methodologies available for all academic staff; and training in impact and innovation for academic staff at all career levels. We will continue to support Welsh Crucible in training future research leaders.	1. Ambition
25	We will work with national and regional government on new funding opportunities in the post-Brexit landscape.	1. Ambition 3. Integration 5. Collaboration
26	We will investigate an 'entrepreneurs in residence' scheme to promote and improve innovation.	3. Integration

Phase Two (2021-2024)

Action number	Action	Principle addressed
27	We will embed research requirements within the Estates Strategy and use of space.	5. Collaboration
28	We will review our schemes which enable students to participate in staff research projects.	1. Ambition 2. Confidence 5. Collaboration
29	We will work with Human Resources to develop procedures and support for those staff on Teaching & Scholarship contracts who wish to be considered for research contracts.	4. Inclusivity
30	We will develop better role profiles for research staff, and improve the processes for recruiting staff on research contracts.	1. Ambition
31	We will review the policy on research leave to ensure that all research staff have equal opportunities.	4. Inclusivity
32	We will explore ways to improve links with researchers not based on the Penglais Campus.	4. Inclusivity
33	We will introduce new software for improving grant management.	1. Ambition
34	We will improve our monitoring of responsible research, and explore establishing a research integrity unit.	1. Ambition
35	We will aim to create a scheme enabling Early Career Researchers to spend up to three months at a major international research facility as part of their career development.	1. Ambition 5. Collaboration

Research, Business and Innovation

Success in research and innovation is not the responsibility of academic staff alone. It involves professional services and other colleagues across the whole University.

The work of our Department of Research, Business & Innovation (RB&I) is central to this inclusive effort to engage staff from all areas in delivering the ambitious aims of this five-year strategy.

The Department provides a wide range of support services, which include:

- Promoting our research within and outside the University
- Forging strong relationships with funders and supporting grant applications
- Costing projects and managing contracts
- Advancing collaboration with academic partners, industry and business
- Ensuring successful knowledge exchange
- Identifying training needs and coordinating professional development

Building on its core activities, RB&I will become increasingly proactive in championing research and strengthening our culture of innovation and knowledge exchange.

It is by bringing together the talents of all colleagues that we will ensure research excellence and transformational change that makes a real impact on society in Wales as well as internationally.

www.aber.ac.uk/rbi





Research in action:

Professor John Draper

Institute of Biological, Environmental and Rural Sciences

My research has centred on developing molecular diagnostics to accurately measure what people eat and to show how metabolites derived from distinctive chemicals found in specific foods can be identified in urine the day after consumption.

It has pioneered the development and commercialisation of postable urine sampling kits suitable for use in home, community and clinical settings anywhere in the world.

This approach is far more reliable than the traditional assessment of dietary intake by self-reporting using questionnaires or diet diaries, which is fraught with problems due to misreporting and the complexity of processed foods available in supermarkets.

Biomarkers of food intake (BFIs) can provide objective information on habitual diet, which is important in order to link exposure to discrete foods with specific health outcomes and thus advise public health policies. BFIs can also provide scope for developing an evidence base for the future design of 'Functional Foods' that can help alleviate problems associated with many chronic conditions such as diabetes, obesity and heart disease.

www.aber.ac.uk/ibers



Research in action:

Dr Margaret Ames

Reader, Department of Theatre, Film & Television Studies

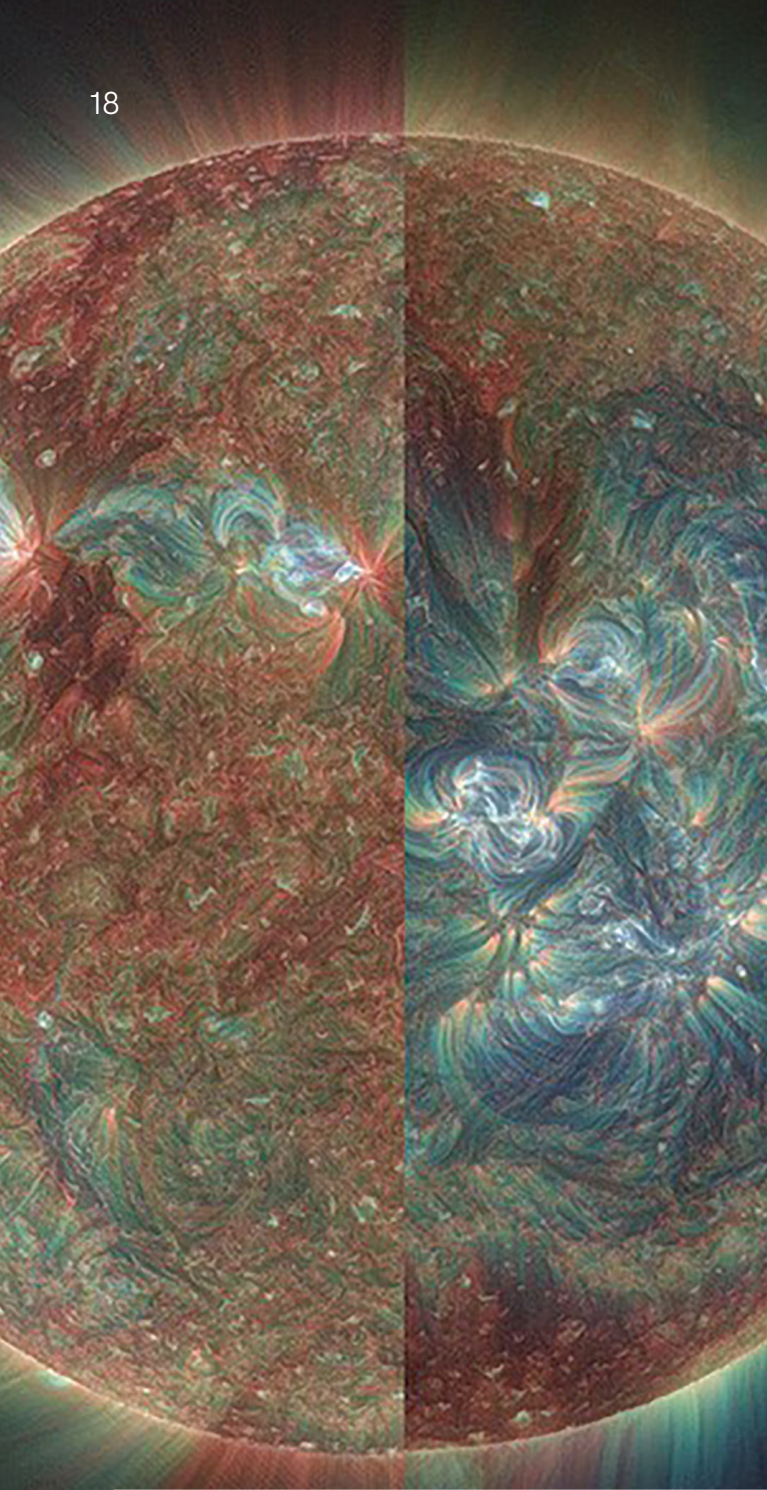
My research is based in practice. I have been working since 1987 with dance-theatre company Cyrff Ystwyth where people with and without learning disabilities follow the work of colleagues with learning disabilities.

This approach is the reverse of the more usual model within the arts where people with learning disabilities are encouraged to take part in performance but are led by non-disabled facilitators.

Learning-disabled people continue to be on the margins of society. Often people who find it hard to manage our complex world are involved in theatre practice because it can be beneficial. However, learning-disabled people who have the opportunity to lead creative projects reveal new approaches to choreography and themes, drawing on their particular experiences, views and knowledge. It can also alter the perceptions of learning disability among people without learning disabilities.

www.aber.ac.uk/tfts

Photo by Chris Stuart



Research in action:

Youra Taroyan

Lecturer, Department of Physics

My research is concerned with the Sun's mysterious atmosphere known as the corona. It is hundreds of times hotter than the Sun's surface. Events in the corona may affect the Earth and the technologies we depend upon such as satellites, radio transmissions, and electricity grids.

Working with departmental colleague Dr Huw Morgan, I have been analysing global conditions in the solar corona to provide an estimate of the relative contributions of the quiet corona and active regions to the Sun's extreme ultraviolet (EUV) irradiance between 2010-2017. In contrast to the quiet corona, active regions usually lie above sunspots and contain strong magnetic fields.

An important conclusion of our study is that the EUV irradiance received at Earth cannot be accurately predicted from simple indices of solar activity such as sunspot area. Other factors such as the quiet coronal component or the long-term variations in active region temperatures must also be taken into account.

This image of the sun shows the changing appearance of the corona from solar minimum in May 2010 (left) to solar maximum in December 2014 (right) when large numbers of sunspots are present. It can be seen that the area covered by active regions increases towards solar maximum.

www.aber.ac.uk/physics

Research in action:

Eurig Salisbury

Lecturer, Department of Welsh and Celtic Studies

Introducing a non-Welsh-speaking audience to Welsh poetry can be a challenge. When it comes to *cynghanedd*, a complex system of alliteration and rhyme, it can be even more challenging.

Nonetheless, as with every national treasure, the basic principles of the craft can bridge linguistic and cultural divides. In my work as a poet and author, and in my research into *cynghanedd*, I collaborate with poets in Wales and beyond to allow new audiences to access Wales's bardic culture.

These engagements are all rooted in pioneering revisionist research on *cynghanedd* that redefines it as an essentially open and changeable craft.


Working with Sampurna Chattarji, a poet and author from Mumbai, I have introduced hundreds of children from India to a new way of composing poetry that shows that *cynghanedd* belongs to everyone. Closer to home, I introduced a new project, *Talwrn y Beirdd Ifanc* (the Young Poets' *Talwrn*), to enable young people to use *cynghanedd* to compete in the unique format that is the '*talwrn*' contest - an idea picked up by BBC Radio Cymru to be part of their own iconic programme, *Talwrn y Beirdd*.

www.aber.ac.uk/welsh



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