

# MASI

DISCOVERY & INNOVATION  
TO CHANGE THE WORLD

## WORKSHOP REPORT

MASI Agenda Setting Workshop on  
Unconventional and Natural Computing

Taking inspiration from natural systems  
for beyond-next-generation technology

7 – 8th July 2022  
Swansea University Bay Campus



Swansea  
University  
Prifysgol  
Abertawe

# “The beginning is the most important part of the work.”

## - Plato, The Republic

### Summary

**U**nconventional and Natural Computation (UNC) encompasses physical systems that imitate life, and the study of how biological systems process information by reacting to their environment. The MASI Agenda Setting Workshop on Unconventional and Natural Computing brought together researchers from three universities in Wales, to explore transdisciplinary opportunities. Supported by three external subject specialists, and stimulated by presentations from leading experts in the field, the team of researchers discussed four key questions around UNC collaboration: Who are we?, What should we do?, How do we support diversity?, and What is the future of any collaboration?

In this intrinsically interdisciplinary field, creating meaningful collaborations requires time to build a diverse collective and establish the conceptual space that the group could occupy. Past attempts at creating ad hoc groupings in response

to short call deadlines have shown that this is a real challenge for truly interdisciplinary work. This event was a critical first step in bringing together interested researchers to build the necessary foundations, ahead of a call. The collective research of the universities in attendance covered the three principal themes of UNC, and was supported by a mix of theoretical, modelling and experimental work. Within an overarching umbrella of UNC there is value in the universities of Wales working together at this level, which not only creates the necessary breadth of expertise, but also establishes a potential brand which both participants and the external advisors cited as critical. To support interest in group activities and to help build towards such a network, a new open Jisc mailing list was created. Two potential networking grants were discussed as ways to support ongoing collaboration at this level.



Participant and critical friend feedback suggested opportunities for collaboration would be found in smaller groupings within the larger UNC collective. A UNC Wales grouping could become an association of researchers with common interests, from which subgroups are drawn to tackle calls as they emerge, switching to a top-down model of interdisciplinarity. Several such connections are reported here from the meeting, leading to immediate collaboration. The three themes identified for future collaborative research within UNC closely matched those established during the preceding community discussions, which were self-assembled materials (including neuromorphic materials), biological systems (including assembly-structure function relationships) and emergence (including biological systems). However, researchers also produced a paired list of techniques which are applicable to study these fields. Together they help to begin defining the space of the collaboration more clearly.

Some of the key subjects in UNC have poor gender diversity profiles, which limits the talent available to research. During a session devoted to this, the workshop explored existing diversity programmes in engineering and explored how better framing of the research we do can support these efforts.

Much of the meeting focused around finding the language required to bridge the different disciplines and describe the work we do. This was echoed in the session on diversity, which for most participants was the first time it had been discussed in a research meeting. Perhaps the most valuable part of the workshop was the creation of these new beginnings in changing the way we work.

Dr Richard Cobley (Chair, Electronic Engineering)  
 Dr Edwin Beggs (Mathematics)  
 Professor Elaine Crooks (Mathematics)  
 Professor Richard Palmer (Mechanical Engineering)  
 Professor John Tucker (Computer Science)

## Introduction

In February 2022 the Morgan Advanced Studies Institute (MASI) issued a call for Agenda Setting Events, under the theme “Preciousness of Life”. The call requested proposals for events that would involve local, national and international participants and identify new transdisciplinary research opportunities, with a view to creating diverse, inclusive and purposeful collaborations focused on excellent research.

This workshop answered that call by uniting researchers around the theme of ‘unconventional and natural computation’ (UNC) to explore taking inspiration from natural systems for beyond-next-generation technology. The electronic devices which surround and drive our everyday lives are a culmination of bringing together specialists in materials, physics, software, human-computer interaction, communications, mathematics, engineering and medicine. However, computational technologies using conventional silicon transistors have reached a bottleneck; we are struggling to make silicon chips smaller, to reduce their power requirements, to increase their processing speed and to make them compatible with non-ideal environments.

Progress in many fields that affect our lives will be impacted by this inability to continue improving conventional electronics based on semiconductor chips. One way to address this is to step outside the traditional development of semiconductor microelectronics, and instead take inspiration from natural systems. These natural systems themselves perform ‘computation’, in the way complex systems behaviour emerges from the seemingly simpler individual interactions. Both bio-inspired technology, and the study of these natural systems themselves, fit under the umbrella of UNC. The sensors and computational systems used to analyse and understand biological systems behaviour are also based on the same silicon technology. Developing new computational technologies based on natural systems which display inherent computation, could lead to new bio-inspired technologies which themselves are then to use to further study biological systems.

This programme aims to recognise the “preciousness of life” by using it to inspire novel computational techniques, and by using advanced techniques to study natural systems, which can only be realised by uniting cross-disciplinary research expertise.



## Scope and Objectives

In April, May and June 2022 two in-person and two online community events were held to discuss both the scope and the objectives of the workshop. By exploring research themes of interest to the community, and those used at the Unconventional Computing and Natural Computing 2021 conference, a local scope for the meeting was established. This produced three themes: programmable materials, self-assembling and self-organising systems, and computational biology. The original bid proposed four key questions that the workshop would address. Following the community meetings, these were altered, ending with the four questions shown here.

### Meeting Scope

Programmable materials (neuromorphic materials, emerging materials, biological materials, quantum computing, optical, chaos and collision-based computing)

Self-assembling and self-organising systems (materials, cells, swarms, behavioural biology, evolutionary computing, artificial life, amorphous computing)

Computational biology (Computational neuroscience, computational systems biology, computational ecology, synthetic biology, cellular in vivo computing)

### Question 1: Who are we?

- A: What research fits within UNC? Where are the synergies in our strengths?
- B: What are the main 2-3 themes within UNC that Swansea/Wales could lead on, and should concentrate on for research and bid development?
- C: What can we do to foster a community of scientific research and interdisciplinary academic discovery?

### Question 2: What should we do?

- A: What is our preparedness to build the interdisciplinary teams necessary to apply for grants? What can we do as a community to support being ready to apply for interdisciplinary calls?
- B: What funding opportunities are there? Who are the external partners we need to realise our ambitions, and who can we support?
- C: How does a UNC grouping relate to the Centre for Biomathematics at SU, and the emerging FSE IRIs? What wider groups exist or could exist in Wales and the UK?

### Question 3: Diversity

- A: What is the current diversity picture within our subjects, and industries? What lessons can we learn from areas that are more diverse?
- B: What stories can we pass down to help UG recruitment and outreach improve gender diversity?
- C: What lessons can we take forward for a potential future DTC bid?

### Question 4: The future

- A: What is the future of UNC in Wales?
- B: How does UNC relate to existing industrially identified priorities? How do we work with CISM and the compound semiconductor investment?
- C: Do we work with the WG and policy makers? Do we build towards a seminar series, MSc programmes, a centre with administrative support?



## Discussion

The workshop was held over the 7th and 8th July 2022 on Swansea University's Bay Campus, delivered in a hybrid in-person and online format to support those who could not attend in person. Invitations were issued to everyone who participated in prior community discussions, to Swansea University general distribution lists, and to targeted external academics at Universities in Wales. In total, twenty-six researchers from Swansea University, Cardiff University and Aberystwyth University attended the workshop, and a further eleven contributed to prior community and email discussions.

To support the agenda setting goal of the workshop, three 'critical friends' were asked to provide external research advice. These independent researchers attended the whole workshop (one in person, two online), observed and took part in the breakout discussions, and then completed a final report providing impartial advice on the resolutions reached at the meeting. These critical friends were: Prof Paolo Milani from the University of Milan, Italy, working on nanostructured systems for biomedical microdevices, computational chemistry, and memristive switching materials; Prof Olivier Bournez from the École Polytechnique, France, researching continuous time models of computation and dynamic systems, distributed computing and decidability and undecidability in verification; and Dr Barbara Salonikidou from the University of Cambridge, UK, with work on resistive switching devices for neuromorphic applications, and printed electronic synapses for biomimetic applications.

To stimulate academic discussion, three external speakers were invited to deliver remote talks

to the workshop. These were Prof Simon Brown at the University of Canterbury, New Zealand, who spoke on ways of building nano-electronic devices from nanoscale atomic clusters, including neuromorphic computing and "true" random number generation; Prof Andrew Adamatzky at the University of the West of England, UK, who gave an overview of different physical systems that display or can perform computation, including reaction-diffusion computing, cellular automata, physarum 'slime mould' computing, and future and emergent computation; and Dr Alberto Fachechi from The Sapienza University of Rome, Italy, who stepped in for Dr Elena Agliari, covering work on the application of statistical mechanics methods for artificial intelligence and complex systems. Each workshop participant presented two slides entitled "What I Do" and "What I Need", which were printed and displayed in the meeting room throughout the workshop to stimulate discussion over the breaks. These slides, and all other material for the workshop, were uploaded to a shared drive, available to all participants and external critical friends. All files were left open for editing during and after the event, with some participants also emailing feedback to the chair.

The meeting was delivered in-person and online to support wider access. Some participants joined online when commitments took them out of the physical meeting, while one participant took part entirely online for both days. In addition, two of the three critical friends took part online only, and all three of the external speakers delivered talks remotely. Seamless integration of these delivery methods was only possible with dedicated AV hardware and technical support, provided at the meeting by Senior Learning Technologist in the Faculty of Science and Engineering at Swansea University, Gareth Evans.



## Who are we?

At the end of the participant introduction session, the meeting broke out into small groups of 4-5 people to address Question 1: Who are we? Each group was given a series of shared files to record their discussion points, over three structured ten minute intervals, before the groups came back together for discussion. The research themes identified for inclusion by the participants included: computation, advanced materials, multiscale modelling of natural and stochastic processing, self-assembly, characterisation and modelling, biological and living systems, theory and atoms, neuromorphic computing, single cell modelling, molecular dynamics, multi-scale modelling, wearable sensors, self-assembly of nano-particles, protein as binding agents between organic and inorganic molecules and control. One critical friend noted that the breadth of activity encompassing all of UNC was an area of strength to be exploited.

When asked to identify two to three common themes in these areas, the groups reported Ai) Modelling and experimental testing, Aii) materials, Aiii) applied computation in biology, physics and chemistry; Bi) emergent phenomenon, Bii) biological structure and assembly-structure function relationships, Biii) simulation of biological structure and assembly; Ci) theory and models to explain devices and materials; Di) neuromorphic computing, Dii) multi-scale and multi-physics computing, Diii) nonlinear optimisation for shape/morphing design and control and Div) systems integration at different levels/scales. The critical friends noted here that these suggested themes are general and unfocused, and that there may

be some attempt to address 'how' the research is done, rather than 'what' is done. One critical friend offered two themes that tied together the areas: i) fabrication and characterization of self-assembled systems using nanoparticles, and ii) multiscale simulations aimed at the understanding of the structure-function relationship of systems and devices.

The final section of question one addressed how to foster a research community. Suggestions here included: further multidisciplinary networking events including ones aligned to calls, social events and events involving more doctoral students, a register of expertise and lab equipment, a document or way to translate between disciplines, interdisciplinary CDTs/masters programmes, seed corn project funding for developing new ideas, and funding support for PhD and postdoctoral researchers. The group also identified two upcoming or planned conferences, which the community was invited to attend or help shape, and a mailing list was suggested. The critical friends supported the list given, and noted that the activities listed were important to create strong internal bonds initially. The critical friends suggested that adding neurosciences, electrical engineering and microelectronics would be helpful, but they also cautioned that developing a cross disciplinary community will require considerable investment in terms of time and resources to be effective. One critical friend noted that joint PhD students are helpful to support cross-disciplinary work.



## What should we do?

In preparation for the second breakout, Professor Elaine Crooks (head of the School of Mathematics and Computer Science at Swansea University) gave an overview of the emerging new research structure within the Faculty of Science and Engineering at Swansea University. She also reported some lessons from the Centre for Biomathematics, of which she is co-director. The session then asked participants to look first at our preparedness to build the interdisciplinary teams necessary to apply for grants. It was noted that it is difficult to be ready for large multidisciplinary grants, and that more networking time and potentially joint seminars and a website were needed first. However, some groups felt that we already had the capacity to put forward medium-scale multidisciplinary proposals, and that we could aim for joint publications at this stage to demonstrate credible interaction. The critical friends cautioned that preparedness for a large unified UNC cohort is low, and that more involvement with national and European networks are important to acquire specific competencies and language in this area. There was a discussion that the group needed to establish a 'conceptual space' which aligned with later comments on establishing a brand.

Comments on funding opportunities gave general schemes available. There was discussion of involving industrial partners, but the critical friends cautioned that industry is likely to require a higher level of technological maturity. The Welsh Government's Engineering Research Network was discussed, but the current status of the scheme was unknown. More information on this is given later.

Finally the groups looked at research structures that this collaboration in UNC could potentially fit into. There was interest in some type of pan-Wales network that could explore neuromorphic materials, emergence and bio-mimetic systems. The groups struggled to find the exact language to describe what this grouping might be called. One group reported a multi-institution initiative in Germany uniting researchers in artificial intelligence, philosophy, educational science, psychology, behavioural biology and neuroscience, called simply Science of Intelligence. Key words that did emerge to describe the collaboration were bi-directionality, reciprocity, feedback, interaction, predictive modelling, complex systems and collective behaviour. Here, the critical friends agreed with the comments given, and noted that being part of a large networks is of strategic importance.



## Diversity

**During bid preparation it became apparent that three of the constituent departments at Swansea University – Electronic and Electrical Engineering, Computer Science, and Mechanical Engineering – have the least gender diverse subjects by typical undergraduate entry. The lack of gender diversity at undergraduate level goes on to restrict the talent available to researchers working in UNC.**

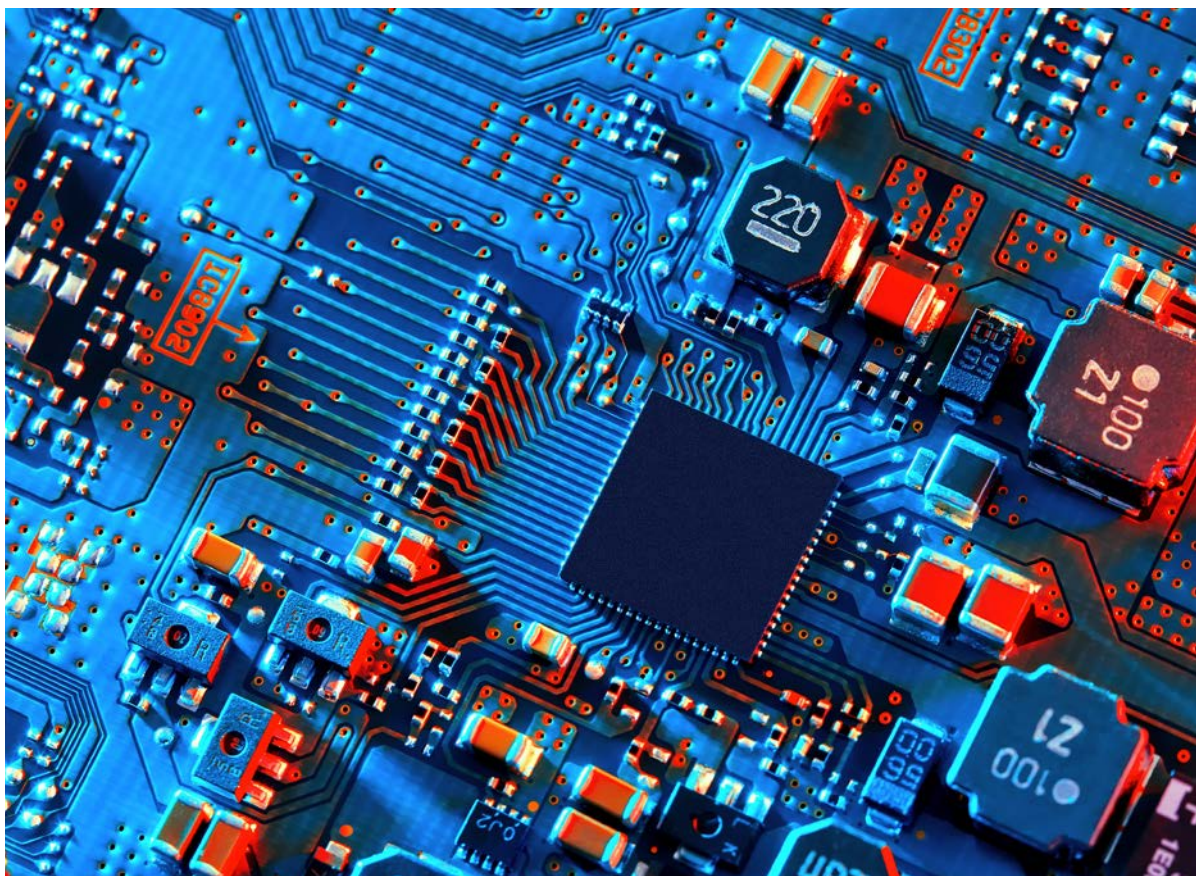
To address this at the workshop, the third breakout session was devoted to a discussion around equality, diversity and inclusivity (EDI). To start the session, Dr Jennifer Thompson (EDI lead for School of Aerospace, Civil, Electrical, General and Mechanical Engineering at Swansea University) gave a presentation on the department of mechanical engineering's 50% by '50 programme, supported by the Faculty of Science and Engineering Inclusivity and Staff Development Officer Katie Hebborn.

Following the presentation, the groups first discussed the current diversity picture within their own disciplines. There was good appreciation of gender diversity within our subjects, which confirmed a picture of low female representation in students and staff in most disciplines.

Next the groups discussed how research could be used to support undergraduate recruitment and outreach. One participant reported on research from the SPIRES longitudinal research project studying young people's science and career aspirations. Here, the 'leaky pipeline' analogy is found to be problematic as it implies a passive process. Instead, under-represented groups of students who start out interested in science get actively persuaded over time that they do not fit in science, technology, engineering and maths (STEM) by persistent systemic messaging. It was reported to the meeting that SPIRES2 PI Professor Louise Archer has said that it is more accurate to say "they are formally and informally ejected by injustices, like a rigged bingo machine".

The session ended by asking what lessons could be used when designing a doctoral training centre. One group cautioned that the question could be seen as exploiting EDI activity to support a bid, and that we must aim for the bigger picture. There was discussion that the requirement in the former College of Engineering at Swansea to include female representation on all recruitment panels pushes additional EDI workload onto women, and degrades their expertise by inviting them because of a requirement, not professional choice. There was the suggestion that EDI training is often online, and designed to support a University's requirement to demonstrate compliance, rather than a real motivation to develop meaningful learning and development. There was discussion around institution motivation for EDI, and the suggestion that if EDI was given equal prominence to the Research Excellence Framework, it would receive more support. Finally, there was discussion around the different motivations of young women entering STEM subjects, whether this was real or societally created, and whether better framing of STEM courses could help. There was the suggestion to work with undergraduate students to identify motivations for female students, to frame subjects around the impact of the subject rather than their intrinsic detail, and to make it clear to prospective students that ethics is now an embedded part of all engineering subjects.

The critical friends had less to say on this part of the workshop, and there was a sense that it was difficult to find solutions during the group discussions. However, it is worth noting that discussions on gender diversity are traditionally rare at Universities, and rarer still at research events. Just as we worked at the meeting to find the language to adequately describe the research we do, the participants worked together to learn new language to appropriately describe, and appropriate contexts to frame, the discussion around gender diversity, and are thus better equipped to go on doing so.



## The future

Ahead of the final groupwork session, the facilities manager for the Centre for Integrative Semiconductor Materials (CISM) Dr Matt Elwin spoke about the experimental facilities and industrial collaboration in the project. There was support from Matt for UNC projects looking for industrial input to be connected to industrialists. In the following discussion, the groups looked at the future of UNC in Wales. A number of specific examples were discussed, with support for a pan-Wales inclusive initiative to be formed. In the second discussion the groups discussed industrial links. One group highlighted that companies such as Opteran, who make biology-inspired technology, could fit into UNC, even if they do not label themselves that way. Some people suggested talking to the CISM companies for non-monetary support, while others reported that the EPSRC grant Application Targeted and Integrated Photovoltaics (ATIP) includes smaller companies as project partners. SCoRE Cymru was mentioned, as was the UK Research and Innovation (UKRI) Knowledge Transfer Partnership (KTP) scheme. More detail is given later on specific schemes. One group noted that the first external speaker discussed the integration of advanced neuromorphic materials onto existing silicon

chips, and that such heterointegration is a focus of CISM. Finally, the groups discussed future activities in UNC. It was noted that there is already an MSc in semiconductors, and any new scheme would need care. One group was hesitant about a seminar series, while another gave it a 'thumbs up'. The groups discussed that computer science MSc students can do projects jointly with a second supervisor outside the discipline, and that this could be a good opportunity for UNC research.

The critical friends noted here that top-down initiatives to link groups on specific themes may be more beneficial than spontaneous bottom-up aggregations. They also reported that the gap between the research in UNC and the semiconductor industries is quite wide and forming links here could be problematic. They concluded that these initiatives are useful, but a top-down ecosystem must be created. This was echoed by participant feedback after the meeting, agreeing that research addressing issues on the lower end of the technology readiness level (TRL) is less appealing to industry, and that research would instead need to be focused on the UK Grand Challenges.

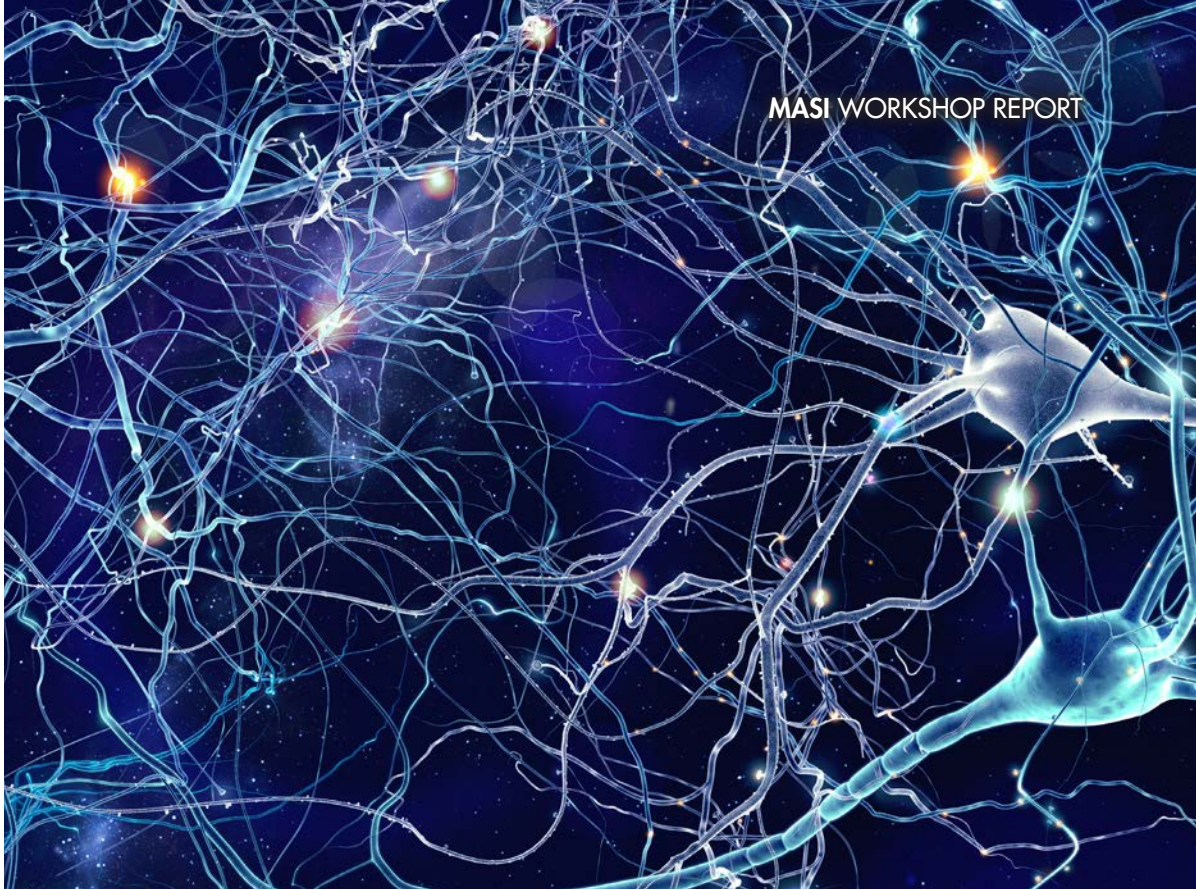


## Meeting Conclusions

A number of research links generated at the meeting were discussed. Experimental researchers working in cell biology have arranged to discuss novel computational and theoretical methods with researchers in mathematics and computer science. An existing collaboration in chemistry and physics on organic neuromorphic materials wants to link with those working in electrical engineering and theory to build their materials into a system, and with those working in nanoscale characterisation to confirm the mechanism of operation. One researcher from Aberystwyth will link additional Aberystwyth researchers in swarms to those at the meeting. A researcher from Cardiff working in theoretical simulation of materials structures was unable to find suitable biologists at the meeting to collaborate with, but meeting organisers are linking him to biologists who may be interested. Researchers working in materials want to link to with researchers from Cardiff who described new microscopy techniques being installed in Cardiff. One mathematician at Aberystwyth will link a researcher in perovskite materials at the meeting to another mathematician

at Aberystwyth for collaboration. A group from Swansea and Cardiff are discussing a new idea of enzyme-triggered nanotube junctions.

The hybrid online and in-person delivery, supported by learning technologist Gareth Evans, received support. The ability to invite external speakers who were not only overseas but in different continents, greatly added to the experience and expertise available at the meeting. Participating in discussion groups in which in-person and online were mixed was challenging. At first a laptop was placed into the circle of one group, but this was replaced in later discussions with Meeting Owl – a device with a 360° camera and microphone – which improved the experience. Participant feedback on this hybrid online model reported that it “really worked quite well”. One challenge in linking researchers across multiple institutions in Wales is the physical distance. Taking advantage of similar technology, with which most researchers are now much more familiar, will be extremely useful.



## Outcomes

The meeting established the background and motivation of the local UNC community. A diverse set of researchers attended the workshop, from experimental, theoretical and modelling backgrounds. Research subjects were well-aligned to the scope of the meeting, covering programmable materials, self-assembling systems and computational biology, with medicine the only potential omission highlighted by the critical friends.

In establishing the core themes of the community, the hierarchy of grouping determines how granular the divisions become. During discussions, two groups suggested themes based around the modelling or experimental methodology. However, as one

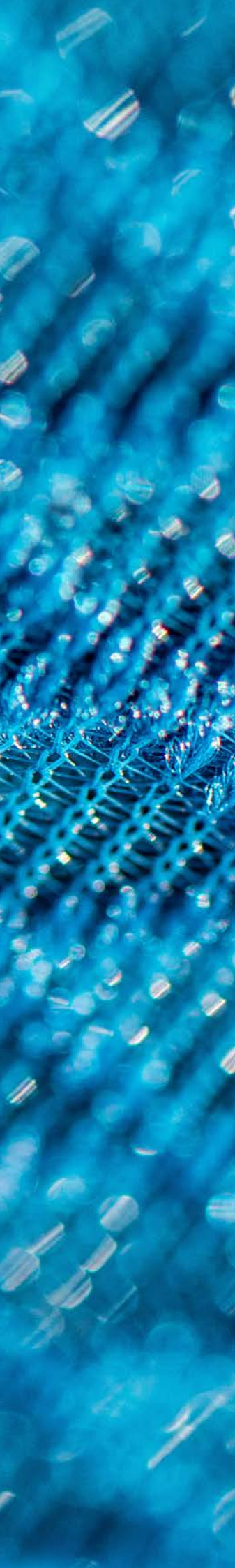
of the critical friends indicated, those who fund research rarely support it based on the methodology alone. For example, there is no EPSRC research area called "multi-scale modelling". Instead it is listed as an appropriate tool within Combustion Engineering and Particle Technology. If the suggested themes are thus split into the application and the methodology separately, then consensus appears between those suggested at the workshop and those from the external critical friends, shown inset. The applications are for the most part the same as the meeting scope established during community discussions, but researchers have now paired this with a comparable list of required techniques to study these areas.

### Applications

- i) Self-assembled materials, neuromorphic networks
- ii) Biological structure and assembly-structure function relationships
- iii) Emergent phenomena, structure-function relationships of multi-scale systems and devices, including biological

### Technique

- i) Multi-scale and multi-physics computing to explore materials, biological structure and systems assembly
- ii) Materials characterisation
- iii) Nonlinear optimisation for shape/morphing design and control



**A**t the highest level we are a group of UNC researchers. The critical friends noted that to work in UNC, being part of large networks is of strategic importance, and that each university alone is unlikely to reach critical mass in this area. It is also important to create a brand and cohesive structure, which do not presently exist within our unified UNC group. However our opportunity could lie in uniting activity across the Universities of Wales, where the necessary multidisciplinary strengths support one another. Further cross-disciplinary development is required to achieve this, with suggestions of further networking, social events, an application for an EPSRC Networking Grant, a register of expertise and laboratory equipment, a document or way to translate between different disciplines, joint supervision and identification of funds for doctoral students and post-doctoral researchers, and joint seminars and external speakers. Several discussions focused on keeping researchers in contact with one another, and the group identified two upcoming or planned conferences which the community was invited to attend or help shape. To support all these activities a new open Jisc mailing list was created: [UNCWales@jisc.ac.uk](mailto:UNCWales@jisc.ac.uk). The external critical friends highlighted the importance of such a grouping reaching out internationally.

The workshop stimulated a number of new interactions, described in the meeting conclusions, and capitalising on these connections was seen as the best option for immediate, small to medium-scale grants, while ongoing work was done to build a community of researchers in the unified theme of UNC. On the research challenges that a UNC grouping could tackle, participant and critical friend feedback suggested a better approach would be to start with a top level initiative, such as the UK Grand Challenges, and form groups set

up to meet these objectives. In this sense, the UNC Wales grouping becomes an association of researchers with common interests, from which subgroups are drawn to tackle calls as they emerge.

The meeting acknowledged that many of the core subjects in UNC typically recruit low numbers of female students, and that this creates a gender imbalance which restricts the talent available to postgraduate and later research. Researchers in UNC can better frame projects around the impact of the subject rather than their intrinsic detail, can include ethics and values in their work, can be mindful of injustices which exclude women from STEM, and can all work together with ongoing EDI activities instead of expecting under-represented groups to take on this additional work.

The head of General Engineering at Swansea University Dr Patricia Xavier was at the meeting, as were two heads of School at Swansea University (Professor Elaine Crooks and Professor Antonio Gil), and so the possibility of internal support exists going forward, where UNC activity aligns to school priorities. During preparation for the workshop Dr Richard Cobley (Electrical Engineering) and Dr Edwin Beggs (Mathematics) submitted an application for a joint collaborative PhD student with three other researchers, which was successful.

Dr Sophie Schermer (Physics, Swansea University) was part of the 2019 US National Science Foundation-funded US-UK Advanced Studies Institute in Robust Control of Quantum Networks. There are ongoing discussions about the next submission, and she would like to hear from people interested in widening the scope to encompass more of UNC around a potential theme of analogue quantum computing.

## Funding opportunities discussed at the workshop

To support researchers, further information was requested on five applicable schemes for UNC in Wales.

### Engineering Research Network Wales

A Welsh Government-funded network involving all eight of the Welsh Universities with an aim to support and grow application-focused university research in the areas of engineering, technology and advanced materials. The ERNW Catalyst Fund is currently available to researchers in engineering and science who can apply for up to £3000 towards the organisation and facilities costs for meetings arranged to enable collaboration with other Welsh Universities on a potential research topic related to the network. The funding is also available for meetings with European collaborators for potential Horizon Europe projects.

### SCoRE Cymru

A Welsh Government scheme to support the costs involved in identifying and building consortia for the Horizon Europe scheme. The general scheme uses an ongoing open call. In addition, timed calls on specific applications are launched. The current call makes available up to £120k funding to support increased economic co-operation with the regions of Baden Württemberg, Brittany and Flanders. It is open to applications from all Welsh organisations with a focus on activity this financial year (up to 31 March 2023).

### UKRI Knowledge Transfer Partnerships (KTPs)

Funding for 1 – 3 years to support partnerships that help businesses to innovate, by employing academic expertise that they do not have in-house, to deliver results that the business would not otherwise be able to. Businesses provide around one-third to half of the project costs depending on their size.

### EPSRC Network Grants

To develop new interdisciplinary research communities and topics by supporting interaction between researchers and relevant science, technology and industrial groups. Funds researchers, including investigator salaries, travel and subsistence, workshops, and administrative support, at 80%. Networks must lead to new collaborative multidisciplinary research proposals in EPSRC areas. Prioritisation of interdisciplinary proposals and those that involve industrial or other users in any field of research relevant to EPSRC remit, with particular encouragement for small and medium enterprise involvement.

### EPSRC DTC

Swansea University Faculty of Science and Engineering issued the Expression of Interest Call for the 2024-25 intake during the workshop, which closed on Friday 22nd July.



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TO CHANGE THE WORLD



## About MASI

The First Minister of Wales launched the Morgan Advanced Studies Institute – MASI – on February 26th 2021. We are Wales' first Advanced Studies Institute focussed on transformative interdisciplinary research. MASI is growing a vibrant, large-scale community, a movement with an urgent purpose to respond to the world's most critical opportunities and challenges. It brings people together from across all disciplines to discover and innovate processes, materials, technologies, policies and practices that will make the world more sustainable, just, well, joyful and hopeful.

MASI will help drive Swansea University forward, serving the city, region, Wales and the world with world-class research and enterprise. It also acts as a base-camp, gathering groups to be trained, motivated and encouraged to set their eyes on the highest of intellectual and impactful summits, preparing us to attract the significant external funding needed to be an effective agent of change.

MASI is named after the late Rhodri Morgan, former First Minister of Wales and Swansea University Chancellor, whose passion for Wales and its place in the World, continues to inspire us.



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