

# Zienkiewicz Institute for Modelling, Data and AI (ZI)



Zienkiewicz Institute  
for Modelling, Data and AI

Sefydliad Zienkiewicz  
ar gyfer Modelu, Data ac AI



Professor  
Arnold Beckmann



Professor  
Chenfeng Li

## Message from ZI Co- Directors

*Our vision is to advance the frontiers of research in mathematical and computational modelling, data science, and artificial intelligence. We strive to integrate these disciplines to develop innovative solutions for real-world problems.*

*Since its inception, we have cultivated a vibrant cross-disciplinary community focused on modelling, data, and AI. This community includes over 160 academics from 16 departments and more than 340 PhD students. We nurture this community through monthly community events, regular seminars, external stakeholder engagement workshops, distinguished seminars and annual public lectures.*

*Our cross-disciplinary community in modelling, data, and AI spans the entire university. Our research theme leads are embedded in all faculties, and ZI is spearheading the university's engagement with the Turing network. The Grenoble-Swansea Centre for AI leverages strong synergies with ZI, and ZI is also at the forefront of the university's High Performance Computing initiative, establishing it as a key technical capability.*

*For the near future, we will focus on external engagement to raise ZI's profile and recognition both nationally and internationally. Specifically, we aim to expand industrial opportunities as another pillar for research and innovation engagement. Additionally, we will concentrate on forming and nurturing our postgraduate research (PGR) cohort, building on our already substantial PhD cohort. This effort will be complemented by our new MSc by Research in Modelling, Data, and AI, for which we will actively recruit a significant cohort. We will also emphasize research coaching and capacity building for grant capture to enhance our members' success in securing funding.*

***Arnold and Chenfeng (ZI founding Co-Directors)***

The Zienkiewicz Institute for Modelling, Data and AI is named for the late Olek C. Zienkiewicz (1921-2009), who served as Professor of Civil Engineering at Swansea University from 1961 and until his passing. Zienkiewicz was an engineer and a mathematician who had a broad vision of modelling the world, and using computers to generate and explore data to solve engineering problems. He pioneered Finite Element Methods mathematically and computationally and, in particular, expanded enormously their areas of application.



Professor Olek Zienkiewicz  
18th May 1921 – 2nd January 2009

## Executive Summary

- **ZI Community:** 160+ academics from 16 departments, 340+ PhD students, 2 AI CDTs, and the ZI MSc by Research program.
- **Research Outputs:** A total of 1,139 publications (Source SciVal data).
- **Grant Submission and Awards:** A total of 134 successful bids totaling £19,168,253M.
- **Zienkiewicz Lecture:** An annual public lecture showcasing research highlights in science and technology.
- **ZI Distinguished Seminars:** Talks by world-leading researchers shaping advancements in modelling, data, and AI.
- **ZI Community Events:** Monthly interdisciplinary gatherings for idea exchange and collaboration.
- **ZI Regular Seminars:** Research seminars featuring external speakers.
- **ZI External Engagement Workshops:** Research summits with strategic partners and stakeholders.
- **Turing University Network:** member since 2023, advances AI and data science through fellowships, student programs, conferences, and strategic collaborations in key research areas.

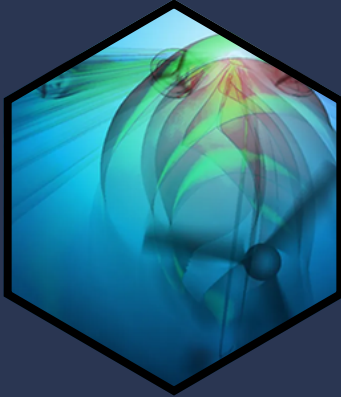
# Our Team



## Zienkiewicz Institute Themes and Theme Leads

### Modelling, Data and AI for Climate Change

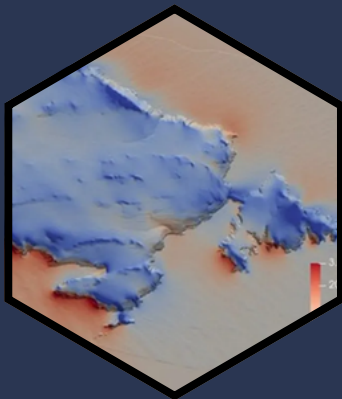
At the ZI Institute, we believe that modelling, data science, and AI are crucial for climate action. They help develop and deploy net zero solutions, predict and mitigate climate extremes, and support interdisciplinary efforts for a sustainable, adaptable society and environment.



Professor  
Enrico Andreoli



Dr  
Yunqing Xuan



### Modelling, Data and AI or Agriculture and Health

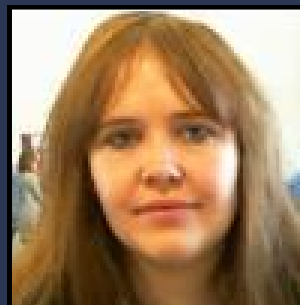
AI is revolutionizing health with breakthroughs in prevention, early diagnosis, and drug discovery. In agriculture, cutting-edge robotics and algorithms optimize geospatial data and assess climate impact. Our mission: foster collaboration, drive innovation, and share expertise to shape the future of these critical fields.



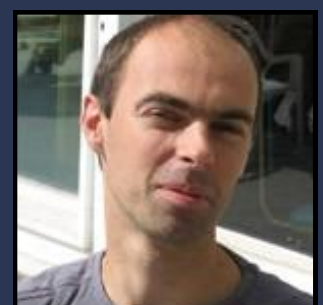
Professor  
Rhiannon Owen



Professor  
Rich Fry



Miss  
Clare Barnes

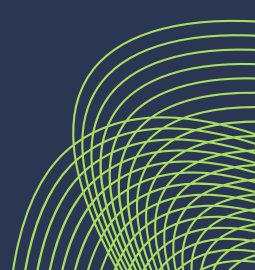


Dr  
Benjamin Mora



Mrs Ruth Caulton

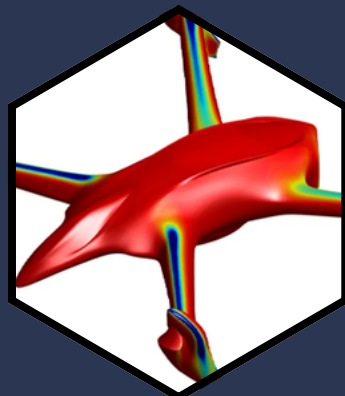
### Research Institute Coordination and Executive Support



# Our Team



## Zienkiewicz Institute Themes and Theme Leads



### Modelling, Data and AI for Materials and Manufacturing

We explore using Modelling, Data, and AI to address materials and manufacturing challenges. Research includes new material design, process optimization, robotics for manufacturing, digital twinning, and circular economy. Our goal is to build a community, foster collaboration, and share knowledge and experience.



Professor Ben Evans



Professor Mark Whittaker



### Modelling, Data and AI in Social Sciences, Humanities and Economy

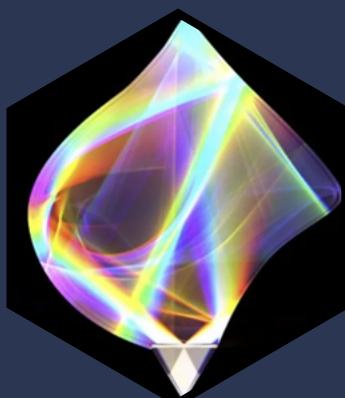
We are committed to advancing the integration of AI modelling and data science to solve social issues fostering transformative research and real-world impact. Through interdisciplinary collaboration, we enhance understanding of human behaviour, economic dynamics, and cultural heritage.



Dr Frederick Boy



Dr Matt Roach



### Foundation and Methods for Modelling, Data Science and AI

We aim to build and support an interdisciplinary community with strong foundations that can significantly contribute to the development of novel methods and understanding in modelling, data and AI. We facilitate opportunities to interact with other researches within the institute and beyond, enabling and supporting application driven development of novel methods.



Professor Wulf Dettmer



Professor Gibin Powathil

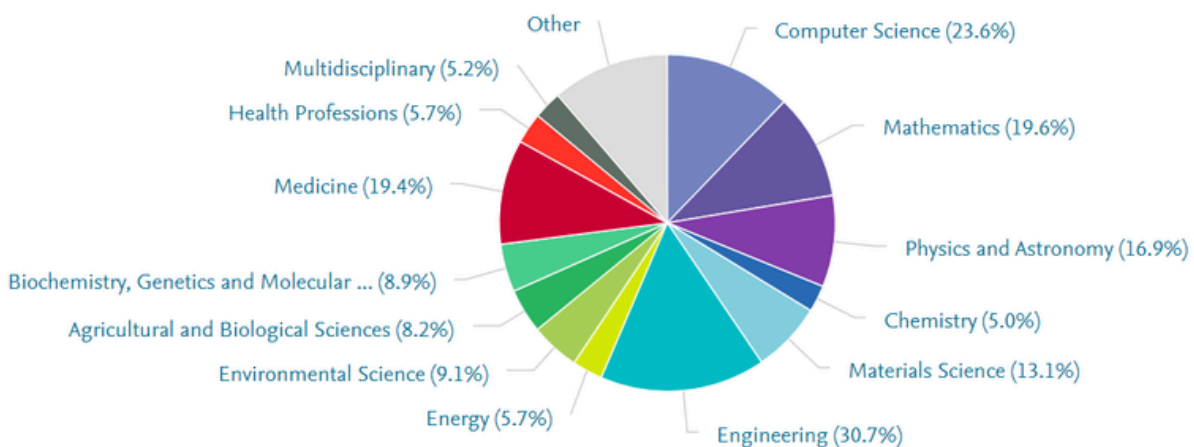
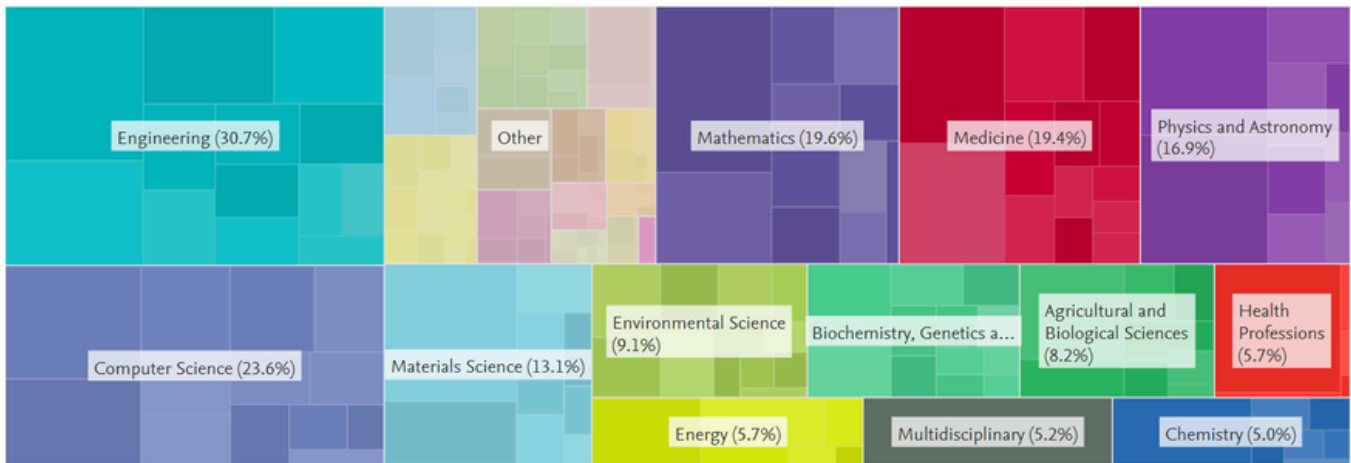




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Since the launch of The Zienkiewicz Institute for Data, Modelling and AI in 2022, the community has grown significantly with our membership now having over 200 academics, researchers and postdocs as well as in excess of 340 PhD students, fostering multidisciplinary research in fields related to modelling, data analytics, and AI.



(source: SciVal 2021-2024)





Zienkiewicz Institute  
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The ZI PhD community consists of over 340 PhD students supervised by our academic members from 16 departments across the University. The SU IEEE Student Branch is a student-led initiative connecting students from various faculties with a global network of peers, academics and professionals across universities and industries. Our branch offers an invaluable platform for student to collaborate, receive career advice, and develop research and transferable skills through peer-organised events fostering interdisciplinary knowledge sharing, mutual support and networking opportunities that help shape their professional paths.

The Zienkiewicz Institute offers a 1-year research-based MSc at Swansea University. Students work on pre-agreed projects with supervisors, receiving training in modelling, data, and AI. They join a vibrant research community and engage in seminars, conferences, and workshops. Graduates earn an MSc by Research in Modelling, Data, and AI.



## ZI PGR Coordinators



Dr  
Fabio Caraffini



Professor  
Wulf Dettmer



Professor  
Gibin Powathil

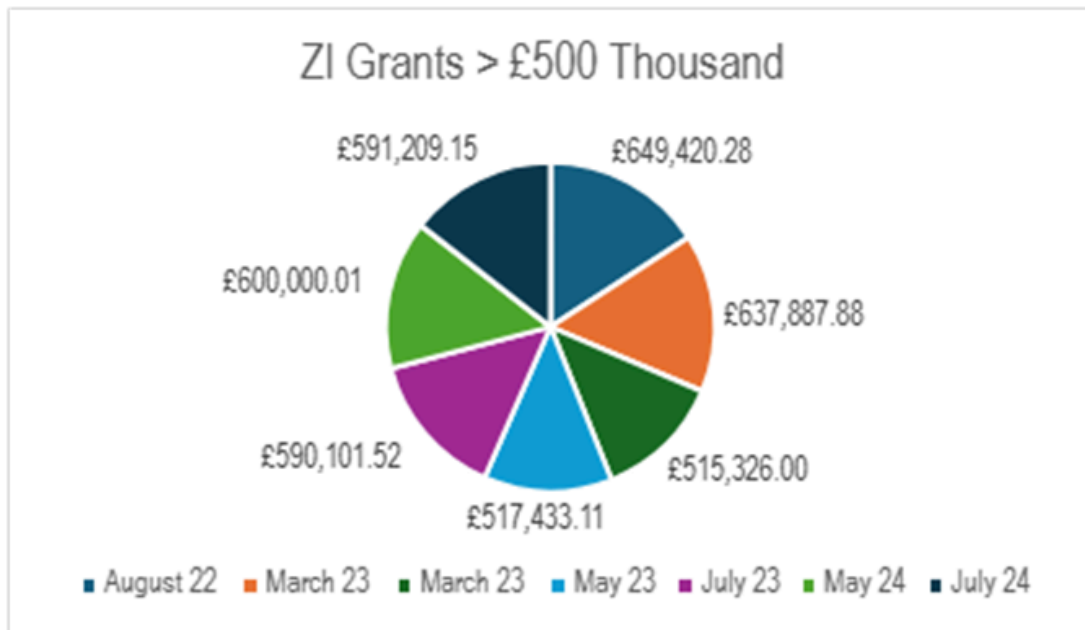
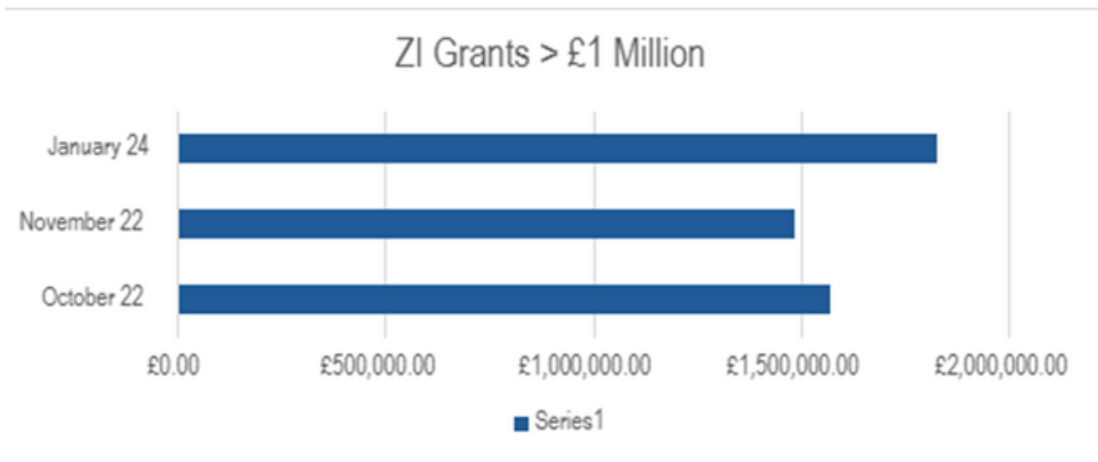
# ZI Funding Success



Zienkiewicz Institute  
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An analysis of our grant portfolio from August 2022 to December 2024, shows that Zienkiewicz Institute members were awarded a total of 134 successful bids totaling **£19,168,253M** in grant income. In this financial period 3 large grants > £1M , 7 grants > £500 thousand and 124 smaller grants < £1M).



(source: AMS 2022-2024)

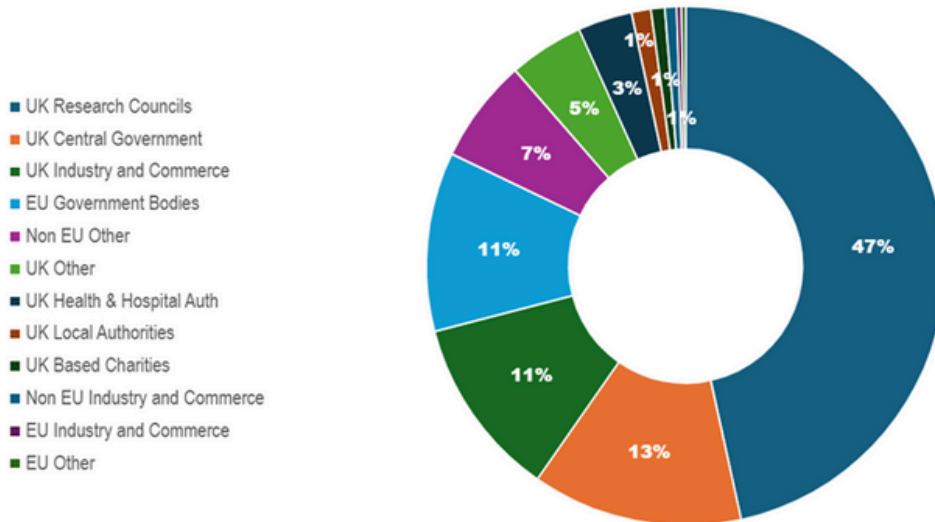




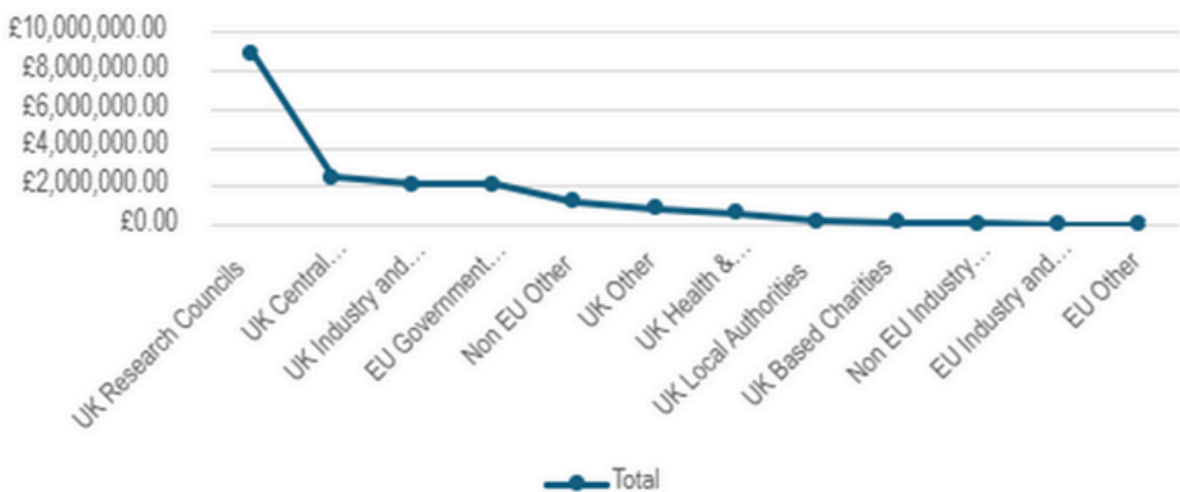
# ZI Grants in numbers 2022-2024

The majority of the research income (47% of the total value) is funded by UKRI Research Council, with 13% UK Central Government and 11% UK and Commerce.

ZI Grant Portfolio (A 2022 - Sept 2024) by Sponsor Category



ZI Grant Portfolio (Aug 2022 - Dec 2024) by Sponsor Category



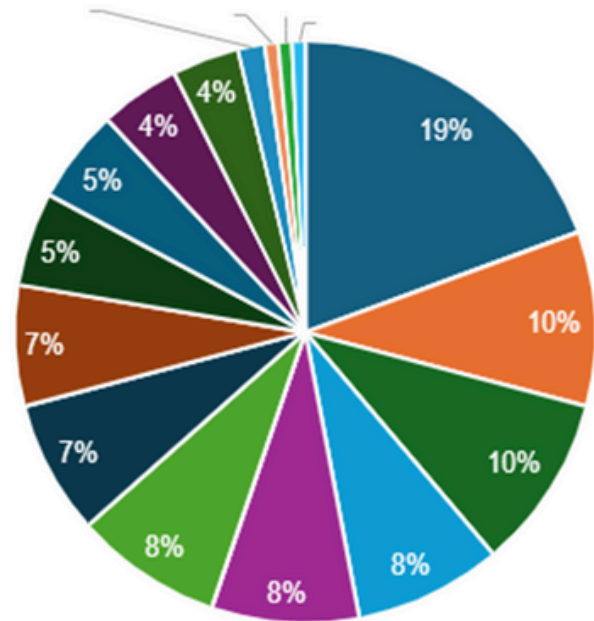
(source: AMS 2022-2024)

# ZI Grants in numbers 2022-2024

This chart analysis is for the financial period August 2022 to December 2024

ZI Grant Portfolio (Aug 2022 - Dec 2024)

- Computer Science
- Mathematics
- Biomedical Engineering
- Sport and Exercise Sciences
- Biosciences
- Civil Engineering
- Chemistry
- Aerospace Engineering
- Chemical Engineering
- Materials Science and Engineering
- Electronic and Electrical Engineering
- Mechanical Engineering
- Engineering
- General Engineering



(source: AMS 2022-2024)

The total number of grants submitted by Zienkiewicz Institute members August 2022-December 2024 was 476. The number of grants still awaiting funder decisions, that were submitted in 2024 is 139 with a total potential award value of > **£63 million**.

We would like to applaud our colleagues on the collaborative efforts and dedicated work to secure future funding.





Started in 2017, the Zienkiewicz Lecture is an annual public lecture, spreading across disciplines in science and technology. Prior to 2022, Zienkiewicz Lectures have been given by:

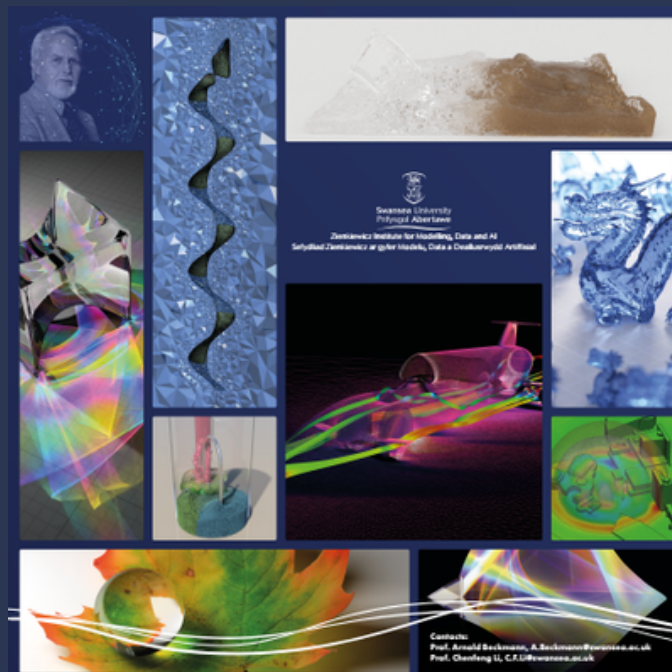
2021: Guest speaker - Baroness Brown of Cambridge delivered a lecture entitled 'Net Zero: Why is it so important and how do we get there?'.

2020: Guest speaker - Professor Sir Andy Hopper delivered a lecture entitled 'Computing for the Future of the Planet'.

2019: Guest speaker - Professor Sir Martyn Poliakoff delivered a lecture entitled 'Supercriticality: from blue fluid to green chemistry'.

2018: Guest speaker - Professor Lord Kumar Bhattacharyya delivered a lecture entitled 'The mobility revolution: How innovation in automotive energy systems, intelligent vehicles and service customization will transform how we travel'.

2017: Guest speaker - Professor Dame Ann Patricia Dowling delivered a lecture entitled 'Towards a Silent Aircraft'.





## ZIENKIEWICZ LECTURE

A Whole Systems Approach to achieving Net Zero: a 21st Century - 9th November 2022

Swansea University were proud to welcome guest speaker Professor Sir Jim McDonald BSc, MSc, PhD, DSc, CEng.

[Professor Sir Jim McDonald Wikipedia Link](#)

Professor Sir Jim McDonald is Principal and Vice-Chancellor of the University of Strathclyde. He Co-chairs, with the First Minister of Scotland, the Scottish Government's Energy Advisory Board. He is Co-Chair of the Independent Glasgow Economic Leadership Board. He currently holds several senior business appointments with organisations including the Weir Group plc, Scottish Power plc, and the UK National Physical Laboratory. Additionally, he Chairs or participates in several senior committees related to research, economic development and education.

In the Queen's Jubilee Birthday Honours List 2012, Professor McDonald was awarded a Knighthood for services to education, engineering and the economy. He was elected President of the Royal Academy of Engineering in September, 2019, through which he is a member of the UK Prime Minister's Council for Science and Technology. He was appointed to the Rolls-Royce Chair in Electrical Power Systems since 1993. He is a Fellow of the Royal Academy of Engineering, the Royal Society of Edinburgh, the Institution of Engineering and Technology, the Institute of Physics, the Energy Institute and an international member of the US National Academy of Engineering.



To view the Zienkiewicz Lecture click here >





### Health Care Transformation through Science and Technology - 22nd November 2023

On Wednesday 22nd November, Swansea University hosted its seventh Zienkiewicz Lecture. The University was delighted to welcome guest speaker, Professor The Lord Darzi of Denham OM KBE PC FRS.

[Ara Warkes Darzi, Baron Darzi of Denham Wikipedia Link](#)

Professor Lord Darzi of Denham is Co-Director of the Institute of Global Health Innovation at Imperial College London and holds the Paul Hamlyn Chair of Surgery at Imperial College London. He is a Consultant Surgeon at Imperial College NHS Trust and the Royal Marsden NHS Foundation Trust. Professor Darzi is Chair of the NHS Accelerated Access Collaborative, Course Director, NHS Digital Health Leadership Programme and Chair for the Pre-emptive Medicine and Health Security Initiative at Flagship Pioneering UK.

To view the Zienkiewicz Lecture click here >



### The Geopolitics of the Internet and Its Implications for the Governance of AI - 20th November 2024



The Zienkiewicz Institute was delighted to welcome Professor Dame Wendy Hall DBE, FRS, FEng, Regius Professor of Computer Science, Associate Vice President (International Engagement) and Director of the Web Science Institute at the University of Southampton.

[Professor Dame Wendy Hall DBE, FRS, FEng Wikipedia Link](#)

One of the first computer scientists to undertake serious research in multimedia and hypermedia, she has been at its forefront ever since. The influence of her work has been significant in many areas including digital libraries, the development of the Internet, and the emerging research discipline of Web Science. Her current research includes exploring interfaces between the social and physical sciences through the development of Web Science and the study of online systems through a sociotechnical lens. She is Managing Director of the Web Science Trust.

To view the Zienkiewicz Lecture click here >



# The Zienkiewicz-Institute Distinguished Seminars

The Zienkiewicz-Institute Distinguished Seminar Series (ZI-DS) is a growing initiative aimed at bringing together world-leading researchers to Swansea, sharing their cutting-edge research findings with the ZI community. The aim of ZI-DS is to shape our research of modelling, data and AI in the context of our five research themes.



**Professor Emile S. Greenhalgh**

**STRUCTURAL POWER COMPOSITES: ASPIRING FOR 'MASSLESS' ENERGY**  
15 May 2024

This talk by Professor Emile S. Greenhalgh focused on structural supercapacitors and introduces the concepts and motivation for their development. Adventurous material developments are needed to achieve net-zero transportation and meet the enormous challenges presented by the climate crisis.



**Professor Raffaella Ocone**  
OBE FREng FRSE

**ENERGY CHALLENGES FROM A MATERIALS PERSPECTIVE - LECTURE 1**  
4 September 2024

This talk by Professor Raffaella Ocone OBE FREng FRSE outlined how engineering practices and research priorities have shifted in response to growing concerns about climate change, environmental sustainability and the need for cleaner energy sources.



**Professor Federico Rosei**

**ENERGY CHALLENGES FROM A MATERIALS PERSPECTIVE - LECTURE 2**  
4 September 2024

Replacing fossil fuels with renewables is urgent and critical. This presentation from Professor Federico Rosei focused on next generation (solar) energy technologies from a materials perspective.

For full information and to watch the talks please click here > [Link](#)



# ZI Community Events 2022

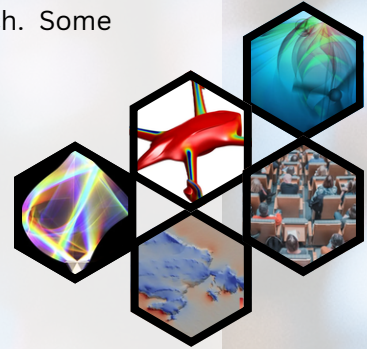
Monthly interdisciplinary gatherings for idea exchange and collaboration

Since the launch in 2022, The Zienkiewicz Institute has been hosting various events throughout the year, including monthly community events. These informal sessions are designed to provide a platform to share knowledge and expertise, build collaborations and network. A diverse, collaborative and multidisciplinary community has grown which we hope will accelerate innovation and encourage ground breaking interdisciplinary research. Some examples of the events are below.

## 2nd November 2022 - ZI - Digital Twinning Event

Speakers included:

*Professor Perumal Nithiarasu, Professor Xianghua Xie,  
Dr Dimitri Finkelshtein, Professor Chenfeng Li and Dr Farooq Shah*

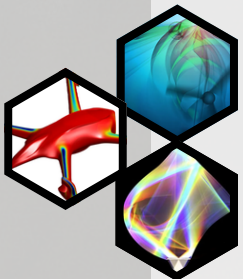


## 14th December 2022 - Railway Modelling

This event was led by Professor Markus Roggenbach who was leading his Theme.

Speakers included;

- *Professor Faron Moller - Global Centre of Rail Excellence in Wales - Opportunities for Swansea University*
- *Professor Markus Roggenbach: The Swansea Railway Verification Group*
- *Dr Monika Seisenberger: Safe and Secure Future AI-Driven Railway Technologies*
- *Dr Yue Hou: High Speed Railway Infrastructures: New Opportunities in the AI-Era*

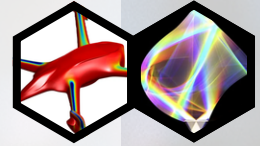


# ZI Community Events 2023

Monthly interdisciplinary gatherings for idea exchange and collaboration

## 8th February 2023 - Data-Driven Engineering Design

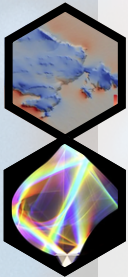
This event was kindly coordinated by Dr Llion Evans



## 10th May 2023 - ZI on Biomathematical and Biomedical Modelling

Short Theme talks included speakers;

- *Dr Raoul Van Loon: Overview of Biomedical modelling in Swansea*
- *Professor Luca Berger: Overview of Biomaths in Swansea*
- *Dr Adesola Ademiloye: Towards an Improved Understanding of the Pathogenesis of Blood-related Diseases*
- *Miss Claire Barnes: Use of deep learning for the classification and exploration of Biomedical and Environmental samples*
- *Christophe Coste: Kinship Demography: Inferring the distribution of collaterals in a population dynamics process*
- *Professor Emily Shepard: Onboard the birds: How are avian lives affected by wind?*
- *Dr Feihu Zhao: Mechanobiology-driven optimisation of environment & devices design for tissue engineering / organoid*





# ZI Community Events 2023

Monthly interdisciplinary gatherings for idea exchange and collaboration

## 12th July 2023 - ZI Annual Meeting

The main focus of the event were presentations from ZI theme leads, and a celebration of the first year of the institute.

Presentations by ZI Theme leads included;

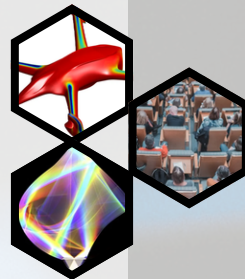
- *Foundation and Methods for Modelling, Data Science and AI: Professor Wulf Dettmer*
- *Modelling, Data and AI for Materials and Engineering: Llion Evans + Professor Mark Whittaker*
- *Modelling, Data and AI for Climate Action: professor Enrico Andreoli + Dr Yunqing Xuan*
- *Modelling, Data and AI for Agriculture and Health: Miss Claire Barnes, Professor Rich Fry (FMHLS), Dr Ben Mora, Professor Rhiannon Owen (FMHLS)*
- *Modelling, Data and AI for Social Sciences, Humanities and Economy: Professor Alan Dix*



## 13th September 2023 - ZI on Robotics and AI

The focus was on robotics and AI with the event coordinated by Professor Xianghua Xie and Dr. Ashraf Fahmy Abdo.

Formal short talks on the theme of robotics and AI included speakers; *Dr Muneeb Ahmad, Dr Daniele Cafolla, Professor Antonio Gil, Dr Mokaraam Hossain, Dr Julian Hough and Zhan Li*

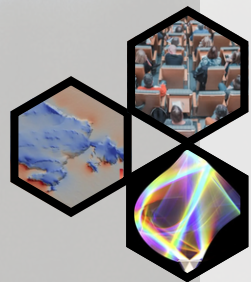


## 13th Dec 2023 - ZI on Modelling, Data and AI for Healthcare

In line with the guest Zienkiewicz Lecture by Lord Darzi highlighting the AI prospects for the Healthcare sector, this event discussed hurdles and issues with research that can be addressed by other researchers with a view to fill the gaps in research areas. New collaborations between Life Science researchers and Researchers from Computer Science, Engineering and Math departments were explored.

**Topic:** ZI Engineering, AI and big data forum on a more proficient healthcare sector.

**Description:** Participants were invited to discuss early research problems and their expectations from Engineering, AI and data modelling techniques to solve the problems.



# ZI Community Events 2024

Monthly interdisciplinary gatherings for idea exchange and collaboration

## 14th February 2024 - ZI on AI and Arts, Humanities and Social Sciences

**Focus:** AI and Arts, Humanities and Social Sciences

With NAIADES, Professor Alan Dix, Dr Fred Boy and Dr Nia Davies

### Speakers and titles;

- *Sam McGregor, AHRC Strategic Lead for KE, Translation & Commercialisation, UKRI. Q&A*
- *Peter Daish, 'Fairness Through Human Awareness: Raising decision-maker awareness of algorithmic bias in real-time through Fairness Explanations for fairer hybrid decision-making.'*
- *Dr Matt Roach, 'It takes two to tango: a synergistic approach to human-machine decision making'*
- *Dr Caroline Jones & Ben Wilson, 'How should AI be regulated? The Healthcare Context'*
- *Dr Yan Wu, towards 'An evaluation of China's 'modelling sovereignty': A case study of key Chinese generative AIs based on large language models (LLMs)'*
- *Dr Sean Walton, 'Designing the Green Transition: Gamifying the historic copperworks for better environmental outcomes'*
- *Dr Nia Davies, 'Autopoiesis? What poetry may show us about generative AI'*

## 10th April 2024 - ZI on AI strategies

This event analyzed current AI strategies:

1. UKRI AI review: Transforming our world with AI
2. UK Gov National AI Strategy
3. UK Gov AI Council AI Roadmap
4. UKRI strategy 2022 to 2027: transforming tomorrow together (with an AI focus)
5. The Turing Institute



## 17th April 2024 - AstraZeneca Seminar

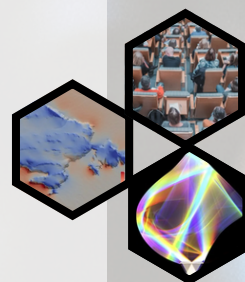
### Speakers;

Dr Mark Penney and Dr Liam Brown from AstraZeneca Oncology R and D (DMPK, Modelling).

**Research Talk Title:** Can we quantify the limits of cancer immunotherapies?

A medley of mathematical-biological models applied to oncology

**Career Talk Title:** Comparing science in academia and industry as a new starter in industry, and careers in AstraZeneca



# ZI Community Events 2024

Monthly interdisciplinary gatherings for idea exchange and collaboration

## 12th June 2024 ZI on strategy

This event covered recent strategic developments and initiatives, including:

- *Zienkiewicz Institute Distinguished Seminar series*
- *MSc by Research in Modelling, Data and AI*
- *Developing strategic research opportunities, e.g. EU and Saudi Arabia*
- *PGR community development*
- *Zienkiewicz Institute Sponsorship Scheme*

## 11th September 2024 - ZI on Foundation and Methods for Modelling, Data Science and AI

### Speakers;

- *Professor Paul Rees- Single cell data analysis for drug discovery through to medical diagnostics*
- *Dr Miguel Lurgi- Modelling the complexity of ecological systems*
- *Professor Eduardo De Souza Neto- Computational multiscale analysis of solid materials*
- *Dr Daniele Cafolla-Towards Open World Intelligent Robotics*



## 9th October 2024 - ZI on be Modelling Climate Change Impact on Energy/NetZero and Transportation

The topic for this event was Modelling Climate Change Impact on Energy/NetZero and Transportation, organised by the ZI theme: Modelling, Data and AI for Climate Action. We were also delighted to have Mr Andrew Johnson from the Global Centre for Railway Excellence (GCRE) who will be introducing GCRE and possible collaboration methods.

### Speakers;

- *Yunqing Xuan- Quantitative Modelling of Hydroclimatic Extremes under Climate Change*
- *Yue Hou- Data-driven analysis of safety and comfortability of high-speed railway infrastructures*
- *Andrew Johnson Introduction to GCRE and collaboration with the ZI communities.*
- *Hamid Eskandari - Forecasting transport energy consumption and CO2 emissions using ML*



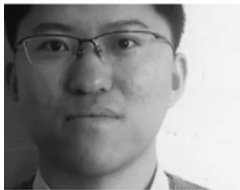
# ZI Regular Seminars 23-24

## Research seminars featuring external speakers



Dr Mokarram Hossain  
ZI Seminar  
Coordinator

Thursday 23 November 14:30 - 16:00	School of Management 113, Bay Campus	Professor Emilio Martínez-Pañeda	<a href="#">Phase field modelling of multi-physics problems: Li-Ion battery degradation, corrosion and hydrogen assisted failures</a>
Thursday 23 February 15:00 - 16:30	103, School of Management, Bay Campus	Dr Rainer Groh	<a href="#">Complex instability phenomena in soft matter</a>
Wednesday 25 January 14:30 - 15:30	001, ESRI, Bay Campus	Professor Laurence Brassart	<a href="#">Theory for coupled large deformation and hydrolytic degradation in hydrogels</a>
Wednesday 15 May 13:00-16:00	003 Computational Foundry	Professor Emile Greenhalgh	Structural power composites: aspiring for 'massless' energy



### DR XIAOXUE SHEN

11th June 2024

**Talk title:** *Knowledge graphs for digital twins of structural dynamic system*

**Venue:** ESRI Lecture Theatre, Bay Campus.

Dr Xiaoxue Shen is a Postdoctoral Research Assoc at the Alan Turing Institute.



### DR JAMES TYACKE

20th June 2024

**Talk title:** *Multi-Fidelity Turbomachinery Simulation – towards automation of complex flows*

**Venue:** Lecture Theatre 003, Computational Foundry, Bay Campus

Dr James Tyacke is a Senior Lecturer and Director of the Aerospace Research Centre at Brunel University London.



### PROFESSOR DIDIER QUELOZ

19th October 2023

**Talk title:** *The Exoplanet Revolution*

**Venue:** Grove Lecture Theatre

Professor Didier Queloz, FRS, is the Jacksonian Professor of Natural Philosophy at Cambridge University and Professor of Physics, ETH-Zurich.



### PROFESSOR EMILIO MARTÍNEZ-PAÑEDA

23rd June 2023

**Talk title:** *Phase field modelling of multi-physics problems: Li-Ion battery degradation, corrosion and hydrogen assisted failures*

**Venue:** School of Management 113, Bay Campus



### DR IKUMU WATANABE

10th July 2023

**Talk title:** *Characterization of Material Properties from Microscopic Heterogeneity using Numerical Testing*

**Venue:** B001, Engineering Central, Bay Campus



### PROFESSOR GEORGES LIMBERT

14th September 2023

**Talk title:** *Unravelling the interplay of structural and material properties of skin*

**Venue:** B003, Engineering Central, Bay Campus

### NVIDIA Modulus Deep Dive Workshop - 12th January 2023

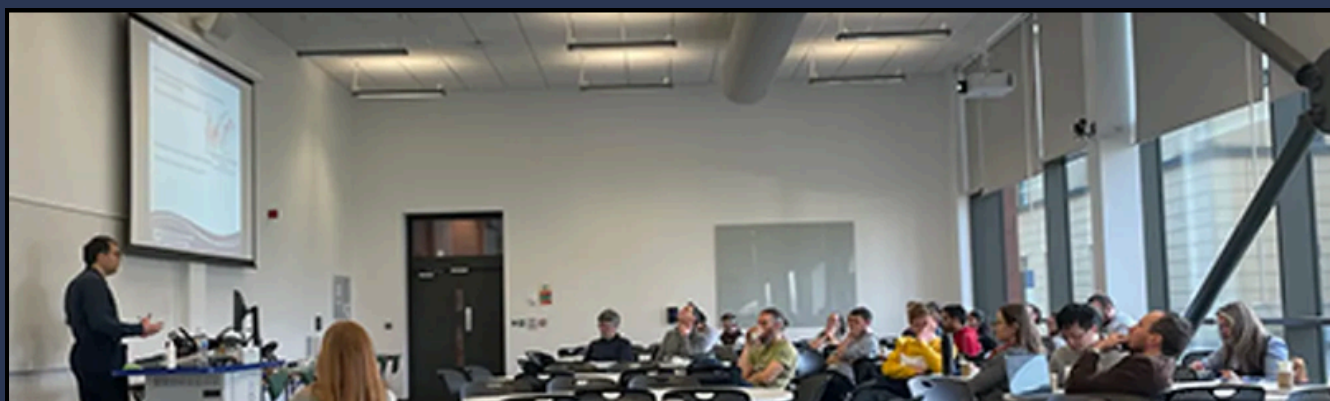


This event in the AccelerateAI project series was co-hosted by SA2C (Swansea University), UKAEA and NVIDIA.

This deep-dive 2-day event was held at Swansea University's Bay Campus, participants benefited from hands-on experience of working with NVIDIA Modulus to solve some of the problems discussed at the round-table event in 2022, and interacted directly with NVIDIA staff to solve problems that occur.

All attendees were able to take advantage of significant opportunities to network directly with Swansea University, UKAEA, STFC, and NVIDIA staff.

There were three elements to the event: Training, Hackathon and Networking



# External Engagement Workshop 2024

## Research summits with strategic partners and stakeholders



### DAFNI ROADSHOWS 2024

### WALES

### 16-17 September 2024

### Swansea University



**DAFNI** Data & Analytics Facility  
for National Infrastructure

#### DAFNI – Wales Roadshow 16-17 September 2024

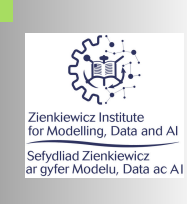
A DAFNI ‘Roadshow’ event was held on 16th and 17th September at Swansea University, with the main goal to explore opportunities with Welsh universities & industry and see how we can collaborate.

The first day involved presentations and lightning talks from ourselves and academics & industry from across Wales to understand the research we are all involved in.

The second day was focused on a workshop regarding the ‘Challenges and Barriers of Data Sharing’. This is in relation to funding we have received from the Department of Science, Innovation and Technology (DSIT). DSIT are undertaking a pilot initiative to address the barriers and opportunities to data sharing. The overall objective of this activity is to test and understand the need for a national research cloud through a series of pilot studies, including ours. The results of these pilots will inform a future funding case for further investment by government. We are looking to collect evidence within this workshop and would love for Welsh universities to be involved.

DAFNI ([www.dafni.ac.uk](http://www.dafni.ac.uk)) is a computing platform which aims to support advanced research into national infrastructure, including transport, water, and energy and city scale modelling.

DAFNI aims to improve the efficiency, reliability, and sustainability of infrastructure through better sharing and use of data, exploitation of simulation and optimization techniques, and engagement with stakeholders through visualisation. DAFNI allows researchers to scale and integrate their computational models to explore the social and environmental impacts of changes in infrastructure with much greater coverage and detail, and to deposit, share and use data collected in research projects and generated in models.



# External Engagement Workshop 2024

## Research summits with strategic partners and stakeholders



A workshop co-organized by Swansea University and the Hartree Centre was held on 26th – 27th September 2024, led by Professor Biagio Lucini.

The main purpose of the workshop was to scope future collaborations between Swansea and the Hartree Centre. Subjects covered included Artificial Intelligence, Automotive, Transport and Logistics, Computational Chemistry, Computational Fluid Dynamics, Digital Manufacturing, Fusion, High-Performance Computing, Materials, Quantum Computing and Quantum Technologies.

Credits: Hartree Centre, Materials and Manufacturing Research Institute, Swansea Academy of Advanced Computing, Zienkiewicz Institute for Data, Modelling and AI.

### Day 1: Thu. 26th of September

- *The Vision from the Hartree Centre and the University of Swansea*
- *Heterogeneous Materials: Characterization, Representation, Simulation plus (Professor Chenfeng Li)*
- *Computational design of Nature-inspired materials (Dr Francisco Martin-Martinez)*
- *Computational Materials Discovery; Virtual Experiments, Real Impact (Rick Anderson)*
- *Quantum Field Theories for Machine Learning (Professor Gert Aarts)*
- *AI for Diverse Applications from Industry and Public Sector (Adriano Agnello)*
- *Quantum Computing: From Theoretical Foundations to Industrial Proof of Concept (Emre Sahin)*

### Day 2: Fri 27th of September

- *Digital Twinning for Smart and Sustainable Manufacturing (Professor Cinzia Giannetti)*
- *The Adoption of Digital Technologies in the Automotive Sector (Tim Powell)*
- *The Mediterranean Matrix Multiplication (Dr Ben Mora)*
- *Industrial Use of High-Performance Computing: Guiding the Way to Exascale (Sue Thorne)*
- *Applied CFD and Optimisation – a selection of case studies (Professor Ben Evans)*
- *Computational Modelling for Next-Generation Design (Ubaid Qadri)*

# AI for Everyone

5th December 2024

held at the new Tramshed Swansea Building  
(The old Palace Theatre)



The event was aimed at business owners, managers and decision-makers across all industries who want to unlock the power of AI for their business. The event was a practical, business-focused event tailored for professionals who want to understand AI without the jargon.



Dr Frederic Boy Keynote Speaker



Dr Matt Roach and the expert panel

As well as hearing from guest speakers, and a panel of government, academic and industry experts, guests heard about real-world examples from local businesses who are using AI in their daily practice.

Attendees benefited from the opportunity to take part in several practical sessions led by Technocamps, Swansea University and AI Wales.







Dr Alma Rahat

Swansea University is active member of the Turing University Network, collaborating with the Alan Turing Institute, since 2023 under ZI and Dr Rahat's leadership. This partnership advances data science and AI research.

Notable engagements include Dr Rahat, Prof. Crick, and Dr Walton becoming Turing Fellows in 2024, with only 51 fellows admitted from the UK. Prof. Shaikh, a cyber-security expert, serves as an independent scientific advisor in the Innovate UK BridgAI programme. PhD student Mr Park secured a place in the Turing Enrichment Scheme.

Dr Rahat also helped organise the PhD Connect conference in November 2024, fostering research and skill development among doctoral researchers. Dr Rahat, our Turing Academic Liaison, and Ms Abi Lewis, our Turing Liaison, drive ongoing engagement, sharing opportunities via a dedicated Teams site with over 70 colleagues.

Future collaborations will focus on Turing priority areas such as health, environment and sustainability, and defence and national security, where ZI have expertise.

