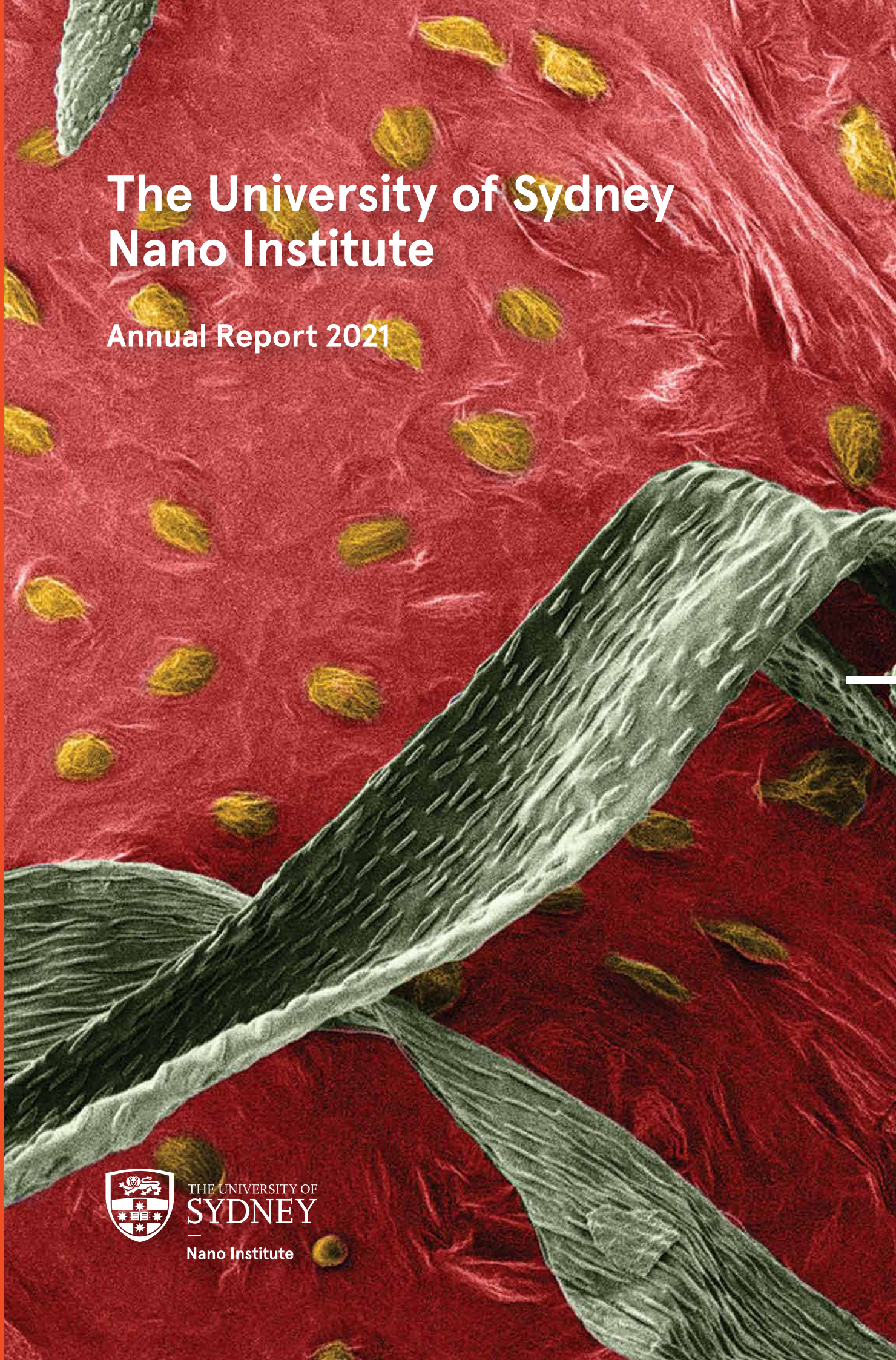
The University of Sydney Nano Institute

Annual Report 2021



THE UNIVERSITY OF SYDNEY

Nano Institute

Cover image: A nanoscale view inside a Jacaranda flower. Image credit: Anthony Katselas and Ahmed Owais.

THE UNIVERSITY OF SYDNEY NANO INSTITUTE

We acknowledge the tradition of custodianship and law of the Country on which the University of Sydney campuses stand. We pay our respects to those who have cared and continue to care for Country.

"Sydney Nano is undertaking research that has the potential to make profound and practical impacts at both global and national levels."

Professor Mark Scott AO
Vice-Chancellor, The University of Sydney

PREFACE

One of the most exciting and fascinating aspects of my role as Vice-Chancellor has been learning more about the work of Sydney Nano – I'm really impressed by its ambitious program of research, innovation and collaboration.

Sydney Nano is one of the University of Sydney's best examples of multidisciplinary research excellence: how we unlock expertise across a range of faculties and schools to jointly problem solve, with research that showcases the strength and impact gained from the plurality of our academic experts working side by side.

Sydney Nano also performs an important role in supporting our outstanding early and mid-career academics at critical points in their research careers. These emerging leaders represent the future of research here at Sydney, in Australia and in the wider world – and we need their expertise to tackle some of the most difficult research priorities that lie ahead.

Together, these colleagues are undertaking research that has huge potential – potential to make profound and practical impacts, guided by a comprehensive academic framework which delivers at both global and national levels, against the United Nations' Sustainable Development Goals (SDGs) and priority research areas identified by the Australian Government.

Sydney Nano is also a brilliant example of what can be achieved when we collaborate with others who bring their own expertise and engagement – be it other universities, research institutes, industry, or government. A recent example – the 'Network 4 Sustainable Nano' – united institutions around the world to address the UN's SDGs through nanotechnology research.

My vision for the University of Sydney in the years to come is that we are globally impactful in our research and able to leverage our strength as a large, comprehensive university where excellence is the norm. We will be broad and deep in the disciplines and take advantage of opportunities to work together and with our external partners to find solutions to the biggest challenges facing the world today, from climate change to future public health emergencies.

I'll be keenly following Sydney Nano as it enters its next growth phase, 'Sydney Nano 2.0'. I'm confident that the institute will continue to be at the forefront of producing research that supports the University to achieve our goal of becoming a truly great institution – research that is relevant, innovative, solution focused, and truly world class.

Professor Mark Scott AO
Vice-Chancellor and President, The University of Sydney

"Sydney Nano creates opportunities for public and policy engagement through unique initiatives formed from collaborative research."

Professor Ben Eggleton
Director, The University of Sydney Nano Institute

DIRECTOR'S NOTE

There is no doubt that 2021 was a challenging year for our community. However, I am continually impressed by the resilience and determination of our Sydney Nano members and I am confident that we will come out of this pandemic stronger than before. Despite a difficult year, Sydney Nano showed excellent engagement with our members, wider communities, and partners through the development and launch of several exciting initiatives and events.

Most notably, I am proud to announce the launch of our Smart Sustainable Building Network (SSBN) earlier this year. Co-chaired by myself and Professor Kim Rasmussen from the Faculty of Engineering, the SSB Network comprises of seven multidisciplinary and diverse research clusters tackling sustainability in the built environment by leveraging cutting-edge scientific advances, particularly those in nanoscale materials and nanotechnology. The framework of this Network, alongside our thriving NanoHealth Network, is aligned with the United Nations' Sustainable Development Goals (UN SDGs) alongside key government research areas. We are in the process of conducting scoping studies to assess the potential for an additional Network for Quantum, which we hope to launch in 2022.

> "These initiatives enable academics from across the University to form and join collaborative research teams and networks, with access to new expertise."

We are thrilled to welcome Professor Mark Scott AO as the 27th Vice-Chancellor of the University of Sydney. His vision for engagement and impact aligns well with the Sydney Nano academic framework and our strategic plans. I am looking forward to showcasing the brilliant work of our multidisciplinary researchers to the University Leadership at the official launch of Sydney Nano 2.0 in March 2022. A tremendous thank you to the previous Vice-Chancellor, Dr Michael Spence AC, for your lasting support of Sydney Nano.

In 2021, our inaugural six Grand Challenges have come to the end of their internal funding period. I am very impressed with their achievement and proud that all of them will continue to strive supported by external funding and engagement with Sydney Nano. Excitingly, we have selected four new Grand Challenge projects that will commence in 2022, covering the broad themes of health and sustainability and aligning well with the UN SDGs. In addition, Sydney Nano endorsed two Frontiers, one Catalyst, and five Kickstarters in 2021. You will find more information about them in our report.

Finally, thank you to the outgoing executive team – farewell to our Deputy Directors Wojciech, Anita, Omid, and James. A warm welcome to our incoming Deputy Directors – read more about this in the Outlook. In 2022, I am excited to further increase our external engagement by developing strong relationships with both national and international collaborators. I look forward to connecting with you all in person next year.

Professor Ben Eggleton
Director, The University of Sydney Nano Institute

ABOUT THE INSTITUTE

At Sydney Nano, we like to say that the next giant leap is seriously small. Revolutionary changes in science and technology have opened access to the nanoscale and together we are tackling some of the most challenging problems faced by humanity. With combined expertise from across the University's disciplines and access to purpose-built facilities, our research is taking nanoscience to new levels.

As a multidisciplinary institute, we foster and enable research and education across all faculties to develop innovative solutions to some of the world's greatest challenges. By connecting scientists and engineers to researchers in humanities, law, and the social sciences, we can create translational and transformative solutions, together.

Our mission remains to transform our economy, society, and everyday life through multidisciplinary research in nanoscale science and technology.

With global significance, our research in 2021 addressed priorities outlined by the UN Sustainable Development Goals, with a strong focus on goals 3, 9, 12, and 17. Additionally, we continue to address the World Health Organisation Priorities as well as the Australian Research Priorities.

Importantly, this work spans key focus industries, such as manufacturing, energy and the environment, medicine and health, communications, computing, and security.

Through our education, training, and outreach programs, we are inspiring the next generation of researchers. Together we are tackling some of the most challenging problems facing humanity: inventing new technologies for renewable energy; designing new medicines; creating nanorobots for medical diagnosis and treatment; and taking inspiration from nature to develop entirely new materials engineered at the nanoscale. The impact of this technology will be felt far beyond science, medicine, and engineering. That is why we are reaching across our academic community into the arts and social sciences, business, law, architecture, and design.

We work horizontally across the University and in close partnership with all faculties and schools to achieve transformational and translational outcomes supported by six strategic activity fields. Each of these fields are linked to our academic framework and continue to support our Grand Challenge projects, the Kickstarters, Frontiers, Catalysts, and our newly formed Networks.

Our strategic fields are:

- Research excellence
- Infrastructure and enabling capabilities
- Member engagement
- Outreach and training
- Academic partnerships
- Industry, innovation and commercialisation

Our vision

Our vision is to be globally trusted and recognised experts in nanoscience and technology.

Our mission

Our mission is to transform our economy, society and everyday life through multidisciplinary research in nanoscale science and technology.

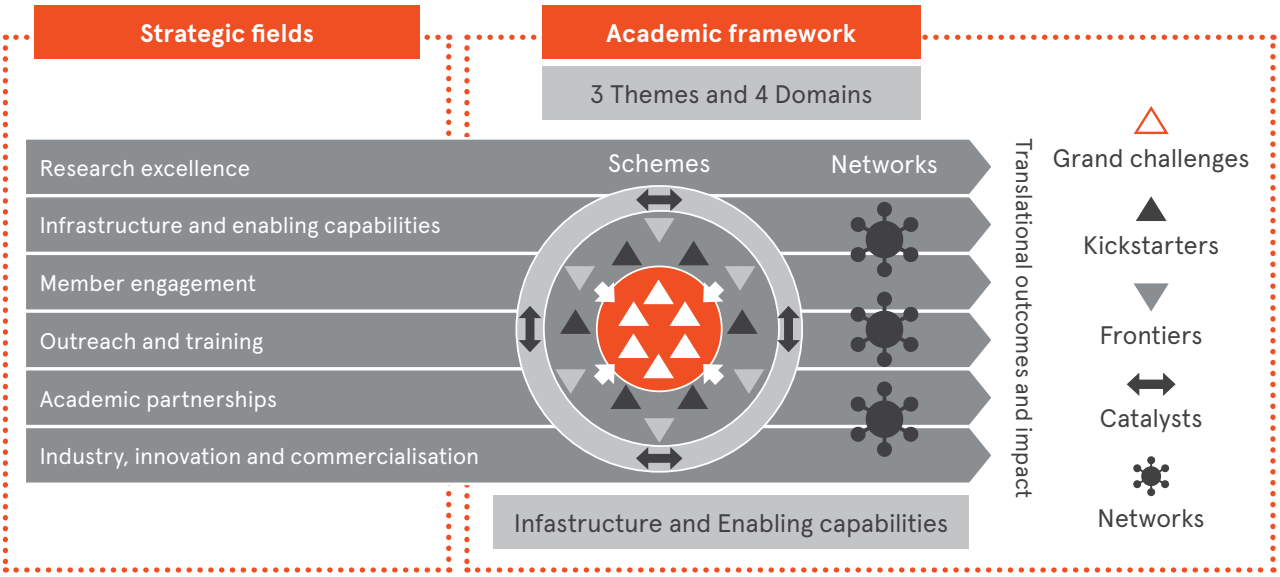
Our purpose

Our purpose is to enable, facilitate and promote transformational activities and translational outcomes in nanoscience and technology that would otherwise not be possible through existing faculty and university structures.

Sydney Nano is not separate to faculties. We facilitate transformational and translational research projects that are populated by academics who belong to faculties.

Strategic Fields and Academic Framework

Sydney Nano works horizontally across the University and in close partnership with all faculties and schools to achieve transformational and translational outcomes. Our strategy is anchored in six strategic fields.



Each of these fields are linked to our academic framework which is structured in four complementary research schemes and the newly launched Networks.

Our research activities are based on three themes and four domains and are underpinned by world-class infrastructure and capability platforms.

Themes

- Manufacturing, energy, and environment
- Health and medicine
- Communication, computing, and security

Domains

- Quantum science
- Nanophotonics
- Materials on the nanoscale
- Molecular nanoscience

What we achieve we achieve together – with our Members, our academic partners and our industry collaborators.

“The next giant leap is seriously small.”

OUR PEOPLE

Sydney Nano Executive Committee

The Sydney Nano Executive Committee, chaired by the Director, Ben Eggleton, comprises the Chief Operating Officer and five Deputy Directors, who work as a team to affect our academic, strategic, and financial goals.

Professor Ben Eggleton
Director

Dr Gunther Schmidt
Chief Operating Officer

Associate Professor Alice Motion
Deputy Director,
Outreach and Training

Dr Omid Kavehei
Deputy Director,
Member Engagement

Professor Wojciech Chrzanowski
Deputy Director,
Academic Partnerships

Professor James Rabeau
Deputy Director,
Industry, Innovation,
Commercialisation and
Enabling Capabilities

Professor Anita Ho-Baillie
Deputy Director,
Member Engagement

Early Career Research Ambassadors

The Early Career Research (ECR) Ambassadors are an integral part of the team. They represent Sydney Nano and support member engagement initiatives and activities at a faculty level, and via national and international networks including academic and social events. ECRAs ensure the integration and alignment of Sydney Nano across their Faculty/University School to meet the research and education strategies of Sydney Nano and the University.

In 2021, 11 ECR Ambassadors were nominated across seven faculties and university schools. Six of these ECR Ambassadors were appointed in 2021 with five ECR Ambassadors continuing their roles from 2020. These ECR Ambassadors support Deputy Directors Dr Omid Kavehei and Prof Anita Ho-Baillie in the Member Engagement portfolio.

Dr Helena Robinson
Faculty of Arts and Social Sciences

Dr Anusha Withana
Faculty of Engineering

Dr Mohammad Mirkhalaf
Faculty of Engineering

Dr Amandeep Kaur
Faculty of Medicine and Health

Dr Nicholas Hunt
Faculty of Medicine and Health

Dr Moritz Merklein
Faculty of Science

Dr Fred Marlton
Faculty of Science

Dr Daniel Yeadon
Sydney Conservatorium of Music

Dr Anastasia Globa
School of Architecture, Design and Planning

Dr Maria Rumyantseva
Sydney Business School

Dr Jarryd Daymond
Sydney Business School

Sydney Nano Student Ambassadors

After the success of the inaugural Student Ambassadors appointed in 2019, six Sydney Nano Student Ambassadors were nominated for 2021-2022. Mentored by the ongoing Deputy Director for Outreach and Training, Associate Professor Alice Motion, the student ambassadors developed their skills in science and technology communication.

Ms Laura Haidar
School of Physics

Mr Bryce Mullens
School of Chemistry

Ms Karuna Skipper
School of Chemistry

Mr Jed Austin
Sydney Business School

Ms Queenie Yip
School of Biomedical Engineering

Mr Timothy Newman
School of Physics

Sydney Nano International Ambassadors

In 2021, Sydney Nano appointed three inaugural International Ambassadors to act as the key contacts for academic institutions in their designated region. These Ambassadors worked closely with the Deputy Director for Academic Partnerships, Professor Wojciech Chrzanowski, to develop our academic partnership strategy and strengthen our international collaborations.

Dr Feng Li
China Ambassador Faculty of Science

Dr Markus Muellner
Europe Ambassador
Faculty of Science

A/Prof Alejandro Montoya
Emerging Regions Ambassador
Faculty of Engineering

Sydney Nano Administrative Support Unit

The Sydney Nano Administrative Support Unit provides administrative and operational support to the Sydney Nano Directorate.

Ms Trudy Fernan
Executive Officer

Ms Noella Lopez
Executive Assistant

Mr Gerard Minogue
Senior Project Officer
– SNH Operations

Ms Rhiagh Cleary
Senior Research Officer
- NanoHealth

Mr Joshua Kim
Senior Research Officer
– Science & Engineering

Ms Matilda McGahey
Project Officer
- Communications

Mr Rex Wang
Project Officer
– Digitisation & Data Management

Mr Terance Pereira
Project Officer
– Digitisation & Data Management

Ms Leesa L'Episcopo
Project Administrator

Our members

Our membership now consists of **over 1000** academic and professional staff from all faculties and service units. A unique group of people from different backgrounds and disciplines, we all share an interest and passion for nanoscience. We love working in multidisciplinary teams and creating translational and transformational outcomes that are only possible in the unique Sydney Nano environment.

The Sydney Nano structure

- Our structure brings together over 1000 academic and professional staff from all faculties and service units.
- Members are conducting nano-related research at the University of Sydney.
- Participants are PhD students and postdocs working with Members.
- Both receive defined benefits including funding opportunities.
- Our community comprises academic and professional staff at the University who work with Sydney Nano or have a general interest in nanoscience and technology.
- We seek a wide and inclusive representation from all disciplines and a higher proportion of women than usual in STEM areas.

1003

Total number of University of Sydney staff engaged

186 Members lead nano research programs as Chief Investigators

One third are **female**

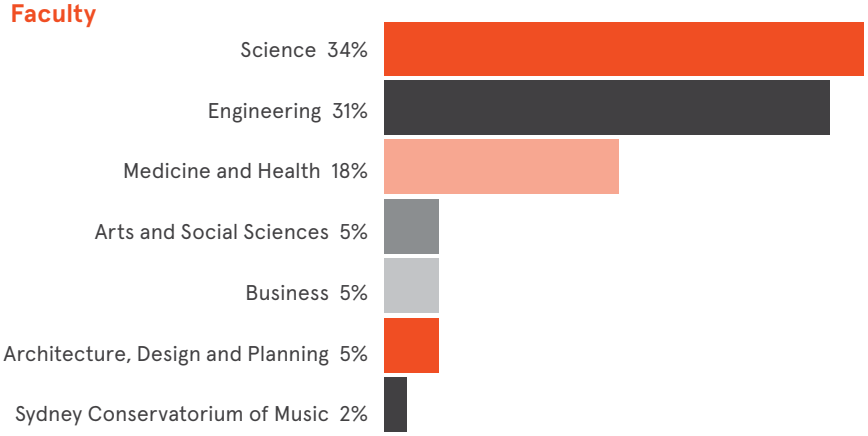
Spread over 7 Faculties/University School

41% Senior academics

34% Mid-Career Researchers

25% Early-Career Researchers

Faculty



Academic level

"I am thrilled to see all the important contributions from engineering academics and students to the grand challenge and networking schemes and I am looking forward to further strengthening our partnership with Sydney Nano."

Professor Willy Zwaenepoel
Dean, Faculty of Engineering

STRATEGIC FIELDS

In 2021, we achieved significant progress in all six strategic fields.

Research Excellence

We aim for excellence in translational and transformative research. Sydney Nano's multi-disciplinary schemes are selected by a governing body in a rigorous selection process, have a defined time frame of seed funding and have achieve ambitious key performance indicators. All 21 nodes in our four schemes made significant progress towards their missions and targets.

In 2021, Sydney Nano continued to roll-out a new framework to foster and enable cross-faculty collaborations and multidisciplinary research: Sydney Nano Networks. Networks form integrated large-scale research focus areas. Co-led by faculties, the focus is on faculty-research priorities, activating expertise across the University. Our research nodes provide great opportunities for multidisciplinary research and education, while presenting prospect for partnerships with industry, end-users and other institutions around the world. In 2021, Sydney Nano grew the NanoHealth Network and launched the Smart Sustainable Building Network.

All of the Sydney Nano schemes and networks are designed to target the United Nations' Sustainable Development Goals, the Australian Government research priorities, and the NSW Government innovation agenda in alignment with the University of Sydney's research strategy. We also expect to align with the NSW 20-year research & development roadmap, to be released in 2022.

THE UNIVERSITY OF SYDNEY
Nano Institute

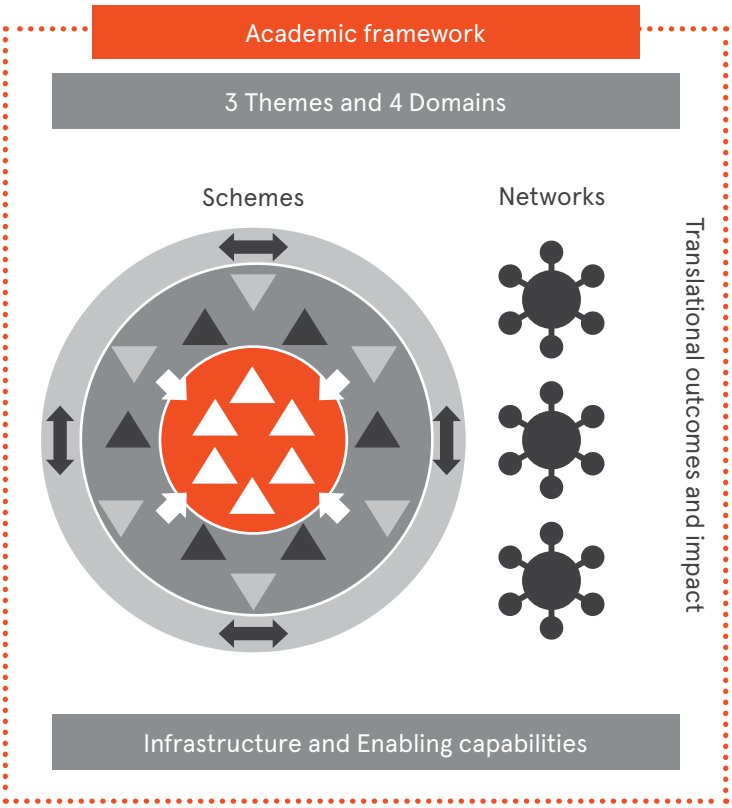
Global | National | Local

SUSTAINABLE DEVELOPMENT GOALS

Australian Government

NSW GOVERNMENT

Expanding the Academic Framework



Grand challenges
flagships nodes that focus on finding multidisciplinary solutions for one grand challenge of our society or economy

Frontiers
nodes that develop one technology platform in multidisciplinary applications with high potential of commercialisation

Kickstarters
individual nodes of multidisciplinary research that could develop into grand challenges

Catalysts
nodes led by social scientists that enhance and influence how we approach our programs and how they create impact

Networks
large scale integrated clusters of research expertise co-led by Sydney Nano and a faculty

21 Active research nodes:

6 Grand Challenges
7 Kickstarters
3 Frontier
5 Catalysts

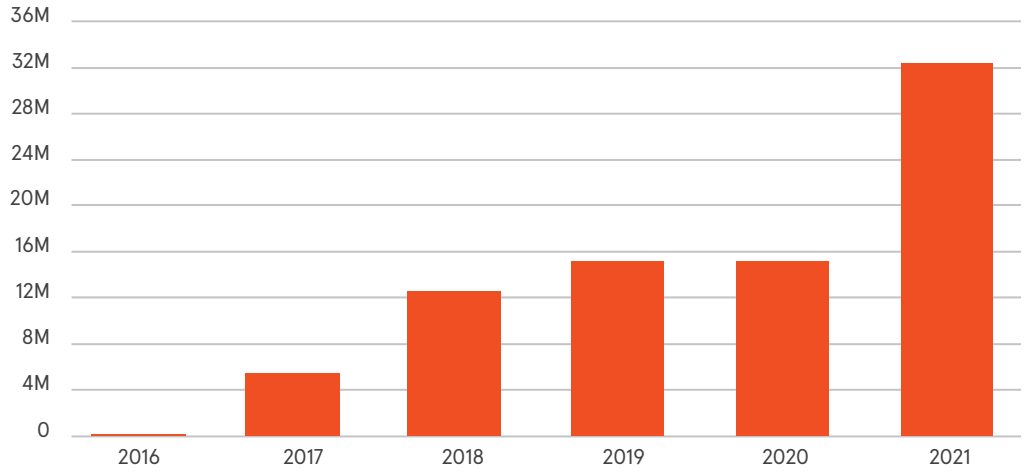
Plus 2 Networks

27 Records of invention associated with Sydney Nano

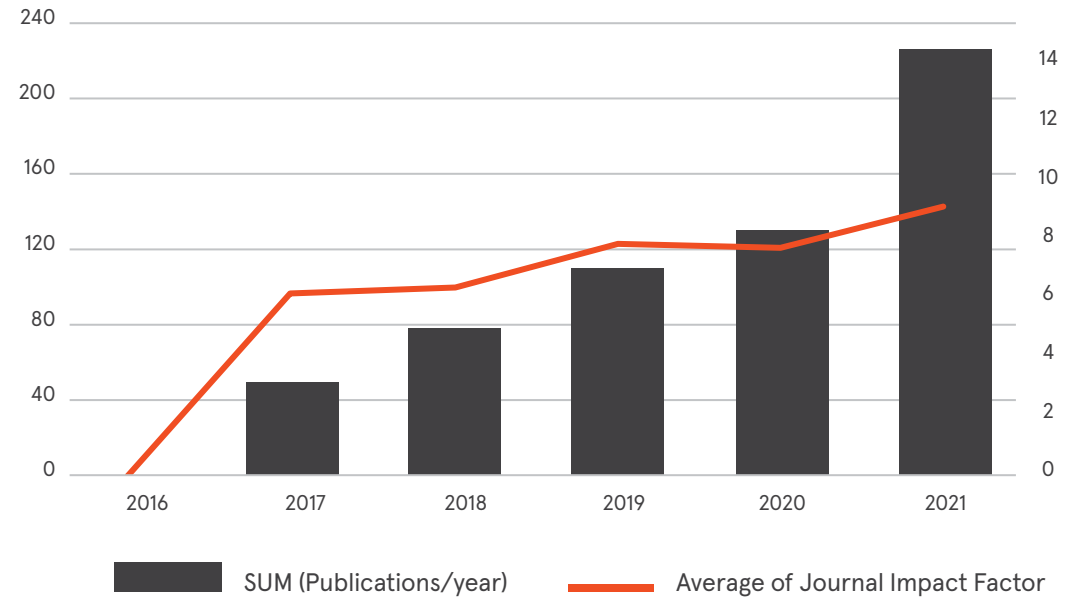
200+ academics engaged in schemes and networks across all Faculties/University Schools

2649 citations, more than doubled from 2020

62 grants enabled valued over $32 million



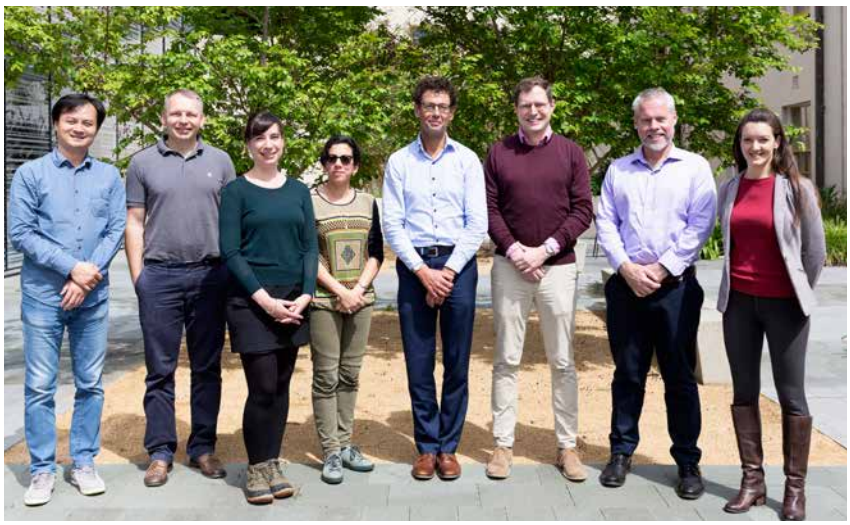
224 affiliated publications, up from 130 in 2020



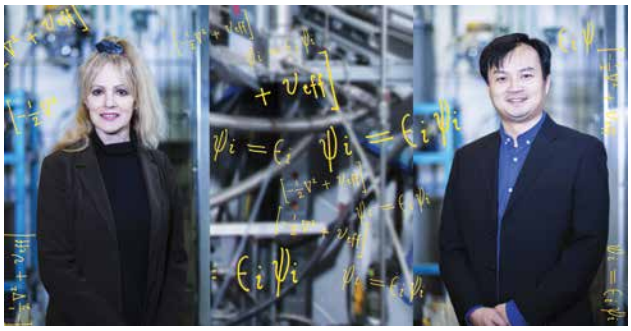
GRAND CHALLENGES

Launched in 2019, our Grand Challenges continue to discover and develop ground-breaking solutions to the world's greatest challenges.

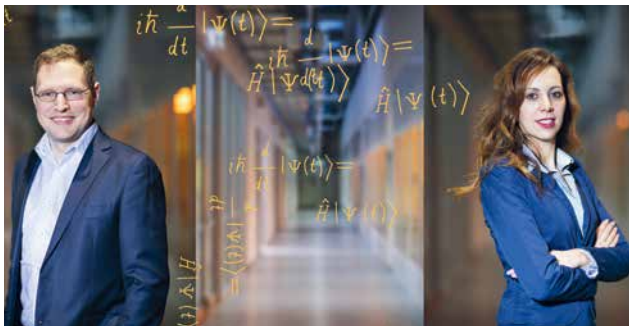
In 2021, our inaugural Sydney Nano Grand Challenges have reached the end of their internal funding period. All six research projects made significant progress towards their goals in alignment with the University of Sydney's strategic priorities. Engaging researchers across the University, the teams include senior and early career researchers, providing a platform for multidisciplinary research and education.



Grand Challenge Champions with Sydney Nano Director Professor Ben Eggleton (second from right). Pictured (from left): Professor Jun Huang; Professor Wojciech Chrzanowski; Dr Shelley Wickham; Professor Chiara Neto; Professor Martijn de Sterke; Associate Professor Ivan Kassal; Professor Ben Eggleton; Dr Anna Waterhouse.



Professor Jun Huang
and Professor Catherine Stampfl
CO_2 Zero
Reducing CO_2 emissions in manufacturing processes and converting CO_2 into commercial products through nanocatalysis.

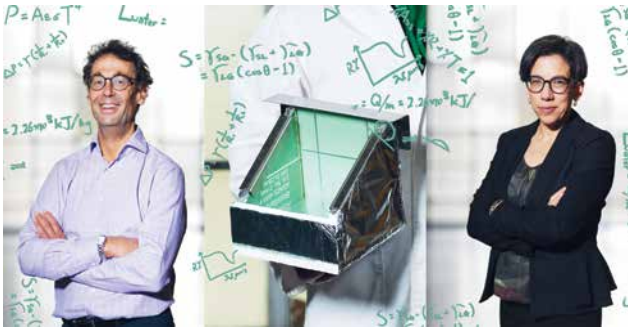


Associate Professor Ivan Kassal
and Dr Lamiae Azizi
Computational Materials Discovery
Simulating new materials from a single atom to fully functioning devices using quantum computers, multiscale simulation, artificial intelligence and machine learning.

Professor Wojciech Chrzanowski and Professor Elizabeth New

Safe-by-Design Nanotechnology

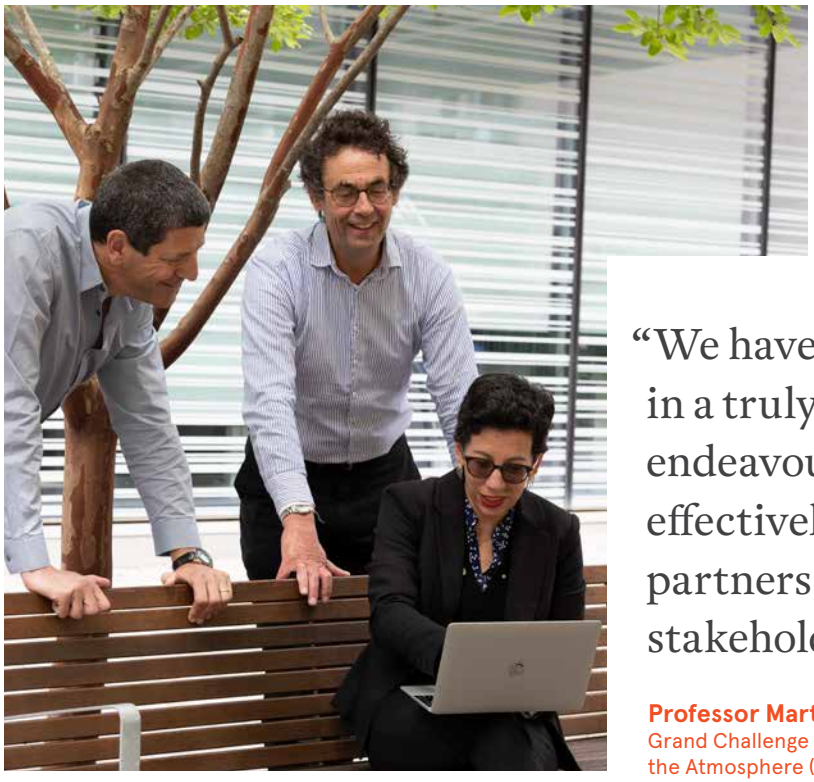
Developing a regulation framework to assess safety, efficacy and toxicity, and guiding the future development of nanomaterials across drug formulations, food additives and biosensors.



Professor Martijn de Sterke and Professor Chiara Neto

Advanced Capture of Water from the Atmosphere (ACWA)

Developing a low-cost method to capture enough water from the atmosphere, alleviating the effect of drought by providing water for humans and animals, and for irrigating plants.



Sydney Nano ACWA Team - Professor Chiara Neto, Professor Martijn de Sterke and Bridge Hub CEO Craig Shapiro.
Credit: Stefanie Zingsheim, the University of Sydney

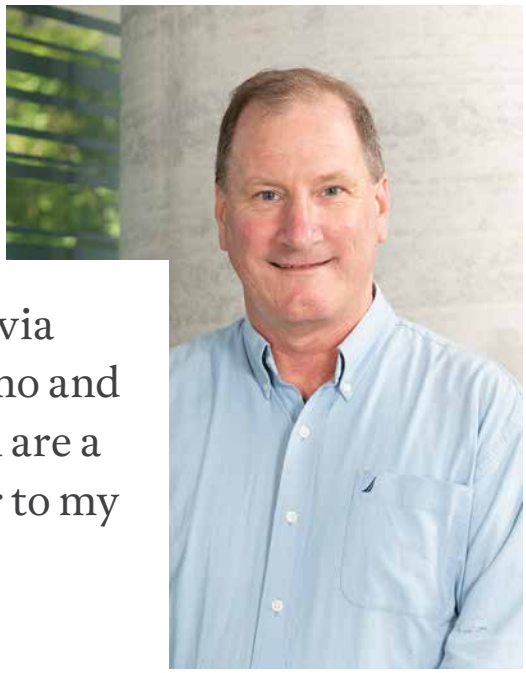
"We have learned to be involved in a truly multidisciplinary endeavour and how to engage effectively with industry partners, investors, and other stakeholders."

Professor Martijn de Sterke and Professor Chiara Neto
Grand Challenge Champions, Advanced Capture of Water from the Atmosphere (ACWA)

Dr Shelley Wickham in the lab

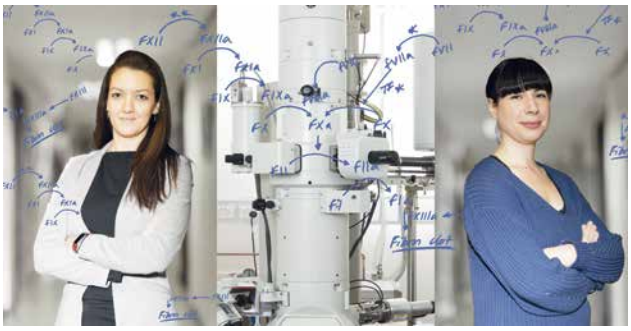
"The leadership opportunities provided to us were extremely helpful in establishing international and national recognition at ECR stage."

Dr Shelley Wickham and Dr Anna Waterhouse
Grand Challenge Champions, Nanorobotics for Health



"The connections I have made via my affiliation with Sydney Nano and the Grand Challenge program are a significant contributing factor to my academic success."

Professor Gregg Suaning
Grand Challenge Champion, Unlocking the Neural Interface



Dr Anna Waterhouse and Dr Shelley Wickham
Nanorobotics for Health
Building autonomous, programmable nanorobots to navigate through the body to detect and treat early disease.

Professor Gregg Suaning and Professor Zdenka Kuncic
Unlocking the Neural Interface
Rethinking the means of intervention into the human nervous system to make untreatable neurological diseases treatable, and to transform treatments into comprehensive cures.

Grand Challenge Achievements

Engaged:

78 academics

36 PhD Students

75+ students

24 academic partner institution collaborations globally across seven countries

15+ industry partner collaborations

59 publications generated

$10M external revenue generated

1 spin off

3 step averaged increase in Technical Readiness Level (TRL)

Additional research programs

Kickstarters

The Kickstarter projects are precursors for Grand Challenges. They enable multi-disciplinary research with a strong focus on humanitarian or environmental impact.


NanoCardio
Chief Investigators: Dr David Martinez-Martin, Professor Corinne Caillaud
NanoCardio aims to develop the scientific and technological grounds to accurately and non-invasively track the BP of patients in real-time and over a period of hours to days.


Hybrid nano-systems curing cancer spread
Chief Investigators: Dr Pegah Varamini, Dr Behnam Akhavan
Harnessing the power of nanotechnology to shift palliative care to preventative solutions for cancer spread via an interdisciplinary multimodal approach.


Nano In Sight
Chief Investigators: Professor Stephanie Watson, Dr Yogambha Ramaswamy
Employing novel bioengineering strategies to address a critical problem in regenerative machine and stem cell therapeutics.

NanoEnergised
Chief Investigator: Professor Ali Abbas
Developing nano phase change materials (nanoPCMs) as a technology platform for a myriad of applications, starting with a focus on a high-efficiency heat battery device for nanoenergised applications in solar roof structures and biomedical wearable technology.

Engineered nanoparticles for treatment of Parkinson's disease
Chief Investigator: Professor Carolyn Sue
Engineering nanoparticles to target dopaminergic neurons and deliver agents that preserve mitochondrial function as a form of treatment for Parkinson's disease.

Bacteriophage NanoRobots
Chief Investigator: Dr Hien Duong
Combining science, engineering, and medicine to perform cutting-edge research using nanotechnology to develop smart phage nanorobots to fight resistant bacteria.

Smart sensors for intelligent buildings
Chief Investigator: Associate Professor Daniel Dias-Da-Costa
Developing an efficient, reliable sensing platform that continuously monitors the critical parameters of sustainable civil structures.

Frontiers

The Frontier scheme was designed to assess and develop one emerging technology platform in multiple applications to identify technology transfer opportunities over a diverse range of sectors.


Breaking space-time barriers with nanosensors

Chief Investigators: Dr Amandeep Kaur and Professor Kate Jolliffe

Addressing food security and health care by developing a molecular and nanotechnological approach to visualise and measure biological and biochemical events.


NanoFluidics

Chief Investigators: Associate Professor Stefano Palomba and Dr Daniele Vigolo

Identifying critical applications of Nanofluidics by conducting academic and industrial mapping in the areas of nanohealth and sensing.

Quantum Sensing

Chief Investigator: Professor James Rabeau

A global perspective on the applications where quantum sensing technologies could play a transformational role in areas such as archaeology, defence, infrastructure, medicine, and mining.

Catalysts

Catalyst projects encourage new ways of thinking about research. They aim to bring together social scientists, artists, and musicians with researchers from science, health, medicine, and engineering.



Nano Technology – Economy – Society
Chief Investigators: Dr Maria Rumyantseva, Professor Susan Park, Professor Ali Abbas
Enhancing the commercialisation of nano technologies through developing innovative methodologies for the assessment of the interdependencies between a technology, the economy and the society.



NanoResonance
Chief Investigators: Dr Diana Chester, Dr Benjamin Carey, Mr Liam Bray
The multi-disciplinary NanoResonance team explores the outputs of scientific data creatively, investigating modes of creative expression made possible by combining 3D audio and video with machine learning and artificial intelligence methods.



Developing Interdisciplinary Expertise
Chief Investigators: Professor Lina Markauskaite, Professor Peter Goodyear, Professor Cara Wrigley
Improving the understanding of how our research nodes and networks create multidisciplinary knowledge and how they learn to function effectively. In addition, the team investigates what it takes for individuals to develop the resourcefulness needed to tackle interdisciplinary challenges.




Nanosonic Stories
Chief Investigators:
Associate Professor Alice Motion,
Dr Chiara O'Reilly,
Dr Naseem Ahmadpour,
Dr Daniel Yeadon
Nanosonic Stories researches effective ways to communicate nanoscience through sound. Using original compositions of music, soundscapes and aural storytelling, this catalyst finds new ways to audibly illustrate scientific concepts and articulate emotions inspired by science at some of the smallest scales.


Engaged Innovation Scholarship for Impact
Chief Investigators:
Professor Steven Maguire,
Professor Eric Knight
Simultaneous teaching and research about innovation, entrepreneurship and related topics by social scientists who are embedded in Sydney Nano's multidisciplinary nodes to study and contribute to innovation 'in the making'.


A31
Sydney Nanoscience Hub
Messel Lecture
Theatre

"Sydney Nano exemplifies the multidisciplinary collaboration that is part of our strategic transformational and translation research engagement. We are particularly pleased with the engagement of FMH Schools from academics and students as medicine & health is balancing several convergent revolutions. The NanoHealth network bridges clinical research with science and engineering captured by our involvement in the Sydney Nano Grand Challenge as we grow the future-facing, at-scale nanomedicine and nanobiology research."

Professor Robyn Ward
Executive Dean and Pro Vice-Chancellor (Medicine and Health), Faculty of Medicine and Health

Professor Mark Rees
Deputy Executive Dean (Research Partnerships), Faculty of Medicine and Health

Sydney Nano Networks

Sydney Nano Networks are created and co-led with faculties. Aligned with faculty strategies, the networks form integrated large-scale research focus areas with the potential of achieving transformational research outcomes and global impact. In 2021, we continued to expand our NanoHealth Network and launched a new Network focussed on Smart Sustainable Building.

NanoHealth Network

Professor Ben Eggleton (Sydney Nano) and Professor Mark Rees (Deputy Executive Dean (Research Partnerships), Faculty of Medicine and Health)

Transformational solutions for global health issues

From round-table discussions to the lab, the inaugural Sydney Nano Network, NanoHealth, enables efficient, innovative solutions to health problems. The network opens the dialogue between multi-disciplinary researchers, industry, and end users, transforming how nanotechnology is used in areas of medicine and health.

NanoHealth aims to address real-world global health challenges, such as the World Health Organisation's top health priorities; Sustainable Development Goals 3, 9 and 12; and locally, the Australian Medical Research and Innovation priorities. NanoHealth's research priorities are outlined by its clusters.

Smart Sustainable Building Network

Professor Ben Eggleton (Director, Sydney Nano) and Professor Kim Rasmussen (Deputy Dean, Faculty of Engineering and IT)

Designing future proof buildings through nanotechnology

The Smart Sustainable Building Network (SSB) connects expertise at the University of Sydney in Engineering and Sciences with academics in Architecture, Design & Planning, Law, Business, and Health to focus on global and national building sustainability priorities. This Network will leverage cutting-edge multi-disciplinary research capabilities with an emphasis on those that are anchored in nanoscale materials and nanotechnology that will lead to innovative capabilities with impact on the built environment.

The SSB Network addresses building-related UN Sustainable Development Goals, particularly 9, 11, 12, and 13, as well as the NSW Government net-zero emission strategy. In addition, this network also contributes to the Australian National Research Priorities as well as the University of Sydney Sustainability Strategies. The SSB Network is structured in two categories, 'Smart Building Blocks' and 'Sustainable Building Management', comprising seven clusters with complementary research priorities.

NanoHealth Network – Clusters

Computational Nano-Medicine

Dr Svetlana Postnova and Dr Lamiae Azizi

Computational Nano-Medicine is the key to mobilising the next generation of health technology. The cluster aims to advance our understanding of the mechanisms, diagnosis, and treatment of human diseases.

Sensors and Diagnostics

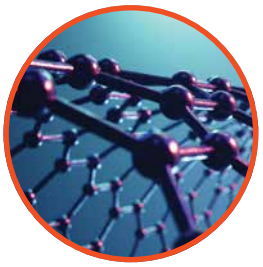
Dr David Martinez Martin and Professor Corinne Caillaud

This cluster guides clinical decisions for better treatment outcomes by using and creating nanoscale sensors to detect pathogens, cellular responses, molecules of interest, and vital signs.

Nano-Pharma

Dr Nicholas Hunt and Dr Pegah Varamini

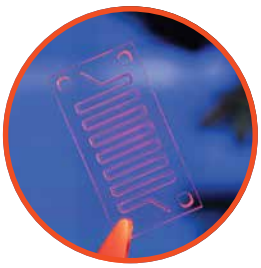
Nano-Pharma seeks to develop next-generation nanotherapeutics to enable precision clinical treatments. The team engineers nanomaterials, enabling an active and passive targeted delivery of proteins, peptides, bioactive, and drug molecules to cells and organs.



Nano Bioengineering

Dr Yogambha Ramaswamy and Dr Steven Wise

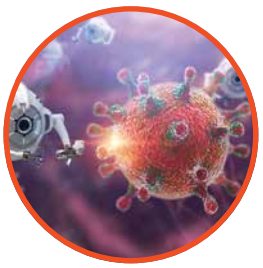
Nano Bioengineering engineers biomaterials at the nanoscale to improve functionality and biological performance. This process including coatings, nanocrystals, nanofiber, and nano catalyst.



Lab/Organ On-Chip

Dr Daniele Vigolo and Associate Professor Stefano Palomba

This cluster develops chip-based devices for nanoscale processes including sensing, molecular assembly, chemical synthesis, interfaces, and microfluidics. This allows the team to develop models that mimic human physiology and disease.



Multifunctional Nanoparticles

Dr Anna Waterhouse and Professor Wojciech Chrzanowski

This team is developing the next generation of multifunctional nanoparticles such as up-conversion nanoparticles and nanorobots, enabling more sensitive disease detection, diagnosis, and therapies.

Smart Sustainable Building Network – Clusters

Smart Building Blocks

Building Envelope

A/Prof Sandra Loschke and Prof Anna Paradowska

Applying the advantages of nanomaterials and nanostructured surfaces, this cluster creates solutions for building surfaces. Smart facades, roofs, and windows become self-cleaning, control temperature, reduce noise, and harvest and store energy.

Indoor Environment

Prof Richard de Dear and Dr Alex Y Song

The Indoor Environment cluster integrates nanotechnologies in temperature, light, and air quality control systems focusing on improvements in user wellbeing and living experiences.

Building Efficiency

Dr Arianna Brambilla and Professor Yuan Chen

This cluster tackles efficiency challenges associated with energy, cost, and time consumption for both building construction and operation, developing innovative nanomaterials and applying efficient design principles to create low carbon buildings.

Sensors and Automation

Professor Simon Fleming and Dr Ali Hadigheh

This cluster combines cutting-edge artificial intelligence and machine learning algorithms with embedded smart sensors to design automated building systems and optimise functionality and energy consumption of the building operation. The team will shorten sensor design cycles which in turn maximise the design diversity of the next generation of smart sustainable building.

Sustainable Building Management

Circular Construction, Supply Chain & Life Cycle Management

Professor Ali Abbas and Dr Arunima Malik

This cluster aims to enhance energy efficiency in construction while minimising generation of building construction/operation wastes and significantly reducing the number of new materials. This includes analysis of life cycle data of building structures using nano sensor technology. The team will focus on hybrid manufacturing as well as circular and sustainable construction.

Virtual Design & Construction

Associate Professor Daniel Dias-da-Costa and Dr Mike Seymour

This cluster will focus on designing a virtual carbon neutral building that is water and energy efficient; has improved air, light, acoustics, and product finishes; promotes physical activity; reduces waste; and considers climate change and environmental impacts in construction and operation.

Legislation, Regulations & Rating Schemes

Nicole Marchhart and Dr Katherine Owens

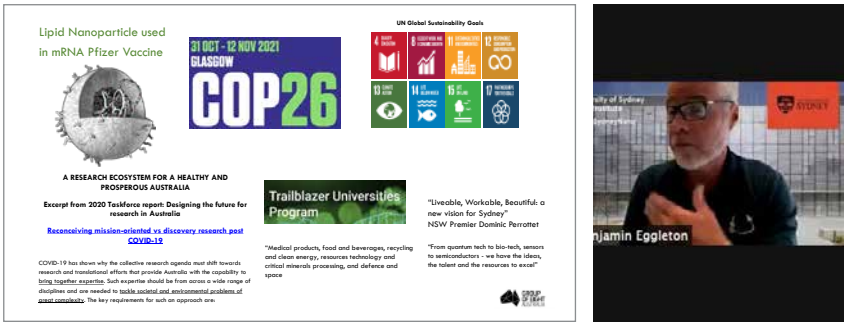
This cluster measures sustainability through the Living Building Challenge imperatives and 6-Star Green Star Rating accreditation. It aims to define market transformation and advocate government legislative requirements.

Member Engagements and Achievements

Sydney Nano is committed to engaging, developing, and celebrating our members' achievements. Aligned with wider-University strategy and our themes and domains, our talented members drive key research programs, such as our Grand Challenges and Networks. Our member engagement strategy aims to connect researchers and thought-leaders with our Sydney Nano community for enriching discussions, learning opportunities, and networking.

Engagements

We held two Sydney Nano Townhalls to inform our community about members' significant achievements, strategy, and direction, and engage with our community members daily via social media, communications, events and forums.



Sydney Nano Director Professor Ben Eggleton reporting on Sydney Nano's research priorities at our December 2021 Town Hall.

Distinguished Lectures

Distinguished Lectures connect the Sydney Nano community with world-class researchers on multi-disciplinary topics in nanoscience. This year, we hosted:

Prof Erez Levanon, Bar-Ilan University Israel, 'A-to-I RNA editing, immune protector and transcriptome diversifier'.

Dr Jeremy O'Brien, PsiQuantum, 'Silicon Photonic Quantum Computing'.

Dr Victor Zhirnov, Semiconductor Research Corporation North Carolina, 'Decadal Plan for Semiconductors: 2030 ICT research goals'.

Prof Ali Khademhosseini, Terasaki Institute for Biomedical Innovation, 'Engineering in Precision Medicine'.

Workshops and seminars

In 2021, we held 15 workshops and seminars covering scientific concepts, training modules, and networking events. We introduced Fireside chats to enhance early-career engagement, participation, learning, and networking opportunities.

See full list in appendix.

Professor Elizabeth New gave a Fireside Chat talk on the topic 'What makes a good DECRA candidate?'

Other Engagements

Support during COVID-19

We facilitated online gatherings with open-discussions on the impact of COVID-19.

Awards and achievements

Many of our members were awarded with significant grants and prizes in 2021, highlighting the breadth, depth, and quality of our research. Some highlights:

US National Academy of Inventors

Professor Tony Weiss became the first academic from the University of Sydney to be elected as a Fellow of the US National Academy of Inventors. Professor Tony Weiss was also awarded the **Prime Minister's Prize for Innovation**.

Fellow of the Academy of Science & ARC Linkage Grant

Professor Hala Zreiqat

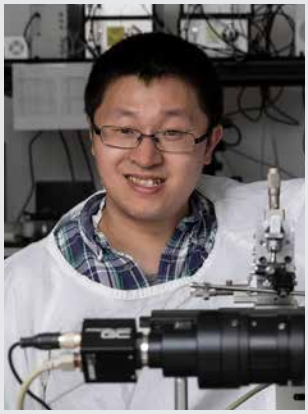
Australian Fulbright Scholars

Professor Antonio Tricoli and Professor Hala Zreiqat were elected as Senior Australian Fulbright Scholars.

Eureka Prize Finalist & ARC Future Fellowship Recipient
Professor Anita Ho-Baillie

David Craig Medal
Professor Thomas Maschmeyer

Australia's top 40 lifetime achievers in research
Professor Ben Eggleton



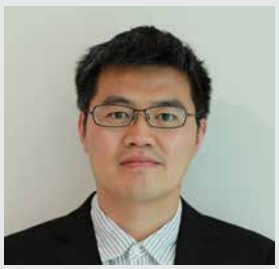
Edgeworth David Medal, Royal Society of NSW
Dr Arnold Ju

Rennie Memorial Medal
Dr Markus Muellner

Vice Chancellor's Award for Excellence

- Professor Richard Payne
- Dr Fengwang Li
- Dr Amandeep Kaur
- Professor Anita Ho-Baillie
- Professor Albert Zomaya
- Dr Ben Brown
- Associate Professor Yu Heng Lau

See appendix for full award list.



7 Members received Vice Chancellor's Awards for Excellence

8 Members received SOAR Prizes

Sydney Nano awarded:

5 Publication Awards

2 HDR Development Awards

Members have received several prestigious awards:

1 Eureka Prize Finalist

1 ARC DECRA

1 NSW Health EMCR Grant

5 Members received:

3 ARC Future Fellowships

18 Sydney Nano Members have been promoted

Sydney Nano held:

4 Distinguished lectures attended by **200** attendees

15 Sydney Nano seminars and workshops

Academic Partnerships

Strategic partners of Sydney Nano

Sydney Nano has strategically progressed existing partnerships, established new partnerships, and grown a major global network. Our collaboration continues to impact sustainability, health, and wellbeing, creating global impact with our partners.

Our new academic partnerships

Microfluid Consortium

In 2021, Sydney Nano joined the Microfluidics Consortium, a global nanotechnology organisation. We connected with this network at the 2021 global exposition and look forward to continuing this engagement in 2022.

Nanotechnology Industries Association (NIA)

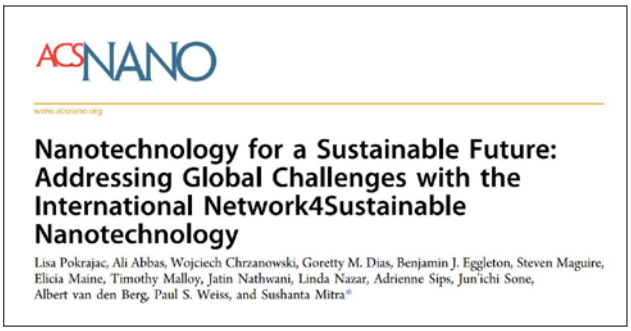
The NIA supports innovation and commercialisation of next generation nanotechnologies and promotes their safe and reliable advancement. Sydney Nano has recently joined this association.

Network 4 Sustainable Nanotechnology

Sydney Nano is a founding member of the International Network for Sustainable Nanotechnology, a consortium of leading organisations in the field of nanotechnology, representing institutes, universities, non-profit and governmental agencies. In collaboration with the Waterloo Institute of Nanotechnology and aligned with the United Nation's SDGs, the main function of the Network is the promotion of nanotechnology advancement for sustainability and to ensure the sustainability of nanotechnology. We plan to co-host a Global Impact Summit in 2022 with the Waterloo Institute of Nanotechnology as part of this network.

BINA

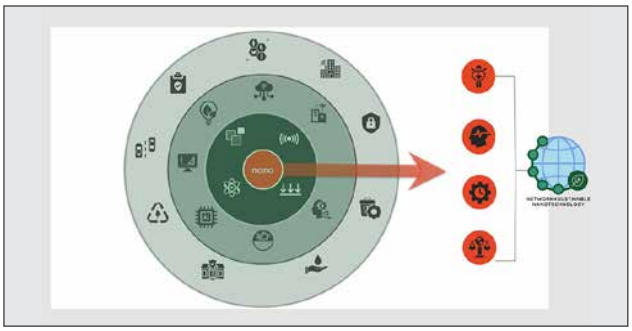
Nano-enabled, safe and societally beneficial nanotechnologies. Our partnership with Bar-Ilan University, Institute of Nanotechnology and Advanced Materials (BINA) explores fundamental aspects of material design, magnetism and photonic phenomena, developing clean technologies and more. In 2021, we introduced two inaugural joint research awards for collaboration of Sydney Nano Members with members of BINA.


ACSNANO

www.acsnano.org

Nanotechnology for a Sustainable Future: Addressing Global Challenges with the International Network4Sustainable Nanotechnology

Lisa Pokrajac, Ali Abbas, Wojciech Chrzanowski, Goretty M. Dias, Benjamin J. Eggleton, Steven Maguire, Elicia Maine, Timothy Malloy, Jatin Nathwani, Linda Nazar, Adrienne Sips, Jun'ichi Sone, Albert van den Berg, Paul S. Weiss, and Sushanta Mitra*



We continue to foster and grow established partnerships

WIN
Sustainability of nanotechnology. In partnership with the Waterloo Institute for Nanotechnology (WIN) at the University of Waterloo, Canada, we are committed to real-world innovation and our activities centre around the development of smart and functional materials, sensors and theranostics that address global challenges faced by our society.

Zhejiang University, China
With the Faculty of Engineering, Sydney Nano has partnered with Zhejiang University to explore collaborative research, training and teaching activities to develop the 'Australia-China Joint Research Centre for Sustainable Environment.' This led to the establishment of a joint Sustainability Lab led by Grand Challenge Champion Professor Jun Huang.

Instituto Italiano di Tecnologia, Italy (ITT)
Our partnership addresses unmet clinical and societal needs and will be a fundamental building block in establishing the next generation research in nano-bioinfo-cogno networks.

University of Massachusetts
Collaborating to deliver two distinguished lectures on Nano Food and Future Foods.

NIMS/MANA, Japan
The formal partnership with the International Centre for Materials Nanoarchitectonics (WPI-MANA) continues to build and promote research collaborations in the area of "adaptive nanosystems", including intelligent nanosystems with neurofunctionality and bio-nanosystems.

Institute of Technology, Bombay
We're establishing a research program focusing on sensing technologies for the detection of pollution in air and water.

Institute of Nano Science and Technology (INST), Punjab
In 2021, Sydney Nano conducted a workshop with INST to identify collaboration opportunities with the intention to form an additional partnership in India.

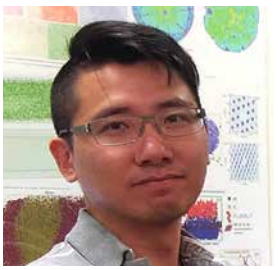
University-wide MoU with Yonsei University
We continue to collaborate with Korea's premier university, aiming to foster greater collaboration in research, teaching, learning and knowledge exchange.

Pusan National University
Our partnership with the College of Nanoscience and Nanotechnology, Pusan National University continues to develop the Bio-Medical Global Educational Program.

OGE Global Development Awards

Congratulations to the five Sydney Nano Members who received the Office of Global Engagement Global Development Awards. These awards provide early-to-mid-career researchers with an opportunity to engage with priority research partners to develop new international projects. Congratulations to:

- Dr Gurvinder Singh – The Chinese University of Hong Kong
- Dr Luke Hespanhol – Utrecht University
- Dr Wei Li – Fudan University
- Dr Yi-Sheng Chen, Shanghai Jiao Tong University
- Dr Yu Heng Lau, The Chinese University of Hong Kong



Pictured:
top left - Dr Gurvinder Singh, top right - Dr Luke Hespanhol, middle left - Dr Wei Li, middle right - Dr Yi-Sheng Chen, bottom - Dr Yu Heng Lau

Internal academic partnerships:

Sydney Nano also supports jointly funded collaboration with strategic partners of the University of Sydney, including:

- **Save Sight Institute:** we're conducting research together to identify nanoparticle carriers for cell-specific delivery of genes and drugs to the human retina
- **Kolling Institute:** we're working together to develop engineered nanoparticles to target dopaminergic neurons and deliver agents as a form of treatment for Parkinson's disease
- With the Engineering Faculty, Sydney Nano launched the 'Australia-China Joint Research Centre for Sustainable Environment' with Zhejiang University.

International strategic partnerships

10 universities **8** countries **3** continents

"Sydney Nano has quickly established itself as a globally significant nano centre, with impact across science, engineering, and importantly, communicating science and its impact to the public. They are well positioned to address the great problems facing our world, particularly sustainability and health challenges, as represented by the United Nations Sustainable Development Goals (UNSDGs). We at UCLA, and our partners around the world, are proud to have established the Network for Sustainable Nanotechnology together, which Sydney Nano co-founded and currently serves as co-secretariat. I look forward to seeing Sydney Nano's profile and impact rise as nanotechnology and the special capabilities of those trained in nano grow increasingly more important for our world."

Professor Paul S. Weiss
Chair, California NanoSystems Institute

Industry, Innovation and Commercialisation

Sydney Nano prioritises creating knowledge for innovation and impact. Our collaboration with researchers across the University and with industry partners facilitates our entrepreneurial culture. We enable researchers to innovate and pursue commercial interests, providing mutual opportunity for both Sydney Nano and our collaborators.

Key partnerships and projects

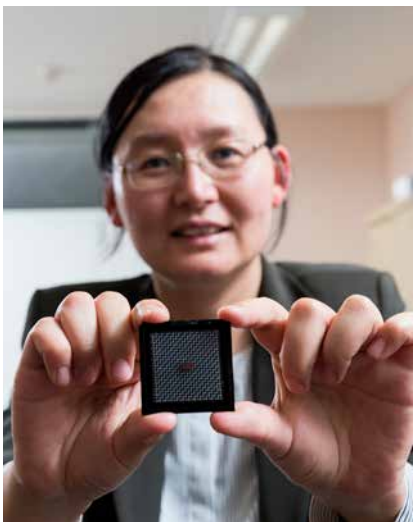
Multiple research groups are collaborating closely with the Australian Defence Force, applying nanophotonics and sensing technologies:

- Professor James Rabeau and Dr Omid Kavehei are supported by the **Defence Innovation Network** and the US Air Force Research Labs to develop new Quantum Sensing technology
- The **Photonic Research Grou**p, led by Professor Xiaoke Yi, has significant collaboration with the Defence Science and Technology Group (DSTG), the Department of Defence and industry, with its achievements benefiting industry and society in the areas of information processing, defence, security, and health.
- Professor Ben Eggleton leads the **Jericho Smart Sensing Lab** located in the Sydney Nanoscience Hub (SNH) with cutting-edge researchers and designers working together to deliver unprecedented sensing technology for the Royal Australian Airforce (RAAF).

In the energy sector, we are collaborating with industry partners:

- Professor Anita Ho Baillie works with industry partners for the use of light-weight, cheap and ultra-thin, perovskite crystals in photovoltaic devices for harvesting solar power
- Professor Thomas Maschmeyer's start-up, Gelion Technologies, continues the commercialisation of cheap, safe and durable zinc-bromine batteries that outcompete lithium-ion technology.

Photos (clockwise from top left): Professor Thomas Maschmeyer, Professor Deanna D'Alessandro, Professor Xiaoke Yi; Professor Ben Eggleton hosting Dr Katerina Agostino, DST Chief



Other industry partnerships

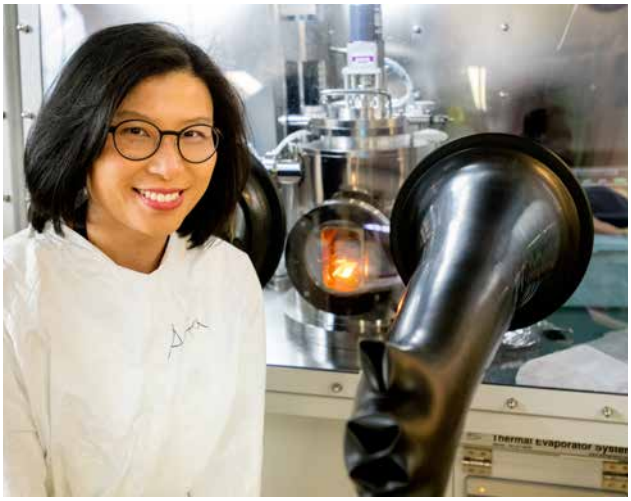
Throughout the year, we offered Sydney Nano members training and networking opportunities in commercialisation and entrepreneurship through a range of events:

- Our members are collaborating with industry to reduce greenhouse emissions, outlined in the innovative nano catalysts (Professor Jun Huang/Professor Catherine Stampfl) and metal-organic-frameworks (MOFS) (Professor Deanna D'Alessandro/Professor Cameron Kepert). Deanna works closely with industry partners to develop decarbonisation technologies.
- Our researchers are developing quantum computing and sensing solutions for major challenges in various segments such as defence, aerospace, health, logistics, transportation, and commodities
- Led by Professor David Reilly, the University of Sydney and Microsoft's multi-year partnership in Quantum Computing research, conducted in the Sydney Nanoscience Hub (SNH), continues to produce significant results
- Q-Ctrl, founded by Professor Michael Biercuk operates from SNH and continues to support global venture capital firms, remaining a trusted provider of quantum control for emerging technologies
- Professor James Rabeau is continuing to engage with the NSW Department of Industry/ Office of Chief Scientist and Engineer to further establish a semiconductor industry in Australia, leading to the establishment of a Semiconductor Service Bureau in 2021. This follows the publication of a report in December 2020 outlining the capabilities, opportunities, and challenges for NSW's meaningful participation in the global semiconductor value-chain.

Developing expertise in translational research highlights

- Sydney Nano's NanoHealth Network was embedded in the Master of Business Admin (MBA) of the Sydney Business School
- Professor Steve Maguire, School of Business, and Professor Rabeau collaborated on a funded research project, **"Perspectives on Innovation Ecosystems"**. This involved coordinating researchers from the School of Business to observe 'innovation' in action, unpacking how innovation happens.

Photos (clockwise from top right): Gelion Technologies; Professor Anita Ho-Baillie; Professor David Reilly.



Outreach

Sydney Nano prioritises creating knowledge for innovation and impact. Our collaboration with researchers across the University and with industry partners facilitates our entrepreneurial culture. We enable researchers to innovate and pursue commercial interests, providing mutual opportunity for both Sydney Nano and our collaborators.

Sydney Nano Ambassador Program

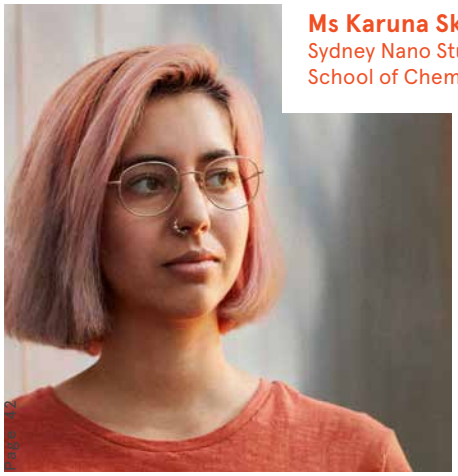
In 2021, Sydney Nano granted six secondary scholarships to PhD students selected for our Student Ambassador Program. Mentored by Deputy Director Outreach, A/Prof Alice Motion, these Ambassadors are learning about the importance of effective science communication. They are also developing an understanding of the interdisciplinary nature of nanoscience. Due to lockdowns throughout 2021, our Ambassadors worked on digital outreach content which will be published in 2022.

We hope that our Student Ambassadors will soon have the opportunity to gain first-hand experience in outreach activities with high schools and the general public post COVID-19 restrictions, including giving visibility to the study of nanoscience in innovative and creative ways.

Welcoming our new Student Ambassadors for 2021-2022.

PhD candidate and Sydney Nano Student Ambassador Tim Newman filming a video about a 'day in the life' of his PhD research where he works in quantum networking and quantum communication.

"With nanotechnologies increasingly at the forefront of scientific development, I find promoting knowledge and understanding of them to be an essential aspect of my university career."



Ms Karuna Skipper
Sydney Nano Student Ambassador,
School of Chemistry

"The Sydney Nano Student Ambassador role has provided a fantastic opportunity to connect with future leaders in nanotechnology across various schools and faculties."

Mr Jed Austin
Sydney Nano Student Ambassador,
Sydney Business School

Public Events – Highlights

"Big solutions on the nanoscale": Public Lecture featuring Sydney Nano researchers

In collaboration with Sydney Ideas, Sydney Nano hosted a public lecture in November 2021 on the topic of "Big solutions on the nanoscale". This lecture featured presentations from Sydney Nano researchers Prof Chiara Neto, Prof Zdenka Kuncic, and Dr Shelley Wickham, discussing the real-world relevance of nanotechnology research. Hosted by A/Prof Alice Motion, Deputy Director Outreach, this event was highly successful – with over 300 viewers and over 1300 podcast listens.

"Big solutions on the nanoscale" online event featuring Sydney Nano researchers Prof Chiara Neto, Prof Zdenka Kuncic, Dr Shelley Wickham, and hosted by A/Prof Alice Motion.

Live from the Lab | FBi Radio Podcast

Live from the Lab (LFTL) is a celebration of Australian music, science, arts, and culture. Created by A/Prof Alice Motion, Deputy Director Outreach, LFTL partners musicians with science researchers to create unique compositions. The research of Prof Anita Ho-Baillie was highlighted in 2021 during Science Week with a composition by artist Setwun, which included NASA solar recordings as well as layers of music and rhythms inspired by electron configurations of the elements that Anita and her team use in their solar cells.

Artist in Residence Program

Sydney Nano awarded two *Artists in Residence* in 2021. The program facilitates collaborations between artists and researchers in nano and quantum science and provides a space for exploring relationships between artistic practice and research in nanoscience and technology.

- Dr Daniel Blinkhorn (Sydney Conservatorium of Music), supporting Nanosonic Stories Catalyst node
- Dr Luke Hespanhol (School of Architecture, Design and Planning), supporting NanoResonance Catalyst node

Dr Luke Hespanhol is a transdisciplinary media artist and senior lecturer/ researcher in Interaction Design, with particular focus on urban media. He is part of the NanoRsonance Catalyst multidisciplinary team.

Dr Daniel Blinkhorn is a Lecturer at the Sydney Conservatorium of Music, as well as a composer, digital media artist & field recordist, often working with environmental sounds. He is part of the Nanosonic Stories Catalyst multidisciplinary team.

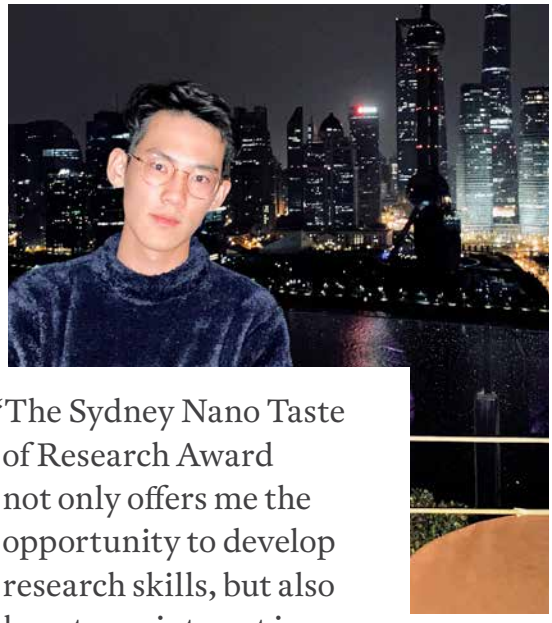
Training and Education

Sydney Nano is focused on training the next generation of academic leaders through offering leadership opportunities, mentoring, and seminars in fields such as grant writing and research commercialisation. Sydney Nano also offers a number of Distinguished Lectures and seminars from researchers across a range of fields related to nanotechnology.

Taste of Research awards

In 2021, four high-performing undergraduate students were offered the opportunity to develop their research skills through our "Taste of Research" program. Throughout a six-week research program, the students gained experience into working with Sydney Nano Members in an academic lab environment, finding solutions to real-world challenges related to nanoscience and technology. Congratulations to:

- Yuhang Zhang, hosted by Dr Gurvinder Singh (School of Biomedical Engineering)
- Yukai Fu, hosted by Dr Behnam Akhavan (School of Biomedical Engineering)
- Kiarash Kyanian, hosted by Dr Arnold Ju (School of Biomedical Engineering)
- Rafia Ali, hosted by Dr Pegah Varamini (Sydney Pharmacy School)

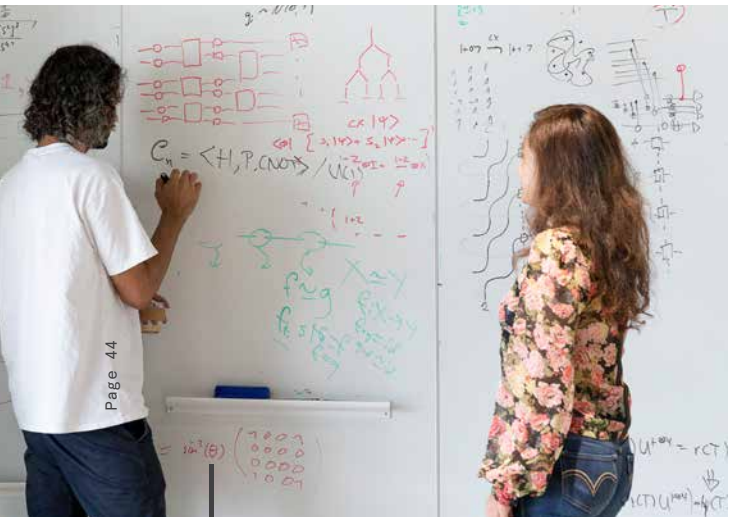


"The Sydney Nano Taste of Research Award not only offers me the opportunity to develop research skills, but also boosts my interest in working on research and solve real world challenges using nanotechnology in my future career."

Mr Yuhang Zhang
Taste of Research 2021 awardee,
School of Biomedical Engineering

EMCR Development Nodes

Launched in 2021, the EMCR Development Nodes were created to provide EMCRs with the opportunity to build and lead a multi-disciplinary research team in order to gain practical experience in leadership and academic skills with mentorship and training from senior colleagues. We currently have 15 EMCRs participating in this program.



Studying Nano

Sydney Nano supports our Members in their nanotechnology relevant units across several faculties and schools, including:

- NANO2002: Introduction to Nanoscience (Faculty of Science)
- NANO4001: Modern Nanoscience (Faculty of Science)
- CHNG5008: Nanotechnology in Chemical Engineering (Faculty of Engineering)
- CHEM3888 and PHYS3888: Interdisciplinary Project (Faculty of Science)
- SIEN6004: Innovation Ecosystems (Sydney Business School)

Future Leaders Training Program

In 2021, the Sydney Nano Future Leaders Training Program was initiated. This program will focus on developing management soft skills for PhD students and PostDocs, to enhance their future careers in academia and industry. The launch was postponed to 2022 due to COVID 19 restrictions.

Infrastructure and Enabling Capabilities

One of our strategic objectives is to enable access to world-class research infrastructure while maximising the return on the University's investment in state-of-the-art research infrastructure. We are achieving this through facilitating the optimal use of the Sydney Nanoscience Hub; supporting the development and use of the University's Core Research Facilities; facilitating access to the equipment platform by our members; influencing the development of the Western Sydney campus; and gaining access to national and international research infrastructure.

The Sydney Nanoscience Hub (SNH) has been designed to provide research in the field of Nano Photonics and Quantum Science. SNH is home to 13 distinct user groups with a combined total of 154 occupants in 2021.

The user groups at the Sydney Nanoscience Hub have developed a "SNH Safety DNA", reflecting our philosophy and values in conducting work safely. These include leadership, safeguarding, accountability, continuous improvement, and culture.

Sydney Nanoscience Hub hosts

7
Research groups

3
CRF Facilities

2
Industry partners (Microsoft, Q-CTRL)

1
Multi-disciplinary Institute (Sydney Nano)

154
Occupants

Sydney Nanoscience Hub comprises

10,000m²
state-of-the-art teaching and learning facilities

32
state-of-the-art nanoscience research laboratories

900m²
ISO Class 5 cleanroom

OUTLOOK 2022

In 2022, Sydney Nano enters its next growth phase – Sydney Nano 2.0. We are excited to present our strategic plan for this new phase at our showcase event to be held in March 2022. We also plan to host a series of externally-focussed engagement events for academic and industry partners, associations and government departments as well as high schools and the general public throughout the year.

A warm welcome to all of our incoming Deputy Directors. We are excited to gain their valuable insights for their respective strategic portfolios. Our Deputy Directors for 2022-2023 are:

- **A/Prof Alice Motion** (ongoing) – External Engagement & Academic Development
- **A/Prof Girish Lakhwani** – Academic Partnerships
- **A/Prof Yixiang Gan** – Member Engagement
- **Prof Stephanie Watson** – Industry, Innovation & Commercialisation
- **Prof Ali Abbas** – Industry, Innovation & Commercialisation

Excitingly, there is a lot of new research coming out of Sydney Nano for 2022. We have funded four new Grand Challenge projects related to sustainability and health in alignment with the UN SDGs. We have also endorsed four Kickstarters and a Frontier project joining our schemes for 2022.

Our new Grand Challenges are:

- **Eco-Active Building Envelopes**, developing the next generation of buildings that positively impact our environment
- **Nanosensing Airborne Pathogens for Public Biosecurity**, engineering nanoscale sensing technologies for the detection of airborne pathogens
- **Organ-on-Chip for Blood Clot assessment**, developing microfluidic devices to detect thrombosis
- **Solar Fuels,** creating new nanomaterials to capture and 'bottle' sunlight in the form of energy-rich, renewable fuels

Our NanoHealth and Smart Sustainable Building Networks have shown excellent growth over 2021 and we hope to see this trend continue into the new year. We are also currently conducting scoping studies to assess the potential for an additional Network for Quantum. We plan to expand our partnerships in new countries and increase engagement with our current international academic partners through joint lectures, research grants, and other activities, including an upcoming Academic Partnership Summit. The global "Network4SustainableNano" (N4SN) will host several events with a focus on UNSDG 3 (Good Health & Wellbeing) and seeks to expands its membership further.

In 2022, we will also be focussing on academic development across all levels. We will shortly launch a Future Leader Program (FLP) for HDR Students and PostDocs to prepare emerging academics for their career in academia or industry as well as an EMCR Development Node to provide early career researchers with a platform to present their research and network with their peers. In addition, we have awarded six HDR students with Student Ambassador scholarships where they will work closely with Deputy Director A/Prof Alice Motion to develop their research communication skills through both outreach and "inreach" programs. We are also offering Taste of Research programs to undergraduate students, where they can obtain experience working with leading academics in fields of nanoscience and nanotechnology in research labs.

Finally, we continue to enable and support our Members in their intentions to commercialise their research via our research nodes and networks as well as specific trainings, seminars and fireside chats. Our direct engagement with potential industry partners will focus on the topics of NanoHealth and Sustainability utilising our network in these fields organising round tables and co-design workshops.

Overall, 2022 will be a year filled with opportunities, events, and exciting new research. Stay tuned, follow us, and get engaged!

Professor Ben Eggleton
Director, The University of Sydney Nano Institute

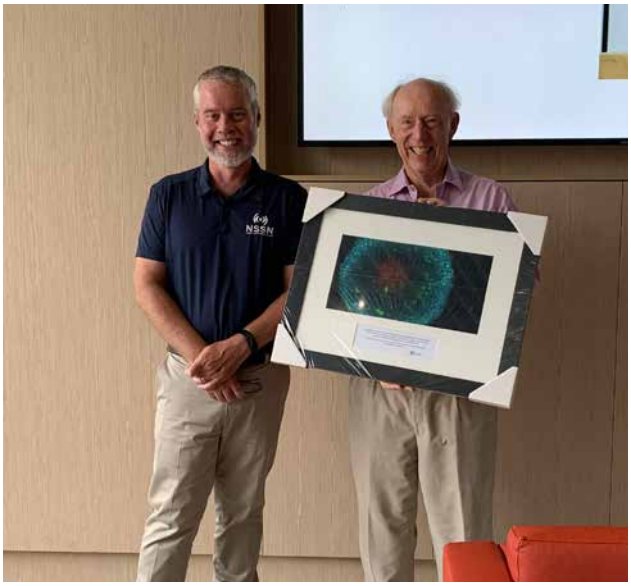
"It is exciting to see the important engagements of our academics and students with Sydney Nano, particularly the Smart Sustainable Building Network and the new Grand Challenge project on Eco-Active Building Envelopes. I am looking forward to further strengthening our multidisciplinary partnership with Sydney Nano."

Professor Robyn Dowling
The University of Sydney School of Architecture, Design and Planning

KEY ENGAGEMENTS

Sydney Nano ran a series of wonderful events and hosted many VIP visitors at the SNH, including donors, investors, government officials, industry, and international delegations.

- Michael Goldman and Sharon Hudson-Dean, United States Embassy, Charge d'Affaires
- Dr Jill Freyne, CSIRO
- Jane Evans, NSW Smart Sensing Network (NSSN)
- David Anstice AO, Former senior executive, Merck
- Dr Katerina Agostino, Chief of Aerospace Division, Defence Science and Technology Group
- Dr Ian Oppermann, NSW Government Chief Data Scientist and CEO NSW Data Analytics Centre
- Greg Robinson, Chief of Infrastructure at the University of Sydney, hosted a Transport for NSW delegation
- Roche Global Pharma Partnering Team
- Clayton Barr MP



Photos from top left (clockwise): Sharon Hudson-Dean and Michael Goldman, United States Embassy, Charge d'Affaires; David Anstice AO, donor, former senior executive, Merck; Dr Katerina Agostino, Chief of Aerospace Division, Defence Science and Technology Group; Dr Jill Freyne, CSIRO and Jane Evans, NSSN.

APPENDIX

List of Members

- Ahmad Jabbarzadeh, Faculty of Engineering
- Ainsley Newson, Faculty of Medicine and Health
- Albert Zomaya, Faculty of Engineering
- Alejandro Montoya, Faculty of Engineering
- Alessandro Tuniz, Faculty of Science
- Alex Song, Faculty of Engineering
- Ali Abbas, Faculty of Engineering
- Ali Hadigheh, Faculty of Engineering
- Alice Motion, Faculty of Science
- Alistair McEwan, Faculty of Engineering
- Allison Tong, Faculty of Medicine and Health
- Amandeep Kaur, Faculty of Medicine and Health
- Anastasia Globa, The University of Sydney School of Architecture, Design and Planning
- Andrew Doherty, Faculty of Science
- Anita Ho-Baillie, Faculty of Science
- Ann Kwan, Faculty of Science
- Anna Paradowska, Faculty of Engineering
- Anna Waterhouse, Faculty of Medicine and Health
- Anne Mai-Prochnow, Faculty of Engineering
- Annette Haworth, Faculty of Science
- Antonio Tricoli, Faculty of Engineering
- Anusha Withana, Faculty of Engineering
- Arianna Brambilla, The University of Sydney School of Architecture, Design and Planning
- Arne Grimsmo, Faculty of Science
- Arunima Malik, Faculty of Science
- Asaph Widmer-Cooper, Faculty of Science
- Axel Spahr, Faculty of Medicine and Health
- Behnam Akhavan, Faculty of Engineering
- Belal Chami, Faculty of Medicine and Health
- Beniamin Goldys, Faculty of Science
- Benjamin Brown, Faculty of Science
- Benjamin Carey, Sydney Conservatorium of Music
- Benjamin Eggleton, Faculty of Science
- Boris Kuhlmey, Faculty of Science
- Brendan Kennedy, Faculty of Science
- Brian Hawkett, Faculty of Science
- Brian Jones, Faculty of Science
- Cameron Kepert, Faculty of Science
- Carolyn Sue, Faculty of Medicine and Health
- Cary Di Lernia, The University of Sydney Business School
- Catherine Hardy, The University of Sydney Business School
- Catherine Stampfl, Faculty of Science
- Catherine Welch, The University of Sydney Business School
- Chiara Neto, Faculty of Science
- Chiara O'Reilly, Faculty of Arts and Social Sciences
- Christopher Ling, Faculty of Science
- Corinne Caillaud, Faculty of Medicine and Health
- Cornelius Hempel, Faculty of Science
- Craig Jin, Faculty of Engineering
- Damien Ricketson, Sydney Conservatorium of Music
- Daniel Blinkhorn , Sydney Conservatorium of Music
- Daniel Gozman, The University of Sydney Business School
- Daniel Dias-da-Costa, Faculty of Engineering
- Daniel Tan, Faculty of Science
- Daniel Yeadon, Sydney Conservatorium of Music
- Daniele Vigolo, Faculty of Engineering
- David Hibbs, Faculty of Medicine and Health
- David Martinez Martin, Faculty of Engineering
- David Wang, Faculty of Engineering
- Deanna D'Alessandro, Faculty of Science
- Deepak Jain, Faculty of Science
- Diana Chester, Faculty of Arts and Social Sciences
- Dianne Wiley, Faculty of Engineering
- Dries Verstraete, Faculty of Engineering
- Elizabeth New, Faculty of Science
- Eugenia Gasparri, The University of Sydney School of Architecture, Design and Planning
- Fariba Dehghani, Faculty of Engineering
- Fengwang Li, Faculty of Engineering
- Filip Braet, Faculty of Medicine and Health
- Georges Grau, Faculty of Medicine and Health
- Girish Lakhwani, Faculty of Science
- Gregg Suaning, Faculty of Engineering
- Gregory Warr, Faculty of Science
- Gurvinder Singh, Faculty of Engineering
- Gwenaelle Proust, Faculty of Engineering
- Hak-Kim Chan, Faculty of Medicine and Health
- Hala Zreiqat, Faculty of Engineering
- Hamidreza Arandiyan, Faculty of Science
- Helen Bramley, Faculty of Science
- Helena Robinson, Faculty of Arts and Social Sciences
- Hien Duong, Faculty of Medicine and Health
- Ingemar Persson, Faculty of Engineering
- Ivan Kassal, Faculty of Science
- Iver Cairns, Faculty of Science
- James Der Derian, Faculty of Arts and Social Sciences
- James Rabeau, Faculty of Science
- Jarryd Daymond, The University of Sydney Business School
- Jianguo (Joe) Zhu, Faculty of Engineering
- Jiao Jiao Li, Faculty of Medicine and Health
- Joel Mackay, Faculty of Science
- John Bartholomew, Faculty of Science
- John Grigg, Faculty of Medicine and Health
- Joyce Hinterding, Faculty of Arts and Social Sciences
- Julie Cairney, Faculty of Engineering
- Jun Huang, Faculty of Engineering
- Justin Beardsley, Faculty of Medicine and Health
- Jyotirmoyee Bhattacharjya, The University of Sydney Business School
- Kanchana Thilakarathna, Faculty of Engineering
- Katrina Jolliffe, Faculty of Science
- Ken-Tye Yong, Faculty of Engineering
- Kimberly Mathieu Coulton, Faculty of Medicine and Health
- Lamiae Azizi, Faculty of Science
- Lauren Macreaide, Faculty of Science
- Laurence Macia, Faculty of Medicine and Health
- Li Chang, Faculty of Engineering
- Lia Bareket, Faculty of Engineering
- Lin Ye, Faculty of Engineering
- Lina Markauskaite, Faculty of Arts and Social Sciences
- Ling Zhu, Faculty of Medicine and Health
- Lining Ju, Faculty of Engineering
- Liwei Li, Faculty of Engineering
- Louis Rendina, Faculty of Science

- Luke Hespanhol, The University of Sydney School of Architecture, Design and Planning
- Luming Shen, Faculty of Engineering
- Marcela Bilek, Faculty of Engineering
- Margaret Sunde, Faculty of Medicine and Health
- Margot Day, Faculty of Medicine and Health
- Maria Rumyantseva, The University of Sydney Business School
- Mark Gillies, Faculty of Medicine and Health
- Markus Muellner, Faculty of Science
- Martijn de Sterke, Faculty of Science
- Martin Tomitsch, The University of Sydney School of Architecture, Design and Planning
- Mary Tara Christie, Faculty of Science
- Maryanne Large, Faculty of Science
- Matthew Cleary, Faculty of Engineering
- Michael Morris, Faculty of Medicine and Health
- Michael Kassiou, Faculty of Science
- Michael Seymour, The University of Sydney Business School
- Mohammad Mirkhalaf, Faculty of Engineering
- Naseem Ahmadpour, The University of Sydney School of Architecture, Design and Planning
- Natalie Holmes, Faculty of Engineering
- Nicholas Hunt, Faculty of Medicine and Health
- Nicholas King, Faculty of Medicine and Health
- Nicholas Lawson, Faculty of Engineering
- Omid Kavehei, Faculty of Engineering
- Pegah Varamini, Faculty of Medicine and Health
- Peter Bennett, Faculty of Science
- Peter Gill, Faculty of Science
- Peter Goodyear, Faculty of Arts and Social Sciences
- Peter Lay, Faculty of Science
- Peter Tuthill, Faculty of Science
- Peyman Obeidy, Faculty of Engineering
- Philip Gale, Faculty of Science
- Philip Leong, Faculty of Engineering
- PJ Cullen, Faculty of Engineering
- Ralph Holz, Faculty of Engineering
- Renae Ryan, Faculty of Medicine and Health
- Richard de Dear, The University of Sydney School of Architecture, Design and Planning
- Richard Payne, Faculty of Science
- Robyn Jamieson, Faculty of Medicine and Health
- Ronald Clarke, Faculty of Science
- Rongkun Zheng, Faculty of Science
- Salah Sukkarieh, Faculty of Engineering
- Sandra Löschke, The University of Sydney School of Architecture, Design and Planning
- Sergio Leon-Saval, Faculty of Science
- Shelley Wickham, Faculty of Science
- Shumi Akhtar, The University of Sydney Business School
- Siegbert Schmid, Faculty of Science
- Simon de Graaf, Faculty of Science
- Simon Fleming, Faculty of Science
- Simon Kwok, Faculty of Arts and Social Sciences
- Stefano Palomba, Faculty of Science
- Stephanie Watson, Faculty of Medicine and Health
- Stephen Bartlett, Faculty of Science
- Steven Maguire, The University of Sydney Business School
- Steven Wise, Faculty of Medicine and Health
- Susan Park, Faculty of Arts and Social Sciences
- Svetlana Postnova, Faculty of Science
- Thomas Grewal, Faculty of Medicine and Health
- Thomas Maschmeyer, Faculty of Science
- Tihana Divnic-Resnik, Faculty of Medicine and Health
- Tony Weiss, Faculty of Science
- Vera Chung, Faculty of Engineering
- Vincent Gomes, Faculty of Engineering
- Wojciech Chrzanowski, Faculty of Medicine and Health
- Xiaoke Yi, Faculty of Engineering
- Xiaozhou Liao, Faculty of Engineering
- Yi Shen, Faculty of Engineering
- Yi-Sheng Chen, Faculty of Engineering
- Yixiang Gan, Faculty of Engineering
- Yu Heng Lau, Faculty of Science
- Yuan Chen, Faculty of Engineering
- Zdenka Kuncic, Faculty of Science
- Zihuai Lin, Faculty of Engineering
- Zongwen Liu, Faculty of Engineering

Successful Promotion Applications

Level E:

- Ali Abbas, Faculty of Engineering
- Zongwen Liu, Faculty of Engineering
- Gwenaelle Proust, Faculty of Engineering
- Simon Paul de Graaf, Faculty of Science
- Catherine Lynelle Welch, The University of Sydney Business School

Level D:

- Markus Muellner, Faculty of Science
- Asaph Widmer-Cooper, Faculty of Science
- Damien Ricketson, Sydney Conservatorium of Music
- Daniel Peter Martin Gozman, The University of Sydney Business School

Level C:

- Anne Gerda Erna Mai-Prochnow, Faculty of Engineering
- Ali Hadigheh, Faculty of Engineering
- Kanchana Dinesh Thilakarathna, Faculty of Engineering
- Anusha Withana, Faculty of Engineering
- Belal Bill Chami, Faculty of Medicine and Health
- Hien Thi Thu Duong, Faculty of Medicine and Health
- Arianna Brambilla, Sydney School of Architecture, Design and Planning
- John Glen Bartholomew, Faculty of Science
- Luke Micheletti Hespanhol, Sydney School of Architecture, Design and Planning

Fellowships and Chairs

ARC Future Fellowship

- Prof Anita Ho-Baillie

2021 Academy of Science Fellow

- Prof Hala Zreiqat

Awards

Australian Fulbright Scholars 2021

- Prof Hala Zreiqat
- Prof Antonio Tricoli

SOAR Prize 2022

- Dr Arianna Brambilla
- Dr Naseem Ahmadpour
- Dr Nicholas Hunt
- Dr Benjamin Carey
- Dr Yu Heng Lau
- Dr Michael Seymour
- Dr Liwei Li
- Dr Arunima Malik

2021 LIEF ARC Grant
- Dr John Bartholomew

Eureka Prize Finalist
- Prof Anita Ho-Baillie

ARC Linkage Grant
- Prof Hala Zreiqat

Edgeworth David Medal, Royal Society of NSW
- Dr Arnold Ju

David Craig Medal
- Prof Thomas Maschmeyer

Prime Minister's Prize for Innovation
- Prof Tony Weiss

NHMRC Ideas Grant
- Prof Joel Mackay

2021 Rennie Memorial Medal
- Dr Markus Muellner

Vice Chancellor's Awards for Excellence 2021
- Prof Richard Payne
- Dr Yu Heng Lau
- Dr Ben Brown
- Prof Albert Zomaya
- Dr Amandeep Kaur
- Dr Fengwang Li
- Prof Anita Ho-Baillie

Bar Illan Institute for Nanotechnology, Israel (BINA) & Sydney Nano Research Award
- Prof Jun Huang
- Dr Yu Heng Lau

Sydney Nano Publication Award
- Dr Shelley Wickham
- Dr Nicholas Hunt
- Dr Gurvinder Singh
- Dr Behnam Akhavan
- Dr Fengwang Li

Taste of Research Awards
- Yuhang Zhang
- Yukai Fu
- Kiarash Kyanian
- Rafia Ali

Excellence in Research Award for Established Researcher
- Prof Steven Maguire

2021 Ramaciotti Biomedical Research Award
- Prof Gregg Suaning
- Dr Omid Kavehei
- Prof Alistair McEwan

Australia's top 40 lifetime achievers in research
- Prof Ben Eggleton

Number 1 researcher in Sustainable Energy (the Australian)
- Prof Anita Ho-Baillie

2021 Clarivate Analytics Highly Cited Researchers List
- Prof Anita Ho-Baillie

2021 ECR Support Fund
- Dr Nicholas Hunt
- Dr Qingbo Xia

2021 HDR Development Award
- Pooria Lesani
- Bryce Mullens

Commercial Development and Industry Partnership Funding
- Dr Belal Chami
- Prof Jun Huang
- Prof Thomas Maschmeyer
- Prof Elizabeth New
- Prof Louis Rendina
- Dr Pegah Varamini
- A/Prof Steven Wise
- A/Prof Rongkun Zheng
- Prof Ken Tye Yong

2021 Bridge Program recipient
- Dr Pegah Varamini

All Events and Engagements

Public Lectures
- 'Big solutions on the nanoscale' co-hosted by Sydney Ideas

Distinguished Lectures
- Dr Victor Zhirnov, Semiconductor Research Corporation North Carolina, 'Decadal Plan for Semiconductors: 2030 ICT research goals'
- Prof Erez Levanon, Bar-Ilan University Israel, 'A-to-I RNA editing, immune protector and transcriptome diversifier'
- Prof Ali Khademhosseini, Terasaki Institute for Biomedical Innovation, 'Engineering in Precision Medicine'
- Dr Jeremy O'Brien, PsiQuantum, 'Silicon Photonic Quantum Computing'

Workshops, Seminars, and Lectures
- NanoPhotonics, NanoEnergy and Quantum materials workshop on self-assembled plasmonic nanoantennas, quantum technologies, energy conservation
- Bio-Nano International Workshop with the Italian Institute of Technology (IIT)
- Meet the Author by Dr Amandeep Kaur, 'Chemical tools for nanoscale imaging: the interdisciplinary journey of a DECRA awardee'
- Meet the Author by Dr Nicholas Hunt, 'Targeted hepatic drug delivery'
- Meet the Author by Dr Seyed Mirkhalaf, 'Halide migration in mixed lead halide perovskites'
- Meet the Author by Dr Hansheng Chen, 'Bridging microstructure and magnetic properties of rare-earth permanent magnets'
- Fireside chat by Prof Fariba Dehghani, 'Collaborations that multiply'
- Fireside chat by Prof Elizabeth New, 'What makes a good DECRA candidate?'
- Seminar by Natasha Rawlings, 'Commercialising science-based inventions: the Uniseed Investment Manager perspective'
- 'Science outside your comfort zone' by Westmead Research Hub
- Scientific seminar by Dr Daniele Vigolo, 'Can we exploit microfluidics to engineer biology?'

Visits
- United States Embassy, Charge d'Affaires, Michael Goldman and Sharon Hudson-Dean
- United States Consulate
- United States Army Research Office
- CSIRO Dr Jill Freyne & NSSN Jane Evans
- David Anstice AO
- Dr Katerina Agostino, Chief of Aerospace Division, Defence Science and Technology Group
- NSW Government Chief Data Scientist and CEO NSW Data Analytics Centre Dr Ian Oppermann
- Greg Robinson, Chief of Infrastructure at the University of Sydney, hosted a Transport for NSW delegation
- Special Envoy Global Business and Talent Attraction
- Roche Global Pharma Partnering Team
- Clayton Barr MP
- Space tech leaders
- Sydney Nano ECR Ambassadors
- University of Sydney Senior Leaders Induction group

Affiliated Publications

Akhavan, B.; Ganesan, R.; Matthews, D. T. A.; McKenzie, D. R.; Bilek, M. M. M. Noble Gas Control of Diamond-like Content and Compressive Stress in Carbon Films by Arc-Mixed Mode High Power Impulse Magnetron Sputtering. *Surf. Coatings Technol.* **2021**, *427*, 127785.

Al Halawani, A.; Abdulkhalek, L.; Mithieux, S. M.; Weiss, A. S. Tropoelastin Promotes the Formation of Dense, Interconnected Endothelial Networks. *Biomolecules* **2021**, *11* (9), 1318.

Alanazi, Y. F.; Lockhart-Cairns, M. P.; Cain, S. A.; Jowitt, T. A.; Weiss, A. S.; Baldock, C. Autosomal Recessive Cutis Laxa 1C Mutations Disrupt the Structure and Interactions of Latent TGFβ Binding Protein-4. *Front. Genet.* **2021**, *12*.

Almora, O.; Baran, D.; Bazan, G. C.; Berger, C.; Cabrera, C. I.; Catchpole, K. R.; Erten-Ela, S.; Guo, F.; Hauch, J.; Ho-Baillie, A. W. Y.; Jacobsson, T. J.; Janssen, R. A. J.; Kirchartz, T.; Kopidakis, N.; Li, Y.; Loi, M. A.; Lunt, R. R.; Mathew, X.; McGehee, M. D.; Min, J.; Mitzi, D. B.; Nazeeruddin, M. K.; Nelson, J.; Nogueira, A. F.; Paetzold, U. W.; Park, N.; Rand, B. P.; Rau, U.; Snaith, H. J.; Unger, E.; Vaillant-Roca, L.; Yip, H.; Brabec, C. J. Device Performance of Emerging Photovoltaic Materials (Version 2). *Adv. Energy Mater.* **2021**, *11* (48), 2102526.

Antunez, E. E.; Mahon, C. S.; Tong, Z.; Voelcker, N. H.; Müllner, M. A Regenerable Biosensing Platform for Bacterial Toxins. *Biomacromolecules* **2021**, *22* (2), 441–453.

Ashhurst, T. M.; Marsh-Wakefield, F.; Putri, G. H.; Spiteri, A. G.; Shinko, D.; Read, M. N.; Smith, A. L.; King, N. J. C. Integration, Exploration, and Analysis of High-dimensional Single-cell Cytometry Data Using Spectre. *Cytom. Part A* **2022**, *101* (3), 237–253.

Baeckens, S.; Temmerman, M.; Gorb, S. N.; Neto, C.; Whiting, M. J.; Van Damme, R. Convergent Evolution of Skin Surface Microarchitecture and Increased Skin Hydrophobicity in Semi-Aquatic Anole Lizards. *J. Exp. Biol.* **2021**, *224* (19).

Baksamawi, H. A.; Ariane, M.; Brill, A.; Vigolo, D.; Alexiadis, A. Modelling Particle Agglomeration on through Elastic Valves under Flow. *ChemEngineering* **2021**, *5* (3), 40.

Baldry, M.; Haidar, L. L.; Akhavan, B.; Bilek, M. M. M. Continuum Modelling of an Asymmetric CCRF Argon Plasma Reactor: Influence of Higher Excited States and Sensitivity to Model Parameters. *Plasma Process. Polym.* **2021**, *18* (6), 2000243.

Balzer, D.; Smolders, T. J. A. M.; Blyth, D.; Hood, S. N.; Kassal, I. Delocalised Kinetic Monte Carlo for Simulating Delocalisation-Enhanced Charge and Exciton Transport in Disordered Materials. *Chem. Sci.* **2021**, *12* (6), 2276–2285.

Bax, D. V.; Nair, M.; Weiss, A. S.; Farndale, R. W.; Best, S. M.; Cameron, R. E. Tailoring the Biofunctionality of Collagen Biomaterials via Tropoelastin Incorporation and EDC-Crosslinking. *Acta Biomater.* **2021**, *135*, 150–163.

Berhane, A. M.; Baldwin, C. G.; Liang, K.; Moshkani, M.; Lustri, C.; Downes, J. E.; Stampfl, C.; Mildren, R. P. Morphogenesis of Mesoscopic Surface Patterns Formed in Polarized Two-Photon Etching of Diamond. *Carbon N. Y.* **2021**, *173*, 271–285.

Bland-Hawthorn, J.; Sellars, M. J.; Bartholomew, J. G. Quantum Memories and the Double-Slit Experiment: Implications for Astronomical Interferometry. *J. Opt. Soc. Am. B* **2021**, *38* (7), A86.

Bo, R.; Taheri, M.; Chen, H.; Bradford, J.; Motta, N.; Surve, S.; Tran-Phu, T.; Garg, P.; Tsuzuki, T.; Falcaro, P.; Tricoli, A. Paper-Like Writable Nanoparticle Network Sheets for Mask-Less MOF Patterning. *Adv. Funct. Mater.* **2022**, *32* (3), 2100351.

Bochicchio, B.; Yeo, G. C.; Lee, P.; Emul, D.; Pepe, A.; Laezza, A.; Ciarfaglia, N.; Quaglino, D.; Weiss, A. S. Domains 12 to 16 of Tropoelastin Promote Cell Attachment and Spreading through Interactions with Glycosaminoglycan and Integrins AlphaV and Alpha5beta1. *FEBS J.* **2021**, *288* (13), 4024–4038.

Boumelhem, B. B.; Pilgrim, C.; Zwicker, V. E.; Kolanowski, J. L.; Yeo, J. H.; Jolliffe, K. A.; New, E. J.; Day, M. L.; Assinder, S. J.; Fraser, S. T. Intracellular Flow Cytometric Lipid Analysis – a Multiparametric System to Assess Distinct Lipid Classes in Live Cells. *J. Cell Sci.* **2022**, *135* (5).

Brunner, M.; Garvey, C. J.; Warr, G. G.; Atkin, R. Conformation of Poly(Ethylene Glycol) in Aqueous Cholinium Amino Acid Hybrid Solvents. *J. Colloid Interface Sci.* **2021**, *602*, 334–343.

Brunner, M.; Imberti, S.; Simmons, B. A.; Warr, G. G.; Atkin, R. Liquid Nanostructure of Cholinium Argininate Biomass Solvents. *ACS Sustain. Chem. Eng.* **2021**, *9* (7), 2880–2890.

Bryant, S. J.; Garcia, A.; Clarke, R. J.; Warr, G. G. Selective Ion Transport across a Lipid Bilayer in a Protic Ionic Liquid. *Soft Matter* **2021**, *17* (10), 2688–2694.

Cao, Y.; Sahin, E.; Choi, J. W.; Xing, P.; Chen, G. F. R.; Ng, D. K. T.; Eggleton, B. J.; Tan, D. T. H. Thermo-Optically Tunable Spectral Broadening in a Nonlinear Ultra-Silicon-Rich Nitride Bragg Grating. *Photonics Res.* **2021**, *9* (4), 596.

Chan, K. K.; Giovanni, D.; He, H.; Sum, T. C.; Yong, K.-T. Water-Stable All-Inorganic Perovskite Nanocrystals with Nonlinear Optical Properties for Targeted Multiphoton Bioimaging. *ACS Appl. Nano Mater.* **2021**, *4* (9), 9022–9033.

Chandrasekar, K.; Farrugia, B. L.; Johnson, L.; Marks, D.; Irving, D.; Elgundi, Z.; Lau, K.; Kim, H. N.; Rnjak-Kovacina, J.; Bilek, M. M.; Whitelock, J. M.; Lord, M. S. Effect of Recombinant Human Perlecan Domain V Tethering Method on Protein Orientation and Blood Contacting Activity on Polyvinyl Chloride. *Adv. Healthc. Mater.* **2021**, *10* (14), 2100388.

Chang, N. L.; Zheng, J.; Wu, Y.; Shen, H.; Qi, F.; Catchpole, K.; Ho-Baillie, A.; Egan, R. J. A Bottom-up Cost Analysis of Silicon–Perovskite Tandem Photovoltaics. *Prog. Photovoltaics Res. Appl.* **2021**, *29* (3), 401–413.

Chen, L.-J.; Humphrey, S. J.; Zhu, J.-L.; Zhu, F.-F.; Wang, X.-Q.; Wang, X.; Wen, J.; Yang, H.-B.; Gale, P. A. A Two-Dimensional Metallacycle Cross-Linked Switchable Polymer for Fast and Highly Efficient Phosphorylated Peptide Enrichment. *J. Am. Chem. Soc.* **2021**, *143* (22), 8295–8304.

Chen, Y.; Song, Y.; Zhang, C.; Zhang, F.; O'Donnell, L.; Chrzanowski, W.; Cai, W. Celltrack R-CNN: A Novel End-To-End Deep Neural Network For Cell Segmentation And Tracking In Microscopy Images. In *2021 IEEE 18th International Symposium on Biomedical Imaging (ISBI)*; IEEE, 2021; pp 779–782.

Cho, Y.; Bing, J.; Kim, H. Do; Li, Y.; Zheng, J.; Tang, S.; Green, M. A.; Wakamiya, A.; Huang, S.; Ohkita, H.; Ho-Baillie, A. W. Y. Immediate and Temporal Enhancement of Power Conversion Efficiency in Surface-Passivated Perovskite Solar Cells. *ACS Appl. Mater. Interfaces* **2021**, *13* (33), 39178–39185.

Cho, Y.; Kim, H. Do; Zheng, J.; Bing, J.; Li, Y.; Zhang, M.; Green, M. A.; Wakamiya, A.; Huang, S.; Ohkita, H.; Ho-Baillie, A. W. Y. Elucidating Mechanisms behind Ambient Storage-Induced Efficiency Improvements in Perovskite Solar Cells. *ACS Energy Lett.* **2021**, *6* (3), 925–933.

Choi, J. W.; Sohn, B.-U.; Sahin, E.; Chen, G. F. R.; Xing, P.; Ng, D. K. T.; Eggleton, B. J.; Tan, D. T. H. An Optical Parametric Bragg Amplifier on a CMOS Chip. *Nanophotonics* **2021**, *10* (13), 3507–3518.

Choudhury, N.; Chowdhury, S.; Das Chowdhury, S.; Kumar Shekhar, N.; Jain, D.; Sen, R.; Dhar, A. Novel Dopant Tailored Fibers Using Vapor Phase Chelate Delivery Technique. *Phys. status solidi* **2022**, *219* (1), 2100484.

Conquest, O. J.; Roman, T.; Marianov, A.; Kochubei, A.; Jiang, Y.; Stampfl, C. Calculating Entropies of Large Molecules in Aqueous Phase. *J. Chem. Theory Comput.* **2021**, *17* (12), 7753–7771.

Craiciu, I.; Lei, M.; Rochman, J.; Bartholomew, J. G.; Faraon, A. Multifunctional On-Chip Storage at Telecommunication Wavelength for Quantum Networks. *Optica* **2021**, *8* (1), 114.

Dai, Z.; Lv, T.; Barbaud, J.; Tang, W.; Wang, T.; Qiao, L.; Chen, H.; Zheng, R.; Yang, X.; Han, L. Stable Tin Perovskite Solar Cells Developed via Additive Engineering. *Sci. China Mater.* **2021**, *64* (11), 2645–2654.

Dai, Z.; Tang, W.; Wang, T.; Lv, T.; Luo, X.; Cui, D.; Sun, R.; Qiao, L.; Chen, H.; Zheng, R.; Yang, X.; Han, L. Stable Tin Perovskite Solar Cells Enabled by Widening the Time Window for Crystallization. *Sci. China Mater.* **2021**, *64* (8), 1849–1857.

Daljit Singh, J. K.; Luu, M. T.; Berengut, J. F.; Abbas, A.; Baker, M. A. B.; Wickham, S. F. J. Minimizing Cholesterol-Induced Aggregation of Membrane-Interacting DNA Origami Nanostructures. *Membranes (Basel).* **2021**, *11* (12), 950.

Das, C. M.; Guo, Y.; Kang, L.; Poenar, D. P.; Xiong, J.; Ramaswamy, Y.; Martinez-Martin, D.; Yong, K. Improving the Sensitivity of SPR Sensors with Au–Ag Alloys and 2D Materials — a Simulation-Based Approach. *Adv. Theory Simulations* **2021**, *4* (12), 2100292.

de Sterke, C. M.; Runge, A. F. J.; Hudson, D. D.; Blanco-Redondo, A. Pure-Quartic Solitons and Their Generalizations—Theory and Experiments. *APL Photonics* **2021**, *6* (9), 091101.

Ding, J.; Wang, L.; Wu, P.; Li, A.; Li, W.; Stampfl, C.; Liao, X.; Haynes, B. S.; Han, X.; Huang, J. Confined Ru Nanocatalysts on Surface to Enhance Ammonia Synthesis: An In Situ ETEM Study. *ChemCatChem* **2021**, *13* (2), 534–538.

Djerdjev, A. M.; Priyananda, P.; Gore, J.; Beattie, J. K.; Neto, C.; Hawkett, B. S. Safer Emulsion Explosives Resulting from NOx Inhibition. *Chem. Eng. J.* **2021**, *403*, 125713.

Dunham, C. S.; Lilak, S.; Hochstetter, J.; Loeffler, A.; Zhu, R.; Chase, C.; Stieg, A. Z.; Kuncic, Z.; Gimzewski, J. K. Nanoscale Neuromorphic Networks and Criticality: A Perspective. *J. Phys. Complex.* **2021**, *2* (4), 042001.

Duong, T.; Pham, H.; Yin, Y.; Peng, J.; Mahmud, M. A.; Wu, Y.; Shen, H.; Zheng, J.; Tran-Phu, T.; Lu, T.; Li, L.; Kumar, A.; Andersson, G. G.; Ho-Baillie, A.; Liu, Y.; White, T.; Weber, K.; Catchpole, K. Efficient and Stable Wide Bandgap Perovskite Solar Cells through Surface Passivation with Long Alkyl Chain Organic Cations. *J. Mater. Chem. A* **2021**, *9* (34), 18454–18465.

Edmunds, C. L.; Tan, T. R.; Milne, A. R.; Singh, A.; Biercuk, M. J.; Hempel, C. Scalable Hyperfine Qubit State Detection via Electron Shelving in the 2D5/2 and 2F7/2 Manifolds in 171Yb+. *Phys. Rev. A* **2021**, *104* (1), 012606.

El-Kamand, S.; Du Plessis, M.; Breen, N.; Johnson, L.; Beard, S.; Kwan, A. H.; Richard, D. J.; Cubeddu, L.; Gamsjaeger, R. A Distinct SsDNA/RNA Binding Interface in the Nsp9 Protein from SARS-CoV-2. *Proteins Struct. Funct. Bioinforma.* **2022**, *90* (1), 176–185.

Eslami, S.; Palomba, S. Integrated Enhanced Raman Scattering: A Review. *Nano Converg.* **2021**, *8* (1), 41.

Farajikhah, S.; Runge, A. F. J.; Boumelhem, B. B.; Rukhlenko, I. D.; Stefani, A.; Sayyar, S.; Innis, P. C.; Fraser, S. T.; Fleming, S.; Large, M. C. J. Thermally Drawn Biodegradable Fibers with Tailored Topography for Biomedical Applications. *J. Biomed. Mater. Res. Part B Appl. Biomater.* **2021**, *109* (5), 733–743.

Fenati, R. A.; Quinn, M. S.; Bilinsky, H. C.; Neto, C. Antifouling Properties of Liquid-Infused Riblets Fabricated by Direct Contactless Microfabrication. *Adv. Eng. Mater.* **2021**, *23* (1), 2000905.

Forder, T. N.; Maschmeyer, P. G.; Zeng, H.; Roberts, D. A. Post-synthetic 'Click' Synthesis of RAFT Polymers with Pendant Self-immolative Triazoles. *Chem. – An Asian J.* **2021**, *16* (4), 287–291.

G Lahori, D.; Varamini, P. Nanotechnology-Based Platforms to Improve Immune Checkpoint Blockade Efficacy in Cancer Therapy. *Futur. Oncol.* **2021**, *17* (6), 711–722.

Garrett, M.; Liu, Y.; Merklein, M.; Choi, D.-Y.; Yan, K.; Madden, S. J.; Eggleton, B. J. Multi-Band and Frequency-Agile Chip-Based RF Photonic Filter for Ultra-Deep Interference Rejection. *J. Light. Technol.* **2022**, *40* (6), 1672–1680.

Gegenhuber, T.; Müllner, M. Molecular Polymer Brushes Made via Ring-Opening Metathesis Polymerization from Cleavable RAFT Macromonomers. *Macromol. Chem. Phys.* **2021**, *222* (13), 2100077.

Genasan, K.; Mehrali, M.; Veerappan, T.; Talebian, S.; Malliga Raman, M.; Singh, S.; Swamiappan, S.; Mehrali, M.; Kamarul, T.; Balaji Raghavendran, H. R. Calcium-Silicate-Incorporated Gellan-Chitosan Induced Osteogenic Differentiation in Mesenchymal Stromal Cells. *Polymers (Basel).* **2021**, *13* (19), 3211.

Ghaly, H. S. A.; Varamini, P. New Drug Delivery Strategies Targeting the GnRH Receptor in Breast and Other Cancers. *Endocr. Relat. Cancer* **2021**, *28* (11), R251–R269.

Gilchrist, A. M.; Wang, P.; Carreira-Barral, I.; Alonso-Carrillo, D.; Wu, X.; Quesada, R.; Gale, P. A. Supramolecular Methods: The 8-Hydroxypyrene-1,3,6-Trisulfonic Acid (HPTS) Transport Assay. *Supramol. Chem.* **2021**, 1–20.

Gomes, A. D.; Zhao, J. T.; Tuniz, A.; Schmidt, M. A. Direct Observation of Modal Hybridization in Nanofluidic Fiber [Invited]. *Opt. Mater. Express* **2021**, *11* (2), 559.

Granados, L.; Morena, R.; Takamure, N.; Suga, T.; Huang, S.; McKenzie, D. R.; Ho-Baillie, A. Silicate Glass-to-Glass Hermetic Bonding for Encapsulation of next-Generation Optoelectronics: A Review. *Mater. Today* **2021**, *47*, 131–155.

Grau, G. E. R.; Hosseini-Beheshti, E. Extracellular Vesicles and Cerebral Malaria; 2021; pp 501–508.

Graziotto, M. E.; Adair, L. D.; Kaur, A.; Vérité, P.; Ball, S. R.; Sunde, M.; Jacquemin, D.; New, E. J. Versatile Naphthalimide Tetrazines for Fluorogenic Bioorthogonal Labelling. *RSC Chem. Biol.* **2021**, *2* (5), 1491–1498.

Guo, X.; Liu, Y.; Yin, T.; Morrison, B.; Pagani, M.; Daulay, O.; Bogaerts, W.; Eggleton, B. J.; Casas-Bedoya, A.; Marpaung, D. Versatile Silicon Microwave Photonic Spectral Shaper. *APL Photonics* **2021**, *6* (3), 036106.

Hakobyan, K.; McErlean, C. S. P.; Müllner, M. RAFT without an "R-Group": From Asymmetric Homo-Telechelics to Multiblock Step-Growth and Cyclic Block Copolymers. *Macromolecules* **2021**, *54* (17), 7732–7742.

Håkonsen, V.; Singh, G.; De Toro, J. A.; Normile, P. S.; Wahlström, E.; He, J.; Zhang, Z. Reconfigurable Mechanical Anisotropy in Self-Assembled Magnetic Superstructures. *Adv. Sci.* **2021**, *8* (8), 2002683.

Hall, A. J.; Robertson, A. G.; Hill, L. R.; Rendina, L. M. Synthesis and Tumour Cell Uptake Studies of Gadolinium(III)–Phosphonium Complexes. *Sci. Rep.* **2021**, *11* (1), 598.

Han, W.; Yin, M.; Zhang, W.; Liu, Z.; Wang, N.; Yong, K. T.; An, Q. Acid-Resistance and Self-Repairing Supramolecular Nanoparticle Membranes via Hydrogen-Bonding for Sustainable Molecules Separation. *Adv. Sci.* **2021**, *8* (23), 2102594.

Harper-Harris, J.; Kant, K.; Singh, G. Oleic Acid-Assisted Synthesis of Tunable High-Aspect-Ratio Multiply-Twinned Gold Nanorods for Bioimaging. *ACS Appl. Nano Mater.* **2021**, *4* (4), 3325–3330.

Ho-Baillie, A. W. Y.; Sullivan, H. G. J.; Bannerman, T. A.; Talathi, H. P.; Bing, J.; Tang, S.; Xu, A.; Bhattacharyya, D.; Cairns, I. H.; McKenzie, D. R. Deployment Opportunities for Space Photovoltaics and the Prospects for Perovskite Solar Cells. *Adv. Mater. Technol.* **2022**, *7* (3), 2101059.

Ho-Baillie, A. W. Y.; Zheng, J.; Mahmud, M. A.; Ma, F.-J.; McKenzie, D. R.; Green, M. A. Recent Progress and Future Prospects of Perovskite Tandem Solar Cells. *Appl. Phys. Rev.* **2021**, *8* (4), 041307.

Hochstetter, J.; Zhu, R.; Loeffler, A.; Diaz-Alvarez, A.; Nakayama, T.; Kuncic, Z. Avalanches and Edge-of-Chaos Learning in Neuromorphic Nanowire Networks. *Nat. Commun.* **2021**, *12* (1), 4008.

Hossain, K. R.; Clayton, D.; Goodchild, S. C.; Rodger, A.; Payne, R. J.; Cornelius, F.; Clarke, R. J. Order-Disorder Transitions of Cytoplasmic N-Termini in the Mechanisms of P-Type ATPases. *Faraday Discuss.* **2021**, *232*, 172–187.

Hu, L.; Zhao, Q.; Huang, S.; Zheng, J.; Guan, X.; Patterson, R.; Kim, J.; Shi, L.; Lin, C.-H.; Lei, Q.; Chu, D.; Tao, W.; Cheong, S.; Tilley, R. D.; Ho-Baillie, A. W. Y.; Luther, J. M.; Yuan, J.; Wu, T. Flexible and Efficient Perovskite Quantum Dot Solar Cells via Hybrid Interfacial Architecture. *Nat. Commun.* **2021**, *12* (1), 466.

Huang, J. E.; Li, F.; Ozden, A.; Sedighian Rasouli, A.; García de Arquer, F. P.; Liu, S.; Zhang, S.; Luo, M.; Wang, X.; Lum, Y.; Xu, Y.; Bertens, K.; Miao, R. K.; Dinh, C.-T.; Sinton, D.; Sargent, E. H. CO2 Electrolysis to Multicarbon Products in Strong Acid. *Science (80-.).* **2021**, *372* (6546), 1074–1078.

Hunt, N. J.; Lockwood, G. P.; Kang, S. W. S.; Westwood, L. J.; Limantoro, C.; Chrzanowski, W.; McCourt, P. A. G.; Kuncic, Z.; Le Couteur, D. G.; Cogger, V. C. Quantum Dot Nanomedicine Formulations Dramatically Improve Pharmacological Properties and Alter Uptake Pathways of Metformin and Nicotinamide Mononucleotide in Aging Mice. *ACS Nano* **2021**, *15* (3), 4710–4727.

Huynh, V. T.; Nguyen, D.; Zhu, L.; Pham, N. T. H.; Priyananda, P.; Hawkett, B. S. Ultra-Thin Patchy Polymer-Coated Graphene Oxide as a Novel Anticancer Drug Carrier. *Polym. Chem.* **2021**, *12* (1), 92–104.

Jain, D.; George, M.; Harris, B.; Fleming, S. Approximate Normalized Frequency (V-Parameter) and Modal Cut-off Wavelengths of M-Type Optical Fibers. In *Frontiers in Optics / Laser Science*; OSA: Washington, D.C., 2020; p FM4D.2.

Jaiswal, A.; Rani, S.; Singh, G. P.; Hassan, M.; Nasrin, A.; Gomes, V. G.; Saxena, S.; Shukla, S. Additive-Free All-Carbon Composite: A Two-Photon Material System for Nanopatterning of Fluorescent Sub-Wavelength Structures. *ACS Nano* **2021**, *15* (9), 14193–14206.

Jami, H.; Jabbarzadeh, A. Molecular Simulation of High-Velocity Deposition of Titanium Dioxide Nanoparticles on Titanium. *Appl. Surf. Sci.* **2021**, *542*, 148567.

Jiang, H. J.; Miao, S.; Imberti, S.; Simmons, B. A.; Atkin, R.; Warr, G. G. Liquid Nanostructure of Choline Lysinate with Water and a Model Lignin Residue. *Green Chem.* **2021**, *23* (2), 856–866.

Kamble, S.; Valtchev, P.; Dao, A.; Pelras, T.; Rogers, M. J.; Savage, P. B.; Dehghani, F.; Schindeler, A. Synthesis and Characterization of Bone Binding Antibiotic-1 (BBA-1), a Novel Antimicrobial for Orthopedic Applications. *Molecules* **2021**, *26* (6), 1541.

Kaur, A.; New, E. J. Mechanistic Insights on How to Avoid and Harness Cyanine Photoconversion. *ACS Cent. Sci.* **2021**, *7* (7), 1095–1098.

Khan, N. A.; Akhavan, B.; Zheng, Z.; Liu, H.; Zhou, C.; Zhou, H.; Chang, L.; Wang, Y.; Liu, Y.; Sun, L.; Bilek, M. M.; Liu, Z. Nanostructured AlCoCrCu0.5FeNi High Entropy Oxide (HEO) Thin Films Fabricated Using Reactive Magnetron Sputtering. *Appl. Surf. Sci.* **2021**, *553*, 149491.

King, G. G. G.; Barnett, P. S.; Bartholomew, J. G.; Faraon, A.; Longdell, J. J. Probing Strong Coupling between a Microwave Cavity and a Spin Ensemble with Raman Heterodyne Spectroscopy. *Phys. Rev. B* **2021**, *103* (21), 214305.

Knock, S. A.; Magee, M.; Stone, J. E.; Ganesan, S.; Mulhall, M. D.; Lockley, S. W.; Howard, M. E.; Rajaratnam, S. M. W.; Sletten, T. L.; Postnova, S. Prediction of Shiftworker Alertness, Sleep, and Circadian Phase Using a Model of Arousal Dynamics Constrained by Shift Schedules and Light Exposure. *Sleep* **2021**, *44* (11).

Koutsakos, M.; Rowntree, L. C.; Hensen, L.; Chua, B. Y.; van de Sandt, C. E.; Habel, J. R.; Zhang, W.; Jia, X.; Kedzierski, L.; Ashhurst, T. M.; Putri, G. H.; Marsh-Wakefield, F.; Read, M. N.; Edwards, D. N.; Clemens, E. B.; Wong, C. Y.; Mordant, F. L.; Juno, J. A.; Amanat, F.; Audsley, J.; Holmes, N. E.; Gordon, C. L.; Smibert, O. C.; Trubiano, J. A.; Hughes, C. M.; Catton, M.; Denholm, J. T.; Tong, S. Y. C.; Doolan, D. L.; Kotsimbos, T. C.; Jackson, D. C.; Krammer, F.; Godfrey, D. I.; Chung, A. W.; King, N. J. C.; Lewin, S. R.; Wheatley, A. K.; Kent, S. J.; Subbarao, K.; McMahon, J.; Thevarajan, I.; Nguyen, T. H. O.; Cheng, A. C.; Kedzierska, K. Integrated Immune Dynamics Define Correlates of COVID-19 Severity and Antibody Responses. *Cell Reports Med.* **2021**, *2* (3), 100208.

Kuncic, Z.; Nakayama, T. Neuromorphic Nanowire Networks: Principles, Progress and Future Prospects for Neuro-Inspired Information Processing. *Adv. Phys. X* **2021**, *6* (1).

Lai, C. K.; Choi, D.; Athanasios, N. J.; Yan, K.; Chong, W. Y.; Debbarma, S.; Ahmad, H.; Eggleton, B. J.; Merklein, M.; Madden, S. J. Hybrid Chalcogenide-Germanosilicate Waveguides for High Performance Stimulated Brillouin Scattering Applications. *Adv. Funct. Mater.* **2022**, *32* (3), 2105230.

Lai, H. Y.; Setyawati, M. I.; Ferhan, A. R.; Divakarla, S. K.; Chua, H. M.; Cho, N.-J.; Chrzanowski, W.; Ng, K. W. Self-Assembly of Solubilized Human Hair Keratins. *ACS Biomater. Sci. Eng.* **2021**, *7* (1), 83–89.

Lam, Y. T.; Tan, R. P.; Michael, P. L.; Lau, K.; Yang, N.; Rnjak-Kovacina, J.; Wise, S. G. Bioengineering Silk into Blood Vessels. *Biochem. Soc. Trans.* **2021**, *49* (5),

Lane, J. D. E.; Berry, S. N.; Lewis, W.; Ho, J.; Jolliffe, K. A. Diaminomethylenemalononitriles and Diaminomethyleneindanediones as Dual Hydrogen Bond Donors for Anion Recognition. *J. Org. Chem.* **2021**, *86* (7), 4957–4964.

Lau, K.; Waterhouse, A.; Akhavan, B.; Gao, L.; Kim, H. N.; Tang, F.; Whitelock, J. M.; Bilek, M. M.; Lord, M. S.; Rnjak-Kovacina, J. Biomimetic Silk Biomaterials: Perlecan-Functionalized Silk Fibroin for Use in Blood-Contacting Devices. *Acta Biomater.* **2021**, *132*, 162–175.

Lei, Q.; Phan, T. H.; Le Thi, P.; Poon, C.; Pansani, T. N.; Kabakowa, I.; Kalionis, B.; Park, K. D.; Chrzanowski, W. HydroGEV: Extracellular Vesicle-Laden Hydrogel for Wound Healing Applications; 2021; pp 81–89.

Lepkowski, D. L.; Grassman, T. J.; Boyer, J. T.; Chmielewski, D. J.; Yi, C.; Juhl, M. K.; Soeriyadi, A. H.; Western, N.; Mehrvarz, H.; Römer, U.; Ho-Baillie, A.; Kerestes, C.; Derkacs, D.; Whipple, S. G.; Stavrides, A. P.; Bremner, S. P.; Ringel, S. A. 23.4% Monolithic Epitaxial GaAsP/Si Tandem Solar Cells and Quantification of Losses from Threading Dislocations. *Sol. Energy Mater. Sol. Cells* **2021**, *230*, 111299.

Lesani, P.; Lu, Z.; Singh, G.; Mursi, M.; Mirkhalaf, M.; New, E. J.; Zreiqat, H. Influence of Carbon Dot Synthetic Parameters on Photophysical and Biological Properties. *Nanoscale* **2021**, *13* (25), 11138–11149.

Lesani, P.; Singh, G.; Lu, Z.; Mirkhalaf, M.; New, E. J.; Zreiqat, H. Two-Photon Ratiometric Carbon Dot-Based Probe for Real-Time Intracellular PH Monitoring in 3D Environment. *Chem. Eng. J.* **2022**, *433*, 133668.

Lezhennikova, K.; Glybovski, S.; Abdeddaim, R.; Rustomji, K.; Wenger, J.; de Sterke, C. M.; Enoch, S. Near Field Dipole-Dipole Coupling Near Conductive Plate In The Microwave Range: An RF Analogue To Förster Resonance Energy Transfer In Optics. In *2021 International Conference on Electromagnetics in Advanced Applications (ICEAA)*; IEEE, 2021; pp 374–374.

Li, C.; Merklein, M.; Liu, Y.; Choudhary, A.; Eggleton, B. J.; Corcoran, B. Effective Linewidth Reduction in Self-Homodyne Coherent Reception by Stimulated Brillouin Scattering-Based Optical Carrier Recovery. *Opt. Express* **2021**, *29* (16), 25697.

Li, H.; Liu, Y.; Liu, Y.; Wang, L.; Tang, R.; Deng, P.; Xu, Z.; Haynes, B.; Sun, C.; Huang, J. Efficient Visible Light Driven Ammonia Synthesis on Sandwich Structured C3N4/MoS2/ Mn3O4 Catalyst. *Appl. Catal. B Environ.* **2021**, *281*, 119476.

Li, H.; Zhang, Y.; Jones, S.; Segalman, R.; Warr, G. G.; Atkin, R. Interfacial Nanostructure and Friction of a Polymeric Ionic Liquid-Ionic Liquid Mixture as a Function of Potential at Au(1 1 1) Electrode Interface. *J. Colloid Interface Sci.* **2022**, *606*, 1170–1178.

Liang, Y.; Zhao, J.; Zhang, H.; Zhang, A.; Wang, S.; Li, J.; Shakouri, M.; Xiao, Q.; Hu, Y.; Liu, Z.; Geng, Z.; Li, F.; Zeng, J. Bias-Adaptable CO2 -to-CO Conversion via Tuning the Binding of Competing Intermediates. *Nano Lett.* **2021**, *21* (20), 8924–8932.

Liao, C.; Chen, C.; Bing, J.; Bailey, C.; Lin, Y.; Pandit, T. M.; Granados, L.; Zheng, J.; Tang, S.; Lin, B.; Yen, H.; McCamey, D. R.; Kennedy, B. J.; Chueh, C.; Ho-Baillie, A. W. Y. Inorganic-Cation Pseudohalide 2D Cs2 Pb(SCN)2 Br2 Perovskite Single Crystal. *Adv. Mater.* **2022**, *34* (7), 2104782.

Lin, D.; Hsieh, C.-L.; Hsu, K.-C.; Liao, P.-H.; Qiu, S.; Gong, T.; Yong, K.-T.; Feng, S.; Kong, K. V. Geometrically Encoded SERS Nanobarcodes for the Logical Detection of Nasopharyngeal Carcinoma-Related Progression Biomarkers. *Nat. Commun.* **2021**, *12* (1), 3430.

Lin, J.; Graziotto, M. E.; Lay, P. A.; New, E. J. A Bimodal Fluorescence-Raman Probe for Cellular Imaging. *Cells* **2021**, *10* (7), 1699.

Lin, J.; Yang, K.; New, E. J. Strategies for Organelle Targeting of Fluorescent Probes. *Org. Biomol. Chem.* **2021**, *19* (43), 9339–9357.

Lin, Q.; Bernardi, S.; Shabbir, B.; Ou, Q.; Wang, M.; Yin, W.; Liu, S.; Chesman, A. S. R.; Fürer, S. O.; Si, G.; Medhekar, N.; Jasieniak, J.; Widmer-Cooper, A.; Mao, W.; Bach, U. Phase-Control of Single-Crystalline Inorganic Halide Perovskites via Molecular Coordination Engineering. *Adv. Funct. Mater.* **2022**, *32* (16), 2109442.

Liu, Y.; Choudhary, A.; Ren, G.; Choi, D.; Casas-Bedoya, A.; Morrison, B.; Ma, P.; Nguyen, T. G.; Mitchell, A.; Madden, S. J.; Marpaung, D.; Eggleton, B. J. Circulator-Free Brillouin Photonic Planar Circuit. *Laser Photon. Rev.* **2021**, *15* (5), 2000481.

Liu, Y.; Wei, J.; Frenkel, D.; Widmer-Cooper, A. Modelling Aggregates of Cetyltrimethylammonium Bromide on Gold Surfaces Using Dissipative Particle Dynamics Simulations. *Mol. Simul.* **2022**, *48* (10), 872–881.

Liu, Y.; Widmer-Cooper, A. A Dissipative Particle Dynamics Model for Studying Dynamic Phenomena in Colloidal Rod Suspensions. *J. Chem. Phys.* **2021**, *154* (10), 104120.

Lourdesamy, J. P.; Widjadja, J.; Runge, A. F. J.; Alexander, T. J.; Martijn de Sterke, C. Spectral Soliton Complex with Asymmetric Dispersion. In *2021 Conference on Lasers and Electro-Optics Europe & European Quantum Electronics Conference (CLEO/Europe-EQEC)*; IEEE, 2021; pp 1–1.

MacDonell, R. J.; Dickerson, C. E.; Birch, C. J. T.; Kumar, A.; Edmunds, C. L.; Biercuk, M. J.; Hempel, C.; Kassal, I. Analog Quantum Simulation of Chemical Dynamics. *Chem. Sci.* **2021**, *12* (28), 9794–9805.

Mahmud, Z.; Hassan, M.; Hasan, A.; Gomes, V. G. 3D Printed Nanocomposites for Tailored Cardiovascular Tissue Constructs: A Minireview. *Materialia* **2021**, *19*, 101184.

Mao, W.; Hall, C. R.; Bernardi, S.; Cheng, Y.-B.; Widmer-Cooper, A.; Smith, T. A.; Bach, U. Light-Induced Reversal of Ion Segregation in Mixed-Halide Perovskites. *Nat. Mater.* **2021**, *20* (1), 55–61.

Marianov, A. N.; Kochubei, A. S.; Roman, T.; Conquest, O. J.; Stampfl, C.; Jiang, Y. Resolving Deactivation Pathways of Co Porphyrin-Based Electrocatalysts for CO 2 Reduction in Aqueous Medium. *ACS Catal.* **2021**, *11* (6), 3715–3729.

Marianov, A. N.; Kochubei, A. S.; Roman, T.; Conquest, O. J.; Stampfl, C.; Jiang, Y. Modeling and Experimental Study of the Electron Transfer Kinetics for Non-Ideal Electrodes Using Variable-Frequency Square Wave Voltammetry. *Anal. Chem.* **2021**, *93* (29), 10175–10186.

Maschmeyer, P. G.; Liang, X.; Hung, A.; Ahmadzai, O.; Kenny, A. L.; Luong, Y. C.; Forder, T. N.; Zeng, H.; Gillies, E. R.; Roberts, D. A. Post-Polymerization 'Click' End-Capping of Polyglyoxylate Self-Immolative Polymers. *Polym. Chem.* **2021**, *12* (47), 6824–6831.

McDonagh, B. H.; Staudinger, C.; Normile, P. S.; De Toro, J. A.; Bandyopadhyay, S.; Glomm, W. R.; Singh, G. New Insights into Controlling the Twin Structure of Magnetic Iron Oxide Nanoparticles. *Appl. Mater. Today* **2021**, *24*, 101084.

McKay, L.; Lai, C. K.; Athanasios, N.; Choi, D.-Y.; Madden, S. J.; Eggleton, B. J.; Merklein, M. Chip-Based Broadband Microwave Photonic Mixer with Image Rejection. In *2021 International Topical Meeting on Microwave Photonics (MWP)*; IEEE, 2021; pp 1–4.

McNaughton, D. A.; Macreadie, L. K.; Gale, P. A. Acridinone-Based Anion Transporters. *Org. Biomol. Chem.* **2021**, *19* (44), 9659–9674.

McNaughton, D. A.; To, T. Y. (Teresa); Hawkins, B. A.; Hibbs, D. E.; Gale, P. A. Delivering Anion Transporters to Lipid Bilayers in Water. *Org. Biomol. Chem.* **2021**, *19* (44), 9624–9628.

Mehrgardt, P.; Khushi, M.; Poon, S.; Withana, A. Deep Learning Fused Wearable Pressure and PPG Data for Accurate Heart Rate Monitoring. *IEEE Sens. J.* **2021**, *21* (23), 27106–27115.

Merklein, M.; Stiller, B.; Vu, K.; Ma, P.; Madden, S. J.; Eggleton, B. J. On-Chip Broadband Nonreciprocal Light Storage. *Nanophotonics* **2020**, *10* (1), 75–82.

Miao, S.; Jiang, H. J.; Imberti, S.; Atkin, R.; Warr, G. Aqueous Choline Amino Acid Deep Eutectic Solvents. *J. Chem. Phys.* **2021**, *154* (21), 214504.

Mitchell, L.; New, E. J.; Mahon, C. S. Macromolecular Optical Sensor Arrays. *ACS Appl. Polym. Mater.* **2021**, *3* (2), 506–530. https://doi.org/10.1021/acsapm.0c01003.

Mitchell, L.; Shen, C.; Timmins, H. C.; Park, S. B.; New, E. J. A Versatile Fluorescent Sensor Array for Platinum Anticancer Drug Detection in Biological Fluids. *ACS Sensors* **2021**, *6* (3), 1261–1269.

Moaied, M.; Ostrikov, K.; Palomba, S. Non-Local Quantum Plasmon Resonance in Ultra-Small Silver Nanoparticles. *Plasmonics* **2021**, *16* (4), 1261–1267.

Mollah, F.; Varamini, P. Overcoming Therapy Resistance and Relapse in TNBC: Emerging Technologies to Target Breast Cancer-Associated Fibroblasts. *Biomedicines* **2021**, *9* (12), 1921.

Mondou, M.; Maguire, S.; Pain, G.; Crump, D.; Hecker, M.; Basu, N.; Hickey, G. M. Envisioning an International Validation Process for New Approach Methodologies in Chemical Hazard and Risk Assessment. *Environ. Adv.* **2021**, *4*, 100061.

Moore, M. J.; Tan, R. P.; Yang, N.; Rnjak-Kovacina, J.; Wise, S. G. Bioengineering Artificial Blood Vessels from Natural Materials. *Trends Biotechnol.* **2022**, *40* (6), 693–707.

Moreddu, R.; Mahmoodi, N.; Kassanos, P.; Vigolo, D.; Mendes, P. M.; Yetisen, A. K. Stretchable Nanostructures as Optomechanical Strain Sensors for Ophthalmic Applications. *ACS Appl. Polym. Mater.* **2021**, *3* (11), 5416–5424.

Moreddu, R.; Nasrollahi, V.; Kassanos, P.; Dimov, S.; Vigolo, D.; Yetisen, A. K. Lab-on-a-Contact Lens Platforms Fabricated by Multi-Axis Femtosecond Laser Ablation. *Small* **2021**, *17* (38), 2102008.

Najafi-Ashtiani, H.; Jing, F.; McCulloch, D. G.; Akhavan, B. ITO-Free Silver-Doped DMD Structures: HiPIMS Transparent-Conductive Nano-Composite Coatings for Electrochromic Applications. *Sol. Energy Mater. Sol. Cells* **2021**, *231*, 111268.

Nguyen, D.; Huynh, V.; Lam, M.; Serelis, A.; Davey, T.; Paravagna, O.; Such, C.; Hawkett, B. Encapsulation by Directed PISA: RAFT-Based Polymer-Vesiculated Pigment for Opacity Enhancement in Paint Films. *Macromol. Rapid Commun.* **2021**, *42* (10), 2100008.

Nguyen, G.; Postnova, S. Progress in Modelling of Brain Dynamics during Anaesthesia and the Role of Sleep-Wake Circuitry. *Biochem. Pharmacol.* **2021**, *191*, 114388.

Nguyen, T. N.; Guo, J.; Sachindran, A.; Li, F.; Seifitokaldani, A.; Dinh, C.-T. Electrochemical CO2 Reduction to Ethanol: From Mechanistic Understanding to Catalyst Design. *J. Mater. Chem. A* **2021**, *9* (21), 12474–12494.

Niederberger, A.; Pelras, T.; Manni, L. S.; FitzGerald, P. A.; Warr, G. G.; Müllner, M. Stiffness-Dependent Intracellular Location of Cylindrical Polymer Brushes. *Macromol. Rapid Commun.* **2021**, *42* (13), 2100138.

Omelyanchik, A.; Villa, S.; Vasilakaki, M.; Singh, G.; Ferretti, A. M.; Ponti, A.; Canepa, F.; Margaris, G.; Trohidou, K. N.; Peddis, D. Interplay between Inter- and Intraparticle Interactions in Bi-Magnetic Core/Shell Nanoparticles. *Nanoscale Adv.* **2021**, *3* (24), 6912–6924.

Omelyanchik, A.; Villa, S.; Singh, G.; Rodionova, V.; Laureti, S.; Canepa, F.; Peddis, D. Magnetic Properties of Bi-Magnetic Core/Shell Nanoparticles: The Case of Thin Shells. *Magnetochemistry* **2021**, *7* (11), 146.

Ouyang, L.; Jiang, J.; Chen, K.; Zhu, M.; Liu, Z. Hydrogen Production via Hydrolysis and Alcoholysis of Light Metal-Based Materials: A Review. *Nano-Micro Lett.* **2021**, *13* (1), 134.

Ozsvar, J.; Wang, R.; Tarakanova, A.; Buehler, M. J.; Weiss, A. S. Fuzzy Binding Model of Molecular Interactions between Tropoelastin and Integrin AlphaVbeta3. *Biophys. J.* **2021**, *120* (15), 3138–3151.

Ozsvar, J.; Yang, C.; Cain, S. A.; Baldock, C.; Tarakanova, A.; Weiss, A. S. Tropoelastin and Elastin Assembly. *Front. Bioeng. Biotechnol.* **2021**, *9*.

Pansani, T. N.; Phan, T. H.; Lei, Q.; Kondyurin, A.; Kalionis, B.; Chrzanowski, W. Extracellular Vesicle-Based Coatings Enhance Bioactivity of Titanium Implants—SurfEV. *Nanomaterials* **2021**, *11* (6), 1445.

Park, J. H.; Shin, B. S.; Jabbarzadeh, A. Anisotropic Wettability on One-Dimensional Nanopatterned Surfaces: The Effects of Intrinsic Surface Wettability and Morphology. *Langmuir* **2021**, *37* (48), 14186–14194.

Park, S.-H.; Hwang, I.; McNaughton, D. A.; Kinross, A. J.; Howe, E. N. W.; He, Q.; Xiong, S.; Kilde, M. D.; Lynch, V. M.; Gale, P. A.; Sessler, J. L.; Shin, I. Synthetic Na+/K+ Exchangers Promote Apoptosis by Disturbing Cellular Cation Homeostasis. *Chem* **2021**, *7* (12), 3325–3339.

Peppou-Chapman, S.; Neto, C. Depletion of the Lubricant from Lubricant-Infused Surfaces Due to an Air/Water Interface. *Langmuir* **2021**, *37* (10), 3025–3037.

Phan, T. H.; Divakarla, S. K.; Yeo, J. H.; Lei, Q.; Tharkar, P.; Pansani, T. N.; Leslie, K. G.; Tong, M.; Coleman, V. A.; Jämting, Å.; Du Plessis, M.-D.; New, E. J.; Kalionis, B.; Demokritou, P.; Woo, H.-K.; Cho, Y.-K.; Chrzanowski, W. New Multiscale Characterization Methodology for Effective Determination of Isolation–Structure–Function Relationship of Extracellular Vesicles. *Front. Bioeng. Biotechnol.* **2021**, *9*.

Pokrajac, L.; Abbas, A.; Chrzanowski, W.; Dias, G. M.; Eggleton, B. J.; Maguire, S.; Maine, E.; Malloy, T.; Nathwani, J.; Nazar, L.; Sips, A.; Sone, J.; van den Berg, A.; Weiss, P. S.; Mitra, S. Nanotechnology for a Sustainable Future: Addressing Global Challenges with the International Network4Sustainable Nanotechnology. *ACS Nano* **2021**, *15* (12), 18608–18623.

Poon, K.; Lu, Z.; De Deene, Y.; Ramaswamy, Y.; Zreiqat, H.; Singh, G. Tuneable Manganese Oxide Nanoparticle Based Theranostic Agents for Potential Diagnosis and Drug Delivery. *Nanoscale Adv.* **2021**, *3* (14), 4052–4061.

Postnov, D. E.; Merkulova, K. O.; Postnova, S. Desynchrony and Synchronisation Underpinning Sleep–Wake Cycles. *Eur. Phys. J. Plus* **2021**, *136* (5), 488.

Robertson, A. G.; Rendina, L. M. Gadolinium Theranostics for the Diagnosis and Treatment of Cancer. *Chem. Soc. Rev.* **2021**, *50* (7), 4231–4244.

Ruhoff, A. M.; Hong, J. K.; Gao, L.; Singh, J.; Tran, C.; Mackie, G.; Waterhouse, A. Biomaterial Wettability Affects Fibrin Clot Structure and Fibrinolysis. *Adv. Healthc. Mater.* **2021**, *10* (20), 2100988.

Runge, A. F. J.; Alexander, T. J.; Talathi, H. P.; Hudson, D. D.; Blanco-Redondo, A.; de Sterke, C. M. Generalized Self-Similar Propagation and Amplification of Optical Pulses in Nonlinear Media with High-Order Normal Dispersion. *Phys. Rev. A* **2021**, *104* (1), 013506.

Runge, A. F. J.; Qiang, Y. L.; Alexander, T. J.; Rafat, M. Z.; Hudson, D. D.; Blanco-Redondo, A.; de Sterke, C. M. Infinite Hierarchy of Solitons: Interaction of Kerr Nonlinearity with Even Orders of Dispersion. *Phys. Rev. Res.* **2021**, *3* (1), 013166.

Salvati Manni, L.; Duss, M.; Assenza, S.; Boyd, B. J.; Landau, E. M.; Fong, W.-K. Enzymatic Hydrolysis of Monoacylglycerols and Their Cyclopropanated Derivatives: Molecular Structure and Nanostructure Determine the Rate of Digestion. *J. Colloid Interface Sci.* **2021**, *588*, 767–775.

Sharifahmadian, O.; Zhai, C.; Hung, J.; Shineh, G.; Stewart, C. A. C.; Fadzil, A. A.; Ionescu, M.; Gan, Y.; Wise, S. G.; Akhavan, B. Mechanically Robust Nitrogen-Rich Plasma Polymers: Biofunctional Interfaces for Surface Engineering of Biomedical Implants. *Mater. Today Adv.* **2021**, *12*, 100188.

Shen, J.; Tang, R.; Huang, J.; Wu, Y.; Chen, C.; Zhou, Q.; Huang, Y.; Motkuri, R. K.; Jin, X.; Cao, H. Strain Engineered Gas-Consumption Electroreduction Reactions: Fundamentals and Perspectives. *Coord. Chem. Rev.* **2021**, *429*, 213649.

Siddiquee, R.; Kwan, A. Cell-Free Synthesis of Correctly Folded Proteins with Multiple Disulphide Bonds: Production of Fungal Hydrophobins. *BIO-PROTOCOL* **2021**, *11* (10).

Silva, R. S.; Plantes Neto, A. R.; Marques, J. L. B.; Kavehei, O.; Rodrigues, C. R. A Compact QRS Detection System Based on 0.79 MW Analog CMOS Energy-of-Derivative Circuit. *Microelectronics J.* **2021**, *113*, 105097.

Singh, G.; Jami, H.; Lesani, P.; Bhattacharya, S.; Ramaswamy, Y.; Bisht, P. B.; Zreiqat, H. Evolution of Stellated Gold Nanoparticles: New Conceptual Insights into Controlling the Surface Processes. *Nano Res.* **2022**, *15* (2), 1260–1268.

Singh, J. K. D.; Darley, E.; Ridone, P.; Gaston, J. P.; Abbas, A.; Wickham, S. F. J.; Baker, M. A. B. Binding of DNA Origami to Lipids: Maximizing Yield and Switching via Strand Displacement. *Nucleic Acids Res.* **2021**, *49* (19), 10835–10850.

Smith, N. C.; Wilkinson-White, L. E.; Kwan, A. H. Y.; Trewhella, J.; Matthews, J. M. Contrasting DNA-Binding Behaviour by ISL1 and LHX3 Underpins Differential Gene Targeting in Neuronal Cell Specification. *J. Struct. Biol. X* **2021**, *5*, 100043.

Soufan, O.; Ewald, J.; Zhou, G.; Hacariz, O.; Boulanger, E.; Alcaraz, A. J.; Hickey, G.; Maguire, S.; Pain, G.; Hogan, N.; Hecker, M.; Crump, D.; Head, J.; Basu, N.; Xia, J. EcoToxXplorer: Leveraging Design Thinking to Develop a Standardized Web-Based Transcriptomics Analytics Platform for Diverse Users. *Environ. Toxicol. Chem.* **2022**, *41* (1), 21–29.

Spiteri, A. G.; Wishart, C. L.; Pamphlett, R.; Locatelli, G.; King, N. J. C. Microglia and Monocytes in Inflammatory CNS Disease: Integrating Phenotype and Function. *Acta Neuropathol.* **2022**, *143* (2), 179–224.

Sreekanth, K. V.; Medwal, R.; Das, C. M.; Gupta, M.; Mishra, M.; Yong, K.-T.; Rawat, R. S.; Singh, R. Electrically Tunable All-PCM Visible Plasmonics. *Nano Lett.* **2021**, *21* (9), 4044–4050.

Stamper, C.; Sabatini, R. P.; Bernardi, S.; Liao, C.; Dennis, E.; Sharma, A.; Widmer-Cooper, A.; Saidaminov, M. I.; Ho-Baillie, A. W. Y.; Lakhwani, G. Magnetic Optical Rotary Dispersion and Magnetic Circular Dichroism in Methylammonium Lead Halide Perovskites. *Chirality* **2021**, *33* (10), 610–617.

Stefani, A.; Henry Skelton, J.; Tuniz, A. Bend Losses in Flexible Polyurethane Antiresonant Terahertz Waveguides. *Opt. Express* **2021**, *29* (18), 28692.

Sun, H.; Chen, S.; Yang, W.; Wang, L.; Tang, R.; Zhang, X.; Zheng, R.; Gu, S.; Jiang, Y.; Liang, W.; Huang, J. Plasmon-Enhanced Alcohol Oxidations over Porous Carbon Nanosphere-Supported Palladium and Gold Bimetallic Nanocatalyst. *Appl. Catal. B Environ.* **2021**, *292*, 120151.

Suo, S.; Gan, Y. Tuning Capillary Flow in Porous Media with Hierarchical Structures. *Phys. Fluids* **2021**, *33* (3), 034107.

Suo, S.; Moscardini, M.; Becker, V.; Gan, Y.; Kamlah, M. Cyclic Thermo-Mechanical Performance of Granular Beds: Effect of Elastoplasticity. *Powder Technol.* **2021**, *394*, 705–713.

Tan, R. P.; Ryder, I.; Yang, N.; Lam, Y. T.; Santos, M.; Michael, P. L.; Robinson, D. A.; Ng, M. K.; Wise, S. G. Macrophage Polarization as a Novel Therapeutic Target for Endovascular Intervention in Peripheral Artery Disease. *JACC Basic to Transl. Sci.* **2021**, *6* (8), 693–704.

Tan, T. R.; Edmunds, C. L.; Milne, A. R.; Biercuk, M. J.; Hempel, C. Precision Characterization of the 2D5/2 State and the Quadratic Zeeman Coefficient in 171Yb+. *Phys. Rev. A* **2021**, *104* (1), L010802.

Tang, R.; Sun, H.; Zhang, Z.; Liu, L.; Meng, F.; Zhang, X.; Yang, W.; Li, Z.; Zhao, Z.; Zheng, R.; Huang, J. Incorporating Plasmonic Au-Nanoparticles into Three-Dimensionally Ordered Macroporous Perovskite Frameworks for Efficient Photocatalytic CO2 Reduction. *Chem. Eng. J.* **2022**, *429*, 132137.

Tang, R.; Wang, L.; Zhang, Z.; Yang, W.; Xu, H.; Kheradmand, A.; Jiang, Y.; Zheng, R.; Huang, J. Fabrication of MOFs' Derivatives Assisted Perovskite Nanocrystal on TiO2 Photoanode for Photoelectrochemical Glycerol Oxidation with Simultaneous Hydrogen Production. *Appl. Catal. B Environ.* **2021**, *296*, 120382.

Tang, R.; Zhou, S.; Zhang, Z.; Zheng, R.; Huang, J. Engineering Nanostructure–Interface of Photoanode Materials Toward Photoelectrochemical Water Oxidation. *Adv. Mater.* **2021**, *33* (17), 2005389.

Tang, S.; Bing, J.; Zheng, J.; Tang, J.; Li, Y.; Mayyas, M.; Cho, Y.; Jones, T. W.; Yang, T. C.-J.; Yuan, L.; Tebyetekerwa, M.; Nguyen, H. T.; Nielsen, M. P.; Ekins-Daukes, N. J.; Kalantar-Zadeh, K.; Wilson, G. J.; McKenzie, D. R.; Huang, S.; Ho-Baillie, A. W. Y. Complementary Bulk and Surface Passivations for Highly Efficient Perovskite Solar Cells by Gas Quenching. *Cell Reports Phys. Sci.* **2021**, *2* (8), 100511.

Taras, A. K.; Tuniz, A.; Bajwa, M. A.; Ng, V.; Dawes, J. M.; Poulton, C. G.; De Sterke, C. M. Shortcuts to Adiabaticity in Waveguide Couplers–Theory and Implementation. *Adv. Phys. X* **2021**, *6* (1).

Thorn, D. C.; Bahraminejad, E.; Grosas, A. B.; Koudelka, T.; Hoffmann, P.; Mata, J. P.; Devlin, G. L.; Sunde, M.; Ecroyd, H.; Holt, C.; Carver, J. A. Native Disulphide-Linked Dimers Facilitate Amyloid Fibril Formation by Bovine Milk AS2-Casein. *Biophys. Chem.* **2021**, *270*, 106530.

Tobing, L. Y. M.; Soehartono, A. M.; Mueller, A. D.; Czyszanowski, T.; Yong, K.; Fan, W. J.; Zhang, D. H. Interplays of Dipole and Charge-Transfer-Plasmon Modes in Capacitively and Conductively Coupled Dimer with High Aspect Ratio Nanogaps. *Adv. Opt. Mater.* **2021**, *9* (22), 2100748.

Tomasi, S.; Rouse, D. M.; Gauger, E. M.; Lovett, B. W.; Kassal, I. Environmentally Improved Coherent Light Harvesting. *J. Phys. Chem. Lett.* **2021**, *12* (26), 6143–6151.

Tong, A.; Sorrell, T. C.; Black, A. J.; Caillaud, C.; Chrzanowski, W.; Li, E.; Martinez-Martin, D.; McEwan, A.; Wang, R.; Motion, A.; Bedoya, A. C.; Huang, J.; Azizi, L.; Eggleton, B. J. Research Priorities for COVID-19 Sensor Technology. *Nat. Biotechnol.* **2021**, *39* (2), 144–147.

Truong, N. D.; Yang, Y.; Maher, C.; Kuhlmann, L.; McEwan, A.; Nikpour, A.; Kavehei, O. Seizure Susceptibility Prediction in Uncontrolled Epilepsy. *Front. Neurol.* **2021**, *12*.

Tummanapalli, S. S.; Kuppusamy, R.; Yeo, J. H.; Kumar, N.; New, E. J.; Willcox, M. D. P. The Role of Nitric Oxide in Ocular Surface Physiology and Pathophysiology. *Ocul. Surf.* **2021**, *21*, 37–51.

Tuniz, A. Nanoscale Nonlinear Plasmonics in Photonic Waveguides and Circuits. *La Riv. del Nuovo Cim.* **2021**, *44* (4), 193–249.

Varamini, P.; Dhiman, K.; Khazeni, S.; Mansfeld, F.; Toth, I. Lipoamino Acid-Modified GnRH Analogs with Receptor-Mediated Antiproliferative Activity in Prostate and Ovarian Cancer Cells. *Med. Chem. Res.* **2021**, *30* (8), 1577–1587.

Vindin, H. J.; Oliver, B. G.; Weiss, A. S. Elastin in Healthy and Diseased Lung. *Curr. Opin. Biotechnol.* **2022**, *74*, 15–20.

Wang, H.; Zhang, C.; Yu, J.; Song, Y.; Liu, S.; Chrzanowski, W.; Cai, W. Voxel-Wise Cross-Volume Representation Learning for 3D Neuron Reconstruction. In *Machine Learning in Me*; 2021; pp 248–257.

Wang, P.; Wu, X.; Gale, P. A. Carbazole-Based Bis-Ureas and Thioureas as Electroneutral Anion Transporters. *Supramol. Chem.* **2021**, *33* (4), 143–149.

Wang, X.; Zhai, C.; Gan, Y. Stress-Dependent Electrical Impedance Behaviours at Fractal Rough Interfaces. *Surf. Topogr. Metrol. Prop.* **2021**, *9* (2), 025014.

Wang, Z.; Maillet, B.; Pereira, J.; Gan, Y. Towards the End of Drying of Granular Materials: Enhanced Evaporation and Drying-Induced Collapse. *Water Resour. Res.* **2021**, *57* (7).

Wang, Z.; Owais, A.; Neto, C.; Pereira, J.; Gan, Y. Enhancing Spontaneous Droplet Motion on Structured Surfaces with Tailored Wedge Design. *Adv. Mater. Interfaces* **2021**, *8* (2), 2000520.

Wang, Z.; Pereira, J.; Gan, Y. Effect of Grain Shape on Quasi-Static Fluid-Fluid Displacement in Porous Media. *Water Resour. Res.* **2021**, *57* (4).

Wang, Z.; Liu, L.; Mithieux, S. M.; Weiss, A. S. Fabricating Organized Elastin in Vascular Grafts. *Trends Biotechnol.* **2021**, *39* (5), 505–518.

Widjaja, J.; Kobakhidze, E.; Cartwright, T. R.; Lourdesamy, J. P.; Runge, A. F. J.; Alexander, T. J.; de Sterke, C. M. Absence of Galilean Invariance for Pure-Quartic Solitons. *Phys. Rev. A* **2021**, *104* (4), 043526.

Williams, G. T.; Haynes, C. J. E.; Fares, M.; Caltagirone, C.; Hiscock, J. R.; Gale, P. A. Advances in Applied Supramolecular Technologies. *Chem. Soc. Rev.* **2021**, *50* (4), 2737–2763.

Windsor, M. S. A.; Busse, M.; Morrison, D. E.; Baker, R. W.; Hill, L. R.; Rendina, L. M. Selective Delivery of Remarkably High Levels of Gadolinium to Tumour Cells Using an Arsonium Salt. *Chem. Commun.* **2021**, *57* (70), 8806–8809.

Wong, K. U.; Zhang, A.; Akhavan, B.; Bilek, M. M.; Yeo, G. C. Biomimetic Culture Strategies for the Clinical Expansion of Mesenchymal Stromal Cells. *ACS Biomater. Sci. Eng.* **2021**, acsbiomaterials.0c01538.

Wood, J. A.; Liu, Y.; Widmer-Cooper, A. Crystal Nucleation in Colloidal Rod Suspensions: The Effect of Depletant Size. *J. Chem. Phys.* **2021**, *154* (24), 244505.

Wu, B.; Wang, Y.; Zhong, J.; Zeng, C.; Madoune, Y.; Zhu, W.; Liu, Z.; Liu, Y. Observation of Double Indirect Interlayer Exciton in MoSe2/WSe2 Heterostructure. *Nano Res.* **2022**, *15* (3), 2661–2666.

Wu, N.; Wang, X.; Das, C. M.; Ma, M.; Qiao, N.; Fan, T.; Zhang, H.; Xu, G.; Yong, K.-T. Bioengineering Applications of Black Phosphorus and Their Toxicity Assessment. *Environ. Sci. Nano* **2021**, *8* (12), 3452–3477.

Wu, X.; Gale, P. A. Measuring Anion Transport Selectivity: A Cautionary Tale. *Chem. Commun.* **2021**, *57* (33), 3979–3982.

Xie, T.; Rochman, J.; Bartholomew, J. G.; Ruskuc, A.; Kindem, J. M.; Craiciu, I.; Thiel, C. W.; Cone, R. L.; Faraon, A. Characterisation of Er3+: YVO4 for Microwave to Optical Transduction. *Phys. Rev. B* **2021**, *104* (5), 054111.

Xu, B.-B.; de Boo, G. G.; Johnson, B. C.; Rančić, M.; Bedoya, A. C.; Morrison, B.; McCallum, J. C.; Eggleton, B. J.; Sellars, M. J.; Yin, C.; Rogge, S. Ultrashallow Junction Electrodes in Low-Loss Silicon Microring Resonators. *Phys. Rev. Appl.* **2021**, *15* (4), 044014.

Xu, Y.; Shen, Y.; Michaels, T. C. T.; Baumann, K. N.; Vigolo, D.; Peter, Q.; Lu, Y.; Saar, K. L.; Vella, D.; Zhu, H.; Li, B.; Yang, H.; Guttenplan, A. P. M.; Rodriguez-Garcia, M.; Klenerman, D.; Knowles, T. P. J. Deformable and Robust Core–Shell Protein Microcapsules Templated by Liquid–Liquid Phase-Separated Microdroplets. *Adv. Mater. Interfaces* **2021**, *8* (19), 2101071.

Xu, Z.; Jiang, Y.; Fan, M.; Tang, S.; Liu, M.; Law, W.; Yang, C.; Ying, M.; Ma, M.; Dong, B.; Yong, K.; Xu, G. Aggregation-Induced Emission Nanoprobes Working in the NIR-II Region: From Material Design to Fluorescence Imaging and Phototherapy. *Adv. Opt. Mater.* **2021**, *9* (20), 2100859.

Yang, J.; Yu, G.; Sessler, J. L.; Shin, I.; Gale, P. A.; Huang, F. Artificial Transmembrane Ion Transporters as Potential Therapeutics. *Chem* **2021**, *7* (12), 3256–3291.

Yang, N.; Moore, M. J.; Michael, P. L.; Santos, M.; Lam, Y. T.; Bao, S.; Ng, M. K. C.; Rnjak-Kovacina, J.; Tan, R. P.; Wise, S. G. Silk Fibroin Scaffold Architecture Regulates Inflammatory Responses and Engraftment of Bone Marrow-Mononuclear Cells. *Adv. Healthc. Mater.* **2021**, *10* (16), 2100615.

Yang, T.; Jin, C.; Qu, J.; Darvish, A. A.; Sabatini, R.; Zhang, X.; Chen, H.; Ringer, S. P.; Lakhwani, G.; Li, F.; Cairney, J.; Liu, X.; Zheng, R. Solution Epitaxy of Halide Perovskite Thin Single Crystals for Stable Transistors. *ACS Appl. Mater. Interfaces* **2021**, *13* (31), 37840–37848.

Yang, T.; Li, F.; Zheng, R. Recent Advances in Radiation Detection Technologies Enabled by Metal-Halide Perovskites. *Mater. Adv.* **2021**, *2* (21), 6744–6767.

Yang, W.; Wang, Z.; Huang, J.; Jiang, Y. Qualitative and Quantitative Analysis of Acid Properties for Solid Acids by Solid-State Nuclear Magnetic Resonance Spectroscopy. *J. Phys. Chem. C* **2021**, *125* (19), 10179–10197.

Yang, X.; Xu, X.; Hou, X.; Zhang, P.; Mi, J.; Xiao, B.; Huang, J.; Stampfl, C. Transition Metal-Doped Tetra-MoN2 Monolayers as an Electrochemical Catalyst for CO2 Reduction: A Density Functional Theory Study. *Catal. Commun.* **2021**, *149*, 106212.

Yap, S. H. K.; Chan, K. K.; Yeh, C.-H.; Chien, Y.-H.; Yong, K.-T. Two-Dimensional MoS2 Nanosheet-Functionalized Optical Microfiber for Room-Temperature Volatile Organic Compound Detection. *ACS Appl. Nano Mater.* **2021**, *4* (12), 13440–13449.

Yates, J.; Daiyan, R.; Patterson, R.; Egan, R.; Amal, R.; Ho-Baille, A.; Chang, N. L. Techno-Economic Analysis of Hydrogen Electrolysis from Off-Grid Stand-Alone Photovoltaics Incorporating Uncertainty Analysis. *Cell Reports Phys. Sci.* **2020**, *1* (10), 100209.

Yin, M.-J.; Li, Z.-R.; Lv, T.-R.; Yong, K.-T.; An, Q.-F. Low-Voltage Driven Flexible Organic Thin-Film Transistor Humidity Sensors. *Sensors Actuators B Chem.* **2021**, *339*, 129887.

Ying, M.; Tang, R.; Yang, W.; Liang, W.; Yang, G.; Pan, H.; Liao, X.; Huang, J. Tailoring Electronegativity of Bimetallic Ni/Fe Metal–Organic Framework Nanosheets for Electrocatalytic Water Oxidation. *ACS Appl. Nano Mater.* **2021**, *4* (2), 1967–1975.

Zarifi, A.; Merklein, M.; Liu, Y.; Choudhary, A.; Eggleton, B. J.; Corcoran, B. Wide-Range Optical Carrier Recovery via Broadened Brillouin Filters. *Opt. Lett.* **2021**, *46* (2), 166.

Zeng, H.; Roberts, D. A. Recent Progress in Stimuli-Induced Morphology Transformations of Block Copolymer Assemblies. *Aust. J. Chem.* **2021**, *75* (2), 55–64.

Zhang, H.; Liu, Y.; Shahidan, M. F. S.; Kinnear, C.; Maasoumi, F.; Cadusch, J.; Akinoglu, E. M.; James, T. D.; Widmer-Cooper, A.; Roberts, A.; Mulvaney, P. Direct Assembly of Vertically Oriented, Gold Nanorod Arrays. *Adv. Funct. Mater.* **2021**, *31* (6), 2006753.

Zhang, S.; Chen, C.; Li, K.; Yu, H.; Li, F. Materials and System Design for Direct Electrochemical CO2 Conversion in Capture Media. *J. Mater. Chem. A* **2021**, *9* (35), 18785–18792.

Zhang, S.; Jing, X.; Wang, Y.; Li, F. Towards Carbon-Neutral Methanol Production from Carbon Dioxide Electroreduction. *ChemNanoMat* **2021**, *7* (7), 728–736.

Zhang, X.; Zhang, R.; Yang, T.; Cheng, Y.; Li, F.; Li, W.; Huang, J.; Liu, H.; Zheng, R. Facile Fabrication of Hybrid Perovskite Single-Crystalline Photocathode for Photoelectrochemical Water Splitting. *Energy Technol.* **2021**, *9* (5), 2000965.

Zhang, X.; Lin, Z.-I.; Yang, J.; Liu, G.-L.; Hu, Z.; Huang, H.; Li, X.; Liu, Q.; Ma, M.; Xu, Z.; Xu, G.; Yong, K.-T.; Tsai, W.-C.; Tsai, T.-H.; Ko, B.-T.; Chen, C.-K.; Yang, C. Carbon Dioxide-Derived Biodegradable and Cationic Polycarbonates as a New SiRNA Carrier for Gene Therapy in Pancreatic Cancer. *Nanomaterials* **2021**, *11* (9), 2312.

Zhang, Y.; Proust, G.; Retraint, D.; Wang, H.; Gan, Y. Predicting Mechanical Properties of 316L Stainless Steel Subjected to SMAT: A Sequential DEM-FEM Investigation. *Int. J. Mech. Sci.* **2021**, *193*, 106173.

Zhang, Y.; Marlow, J. B.; Millar, W.; Aman, Z. M.; Silvester, D. S.; Warr, G. G.; Atkin, R.; Li, H. Nanostructure, Electrochemistry and Potential-Dependent Lubricity of the Catanionic Surface-Active Ionic Liquid [P6,6,6,14] [AOT]. *J. Colloid Interface Sci.* **2022**, *608*, 2120–2130.

Zhao, L.; Xu, F.; Zhang, C.; Wang, Z.; Ju, H.; Gao, X.; Zhang, X.; Sun, L.; Liu, Z. Enhanced Hydrogen Storage of Alanates: Recent Progress and Future Perspectives. *Prog. Nat. Sci. Mater. Int.* **2021**, *31* (2), 165–179.

Zhao, S.; Collins, D.; Wang, L.; Huang, J. Influence of ZSM-5 Porosity and Binder Introduction on the Coke Formation in the Cracking of 1,3,5-Triisopropylbenzene. *Catal. Today* **2021**, *368*, 211–216.

Zhao, S.; Huang, J. Study by Solid-State NMR Spectroscopy on the Acidity and Shape-Selectivity of Zeolites. *Chem. J. Chinese Univ.* **2021**, *42* (1), 165–178.

Zhao, S.; Kim, K. D.; Wang, L.; Ryoo, R.; Huang, J. Tailoring Multiple Porosities of Hierarchical ZSM-5 Zeolites by Carbon Dots for High-Performance Catalytic Transformation. *Adv. Mater. Interfaces* **2021**, *8* (4), 2001846.

Zhao, S.; Yang, W.; Kim, K. D.; Wang, L.; Wang, Z.; Ryoo, R.; Huang, J. Synergy of Extraframework Al 3+ Cations and Brønsted Acid Sites on Hierarchical ZSM-5 Zeolites for Butanol-to-Olefin Conversion. *J. Phys. Chem. C* **2021**, *125* (21), 11665–11676.

Zhao, Z.; Tang, B.; Yan, X.; Wu, X.; Li, Z.; Gale, P. A.; Jiang, Y.-B. Crown Ether-Thiourea Conjugates as Ion Transporters. *Front. Chem. Sci. Eng.* **2022**, *16* (1), 81–91.

Zhong, J.; Wu, B.; Madoune, Y.; Wang, Y.; Liu, Z.; Liu, Y. PdSe2/MoSe2 Vertical Heterojunction for Self-Powered Photodetector with High Performance. *Nano Res.* **2022**, *15* (3), 2489–2496.

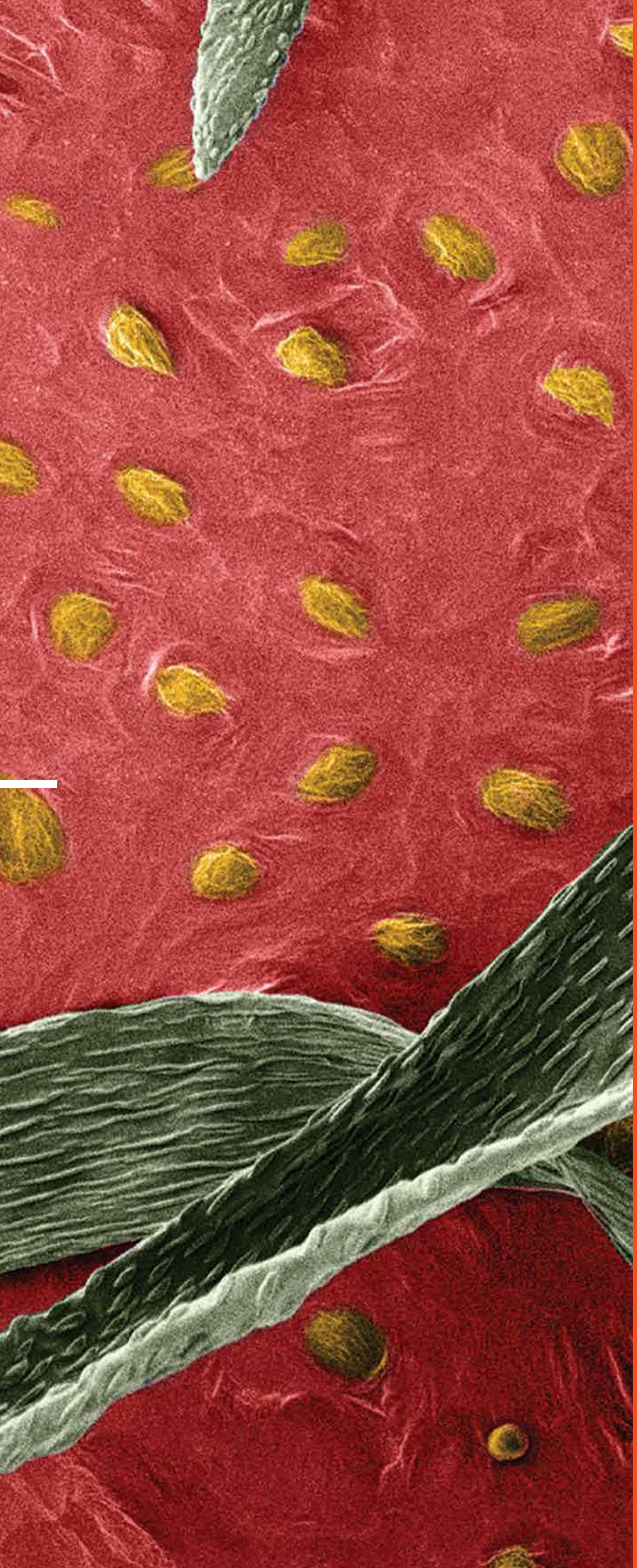
Zhou, Y.; Chen, F.; Arandiyan, H.; Guan, P.; Liu, Y.; Wang, Y.; Zhao, C.; Wang, D.; Chu, D. Oxide-Based Cathode Materials for Rechargeable Zinc Ion Batteries: Progresses and Challenges. *J. Energy Chem.* **2021**, *57*, 516–542.

Zhu, R.; Hochstetter, J.; Loeffler, A.; Diaz-Alvarez, A.; Nakayama, T.; Lizier, J. T.; Kuncic, Z. Information Dynamics in Neuromorphic Nanowire Networks. *Sci. Rep.* **2021**, *11* (1), 13047.

Zhu, R.; Hochstetter, J.; Loeffler, A.; Diaz-Alvarez, A.; Stieg, A.; Gimzewski, J.; Nakayama, T.; Kuncic, Z. Harnessing Adaptive Dynamics in Neuro-Memristive Nanowire Networks for Transfer Learning. In *2020 International Conference on Rebooting Computing (ICRC)*; IEEE, 2020; pp 102–106.

Zhu, R.; Loeffler, A.; Hochstetter, J.; Diaz-Alvarez, A.; Nakayama, T.; Stieg, A.; Gimzewski, J.; Lizier, J.; Kuncic, Z. MNIST Classification Using Neuromorphic Nanowire Networks. In *International Conference on Neuromorphic Systems 2021*; ACM: New York, NY, USA, 2021; pp 1–4.

Zwicker, V. E.; Sergeant, G. E.; New, E. J.; Jolliffe, K. A. A Colorimetric Sensor Array for the Classification of Biologically Relevant Tri-, Di- and Mono-Phosphates. *Org. Biomol. Chem.* **2021**, *19* (5), 1017–1021.



The University of Sydney Nano Institute
Sydney Nanoscience Hub (A31)
Physics Road
The University of Sydney NSW 2006
Australia
+61 2 9036 9050
sydneynano.admin@sydney.edu.au
sydney.edu.au/nano

CRICOS 00026A

Produced by The University of Sydney Nano Institute, August 2022.