

The University of Sydney Nano Institute

Annual Report 2020



THE UNIVERSITY OF
SYDNEY
—
Nano Institute

THE UNIVERSITY OF SYDNEY NANO INSTITUTE

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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 a unique multidisciplinary institute addressing scientific, societal and economical grand challenges of our time.”

Dr Cathy Foley
Australia's Chief Scientist

PREFACE



In 2020, it was my pleasure to be involved in the Sydney Nano Year 3 Review as an external panellist, in my role as the CSIRO Chief Scientist.

The panel found Sydney Nano to be aspirational in its vision, and well-placed to achieve this vision. We were very impressed by the achievements of Sydney Nano, and its strategy and operational excellence under the leadership of Prof Benjamin Eggleton and his executive team. Sydney Nano has been able to engage researchers from all faculties of the University of Sydney as well as building authentic partnerships with industry and with the leading Nano Institutes, nationally and internationally.

The academic framework of Sydney Nano is unique, comprising of complementary schemes allowing researchers from all disciplines to engage and take leadership roles. The research nodes are creative and exciting and are intensely relevant to some of society's biggest challenges.

Besides their research activities, I would like to commend Sydney Nano for their contributions to the personal development of their academic community on all levels. Sydney Nano offers essential leadership opportunities, training and mentoring. I was specifically impressed with the engagement of the institute with HDR students and Early Career Researchers.

I look forward to hearing more about the achievements of Sydney Nano and wish the institute all the best for their exciting journey.

Dr Cathy Foley
Australia's Chief Scientist

“The current global crisis highlights the importance of multidisciplinary research in nanoscale science and technology.”

Professor Ben Eggleton
Director, Sydney Nano

DIRECTOR'S NOTE

2020 – What a year it was!

I am so thankful for and proud of the Sydney Nano executive group, our professional support team, our members and partners for their hard work, commitment, and passion as we navigate the many personal and professional impacts of the pandemic. Within the challenges, our team also saw opportunities, making 2020 another successful year for Sydney Nano, particularly strengthening our cross-Faculty engagement and launching major new initiatives in nanohealth and other areas. A special thanks to Professor Duncan Ivison (DVC Research), Professor Laurent Rivory (PVC Research) and their team for their commitment and ongoing support of our multidisciplinary initiatives and especially Sydney Nano. We are on an amazing journey and our aspirations and achievements are grand.

“Our commitment to transformational and translational mission directed research seeks to address the grand challenges of our society in ways that protect and advance every aspect of human life.”

Excitingly, our Grand Challenges continued to thrive and progress towards the achievement of their missions and targets. Recognising the impact of COVID-19 restrictions, we extended the scheme for a third year, allowing our teams to continue their great work. Consequently, we will launch a new round of Grand Challenge projects in 2022. I look forward to exciting new submissions addressing new grand challenges of our evolving society.

We endorsed one new Kickstarter node and two additional Catalyst nodes, further diversifying our research and supporting our intention to engage more with our colleagues in the social sciences.

NanoHealth was a focus area for us in 2020. We finalised a scoping study about expertise and capabilities across all faculties at The University of Sydney. We thank our academic colleagues involved for their enthusiasm and support for this initiative. This allowed us to launch the Sydney NanoHealth Network, comprising six clusters of research capabilities across medicine and health with representation from the Faculty of Medicine and Health, Faculty of Science and the Faculty of Engineering. I look forward to seeing how the Network develops and what we will achieve next year. The Network will be supported by a donation from David Anstice to whom I am very grateful.

The Sydney Nano community is talented, vibrant and agile. I am so thankful for the opportunity to lead this institute and am looking forward to seeing what we will achieve together in 2021.

Professor Ben Eggleton
Director, Sydney Nano

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, breaking conventional norms. This means science, medicine and engineering researchers work with those across all disciplines to find better 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 2020 addressed priorities outlined by the UN Sustainable Development Goals, the World Health Organisation priorities, and 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, training and education
- Academic partnerships
- Industry, innovation and commercialisation

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

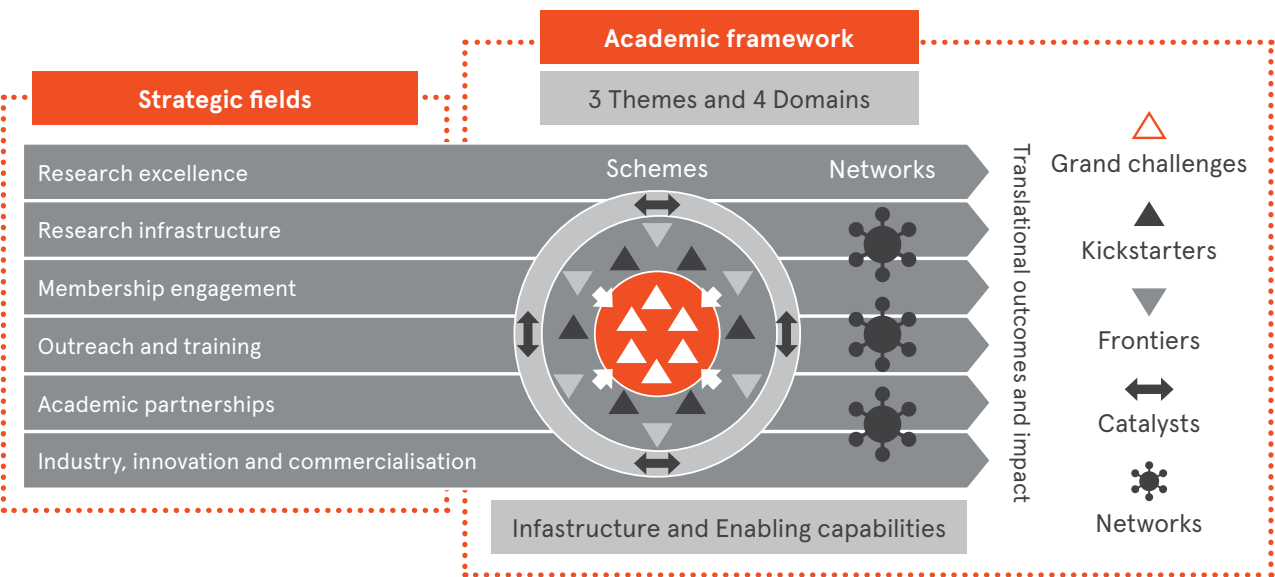
Our mission is to transform our economy, society and everyday life through multidisciplinary research in nanoscale science and technology.

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

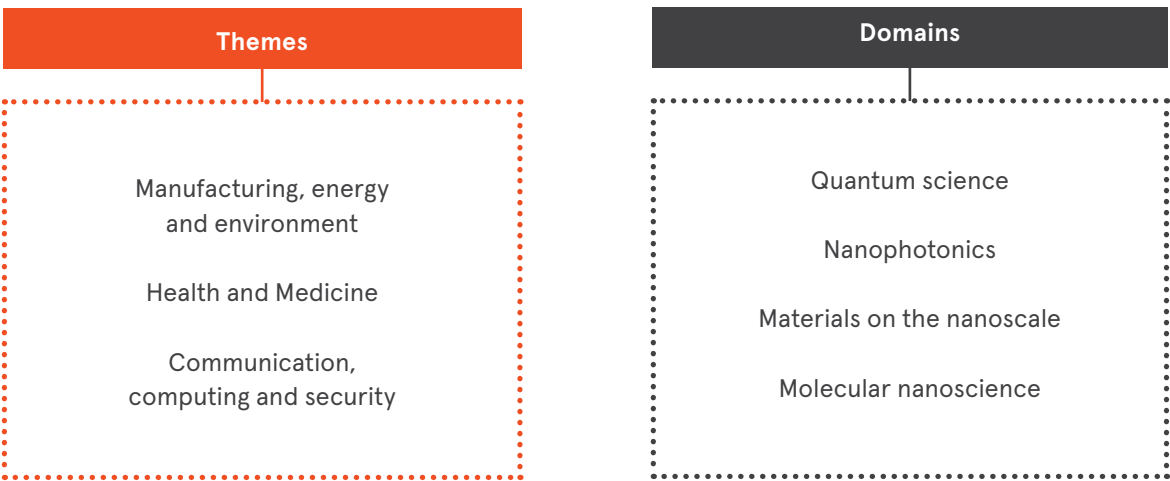
Sydney Nano works horizontally across the University and in close partnership with all faculties and schools to achieve transformational and translational outcomes. Our strategy is anchored in six strategic fields.



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.

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



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



Dr Omid Kavehei
Deputy Director,
Member Engagement



Dr Gunther Schmidt
Chief Operating Officer



Professor Anita Ho-Baillie
Deputy Director,
Education and Training



Associate Professor Alice Motion
Deputy Director,
Outreach



Professor Wojciech Chrzanowski
Deputy Director,
Academic Partnerships

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.

In 2019, eight ECR Ambassadors were appointed across seven faculties/schools, who continued their work in 2020, supporting Deputy Director Dr Omid Kavehei in the Membership Engagement portfolio.



Dr Alessandro Tuniz

Faculty of Science
(Physics) and
Sydney Fellow



Dr Jiao Jiao Li

Faculty of Medicine
and Health (Northern
Clinical School)



Dr Mohammad Mirkhalaf

Faculty of Engineering
(Biomedical Engineering)



Dr Tong Li

Faculty of Medicine and
Health (Health Sciences)



Dr Karla Straker

School of Architecture,
Design and Planning
(Design)



Dr Ben Carey

Sydney Conservatorium of
Music (Composition)



Dr Maria Rumjansetva

Sydney Business School
(Strategy, Innovation and
Entrepreneurship)



Dr Diana Chester

Faculty of Arts and
Social Sciences (Media
and Communication)

Sydney Nano Student Ambassadors

Four Sydney Nano Student Ambassadors who were appointed in 2019 continued their work in 2020. Mentored by newly appointed Deputy Director for Outreach, Associate Professor Alice Motion, the student ambassadors developed their skills in science and technology communication whilst also gaining first-hand experience in outreach activities with high schools and the general public. This included giving visibility to the study of nanoscience in innovative and creative ways.



Mr Christopher Vega
Chemistry



Ms Jiarun (Veronica) Lin
Chemistry



Mr Pradeep Murthy
Chemical and
Biomolecular Engineering



Mr Pooria Lesani
Aerospace, Mechanical
and Mechatronic
Engineering

Sydney Nano Administrative Support Unit

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



Trudy Fernan
Executive Officer



Noella Lopez
Executive Assistant



Eugena Li
Project Officer (Academic)



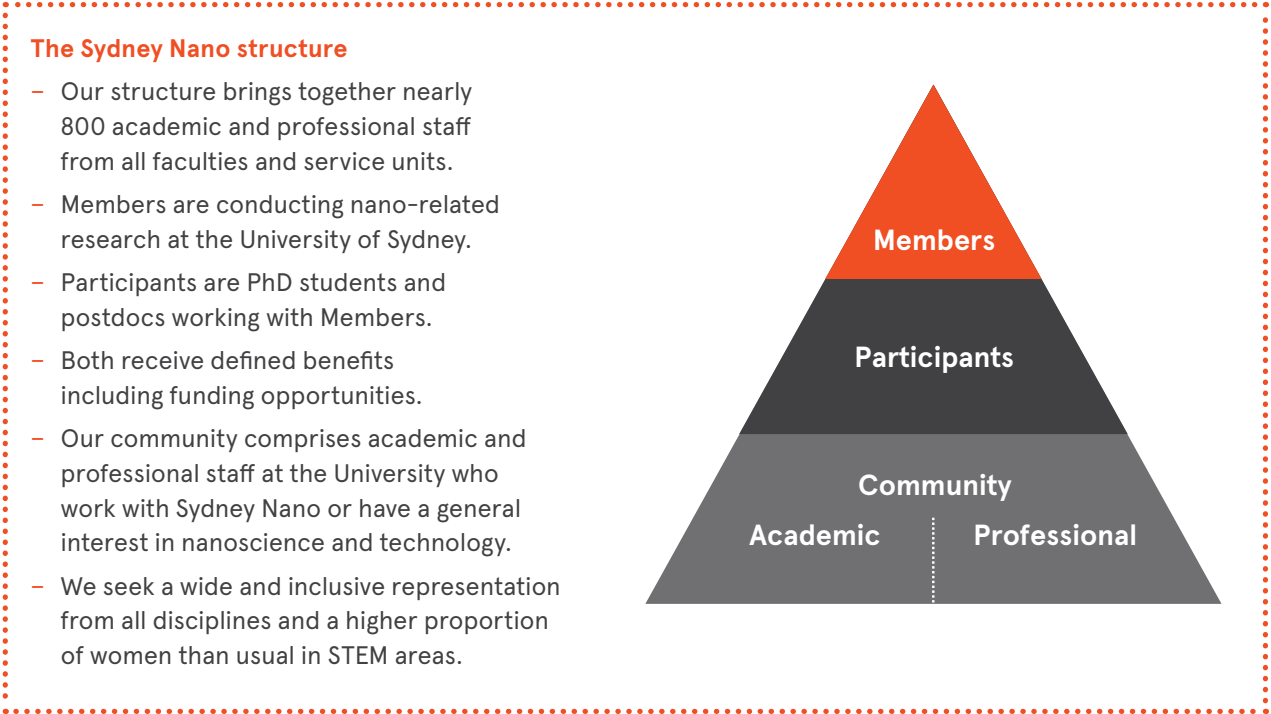
Rex Wang
Project Officer (Data)



Thooyavan Santhirathas
Project Administrator

Our members

Our membership now consists of close to 800 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.



Total number of University of Sydney staff engaged



144 Members lead nano research programs as Chief Investigators

Nearly one third are **female**



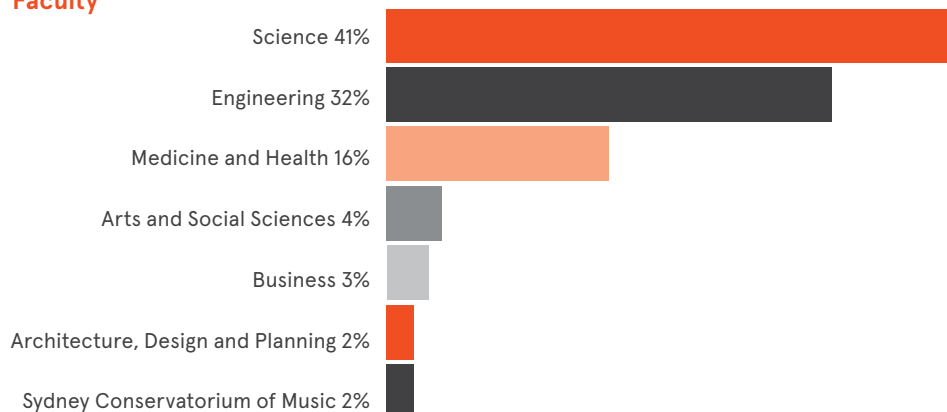
Spread over 7 Faculties/University School

40% Senior academics

34% Mid-Career Researchers

26% Early-Career Researchers

Faculty



Academic level



“Sydney Nano’s unique academic framework is truly transformative and translational: it is tailor made for multidisciplinary collaboration and research excellence.”

Professor Kathryn Refshauge
Faculty of Medicine and Health;
Chair of Sydney Nano 3 Year Review



STRATEGIC FIELDS

In 2020, 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 funded and have achieve ambitious key performance indicators. All 15 nodes in our four schemes made significant progress towards their missions and targets.

In 2020, we expanded our academic framework by introducing a new approach to foster and encourage multi-disciplinary 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. Uniquely, networks are neither seed-funded nor selected. They derive from research focus areas of our Faculties and are co-led with them. 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.

COVID-19 Sensor Co-Design Workshop

Chaired by Professor Ben Eggleton and Professor Tania Sorrell, over 60 researchers, industry members, multidisciplinary clinicians, patients, and the public partnered for a workshop on "Sensor technology to address COVID-19 and other infectious disease: Research priority setting". The group collaborated to discuss topical problem statements to develop an understanding of sensor technology that will aid in prevention, detection, and management for infectious diseases, including COVID-19. The group discussed themes of feasibility, equity, impact, sustainability, evidence gaps and more.



Correspondence | Published: 16 January 2021

Research priorities for COVID-19 sensor technology

Allison Tong , Tania C. Sorrell, Andrew J. Black, Corinne Caillaud, Wojciech Chrzanowski, Eugena Li, David Martinez-Martin, Alistair McEwan, Rex Wang, Alice Motion, Alvaro Casas Bedoya, Jun Huang, Lamiae Azizi, Benjamin J. Eggleton & The COVID-19 Sensor Research Priority-Setting Investigators

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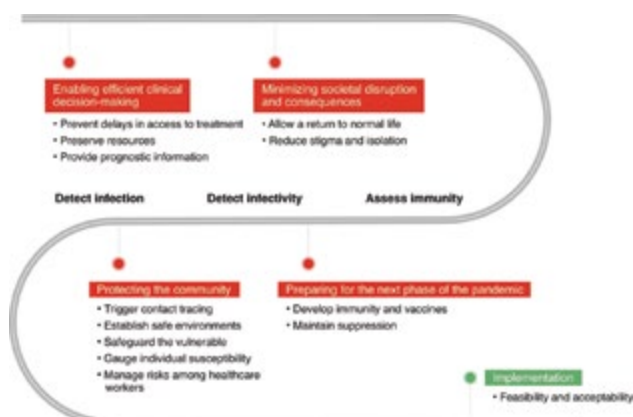
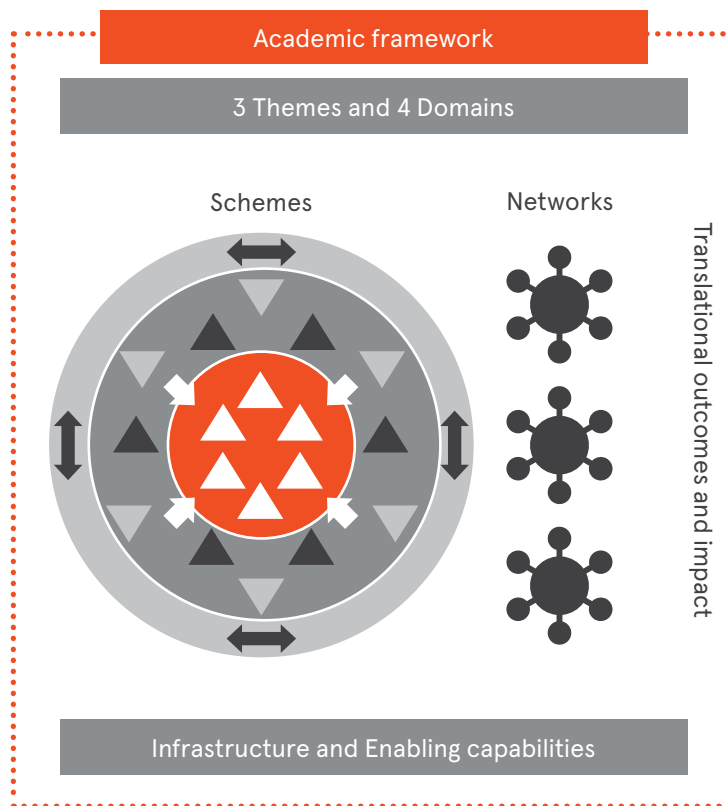


Figure 1: A roadmap for research priorities for COVID-19 sensor technology.

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

16 Active research nodes:

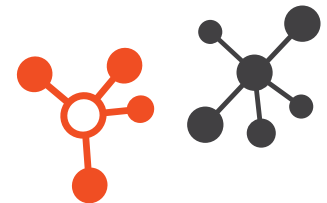
6 Grand Challenges

4 Kickstarters

1 Frontier

4 Catalysts

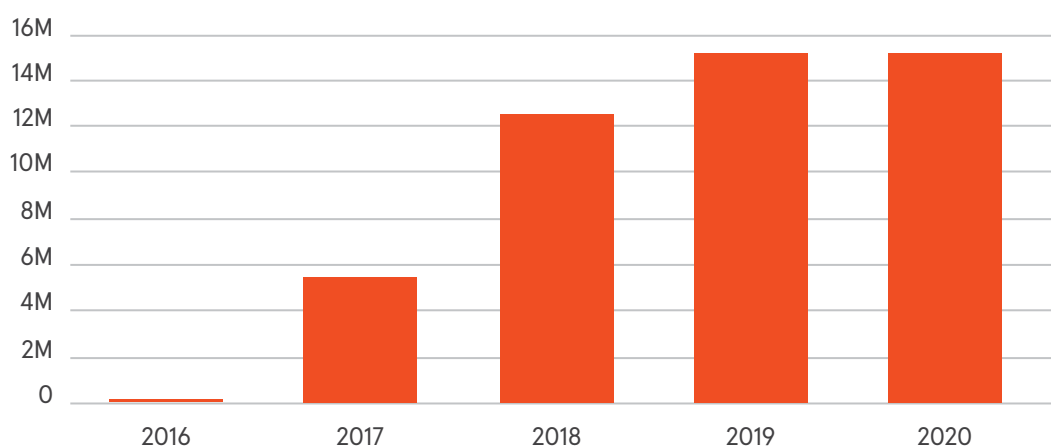
Plus 1 Inaugural Network



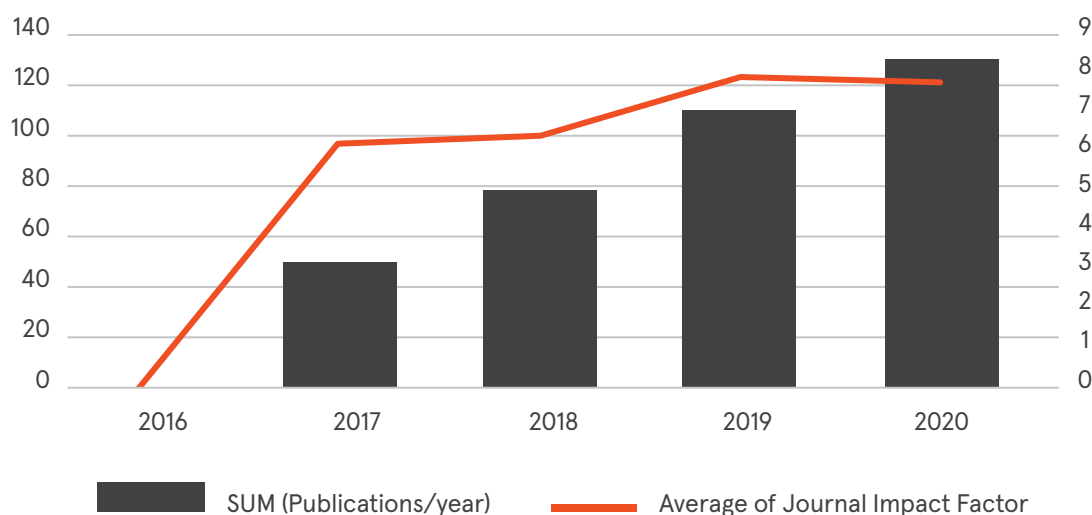


200+ academics engaged in schemes and networks across **7** Faculties/University Schools

27 grants enabled valued over \$15 million



130 affiliated publications, up from 110 in 2019





GRAND CHALLENGES

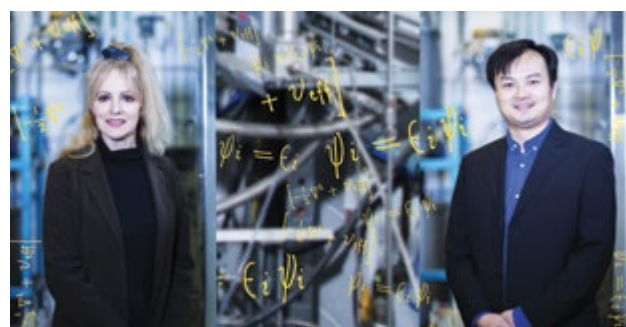
Launched in 2019, our Grand Challenges continue to discover and develop ground-breaking solutions to the world's greatest challenges.

Our flagship Sydney Nano Grand Challenges continue to achieve significant outcomes aligned 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.



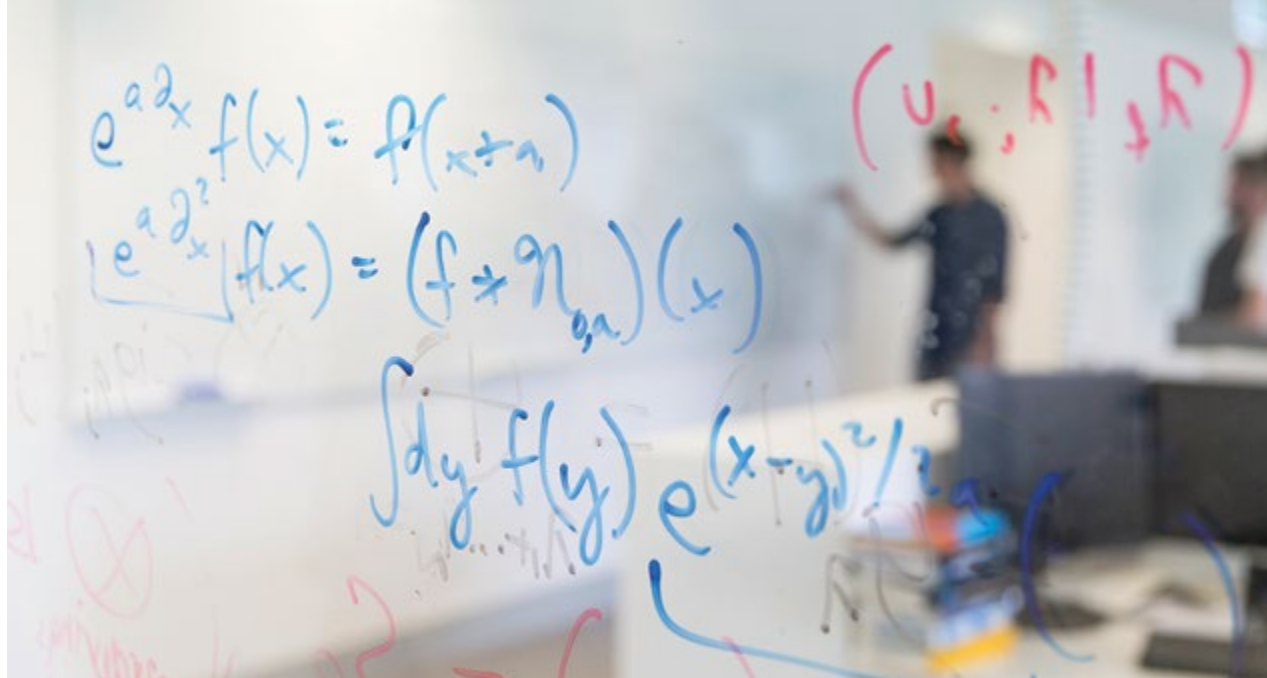
**Professor Gregg Suaning
and Professor Zdenka Kuncic**
Unlocking the Neural Interface

Rethinking the means of intervention into the human nervous system to make untreatable neurological diseases treatable, and to transform treatments into comprehensive cures.



**Professor Jun Huang
and Professor Catherine Stampfl**
CO₂ Zero

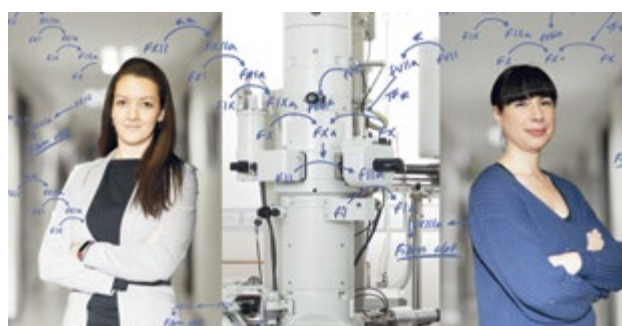
Reducing CO₂ emissions in manufacturing processes and converting CO₂ into commercial products through nanocatalysis.



**Professor Wojciech Chrzanowski
and Professor Elizabeth New**

Safe-by-Design Nanotechnology

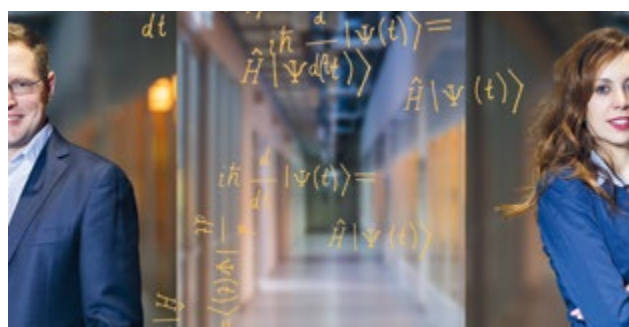
Developing a regulation framework to assess safety, efficacy and toxicity, and guiding the future development of nanomaterials across drug formulations, food additives and biosensors.



**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.



**Dr 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.



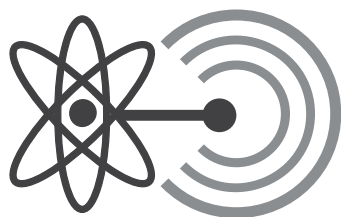
**Professor Martijn de Sterke
and Professor Chiara Neto**

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.

Frontier

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.



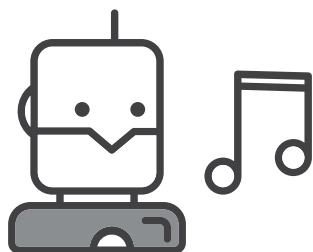
Quantum Sensing

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.

Catalyst

We introduced two new catalysts in 2020:



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.

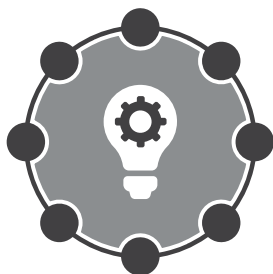


Developing Interdisciplinary Expertise

Chief Investigators: Professor Lina Markauskaite, Professor Peter Goodyear

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.

We continue to achieve great results with our established nodes:



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'.



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.



Kickstarter

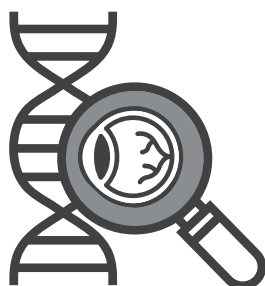
The Kickstarter projects are precursors for the Grand Challenges, involving researchers from at least 2 faculties, researching with humanitarian or environmental impact. In 2020 we welcomed NanoCardio and continued with three existing Kickstarter projects:



NanoVision

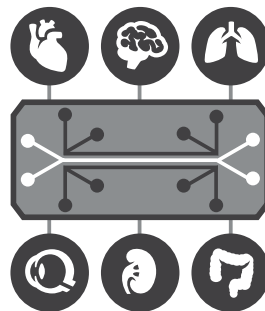
Chief Investigators: Professor Mark Gillies, Professor Wojciech Chrzanowski, Dr Ling Zhu

Identifying lipid nanoparticle carriers for cell-specific delivery of genes and drugs to the human retina.



GeneNano

Chief Investigators: Professor Robyn Jamieson
Providing new approaches in therapies for genetic retinal disorders using novel carbon nanoparticle carriers.



Organs-on-chips: Tissues-in-fibre

Chief Investigators: Dr Stuart Fraser, Professor Marcela Bilek

Generating highly specific engineered biofunctionalised 2-D and 3-D surfaces to combine with stem cell differentiation, forming mature functional tissue-like structures.



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.



Inaugural Sydney Nano Network

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.

NanoHealth Network

Professor Ben Eggleton (Sydney Nano) and Professor Mark Rees (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.



NanoHealth clusters



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.



Computational Nano-Medicine

Dr Svetlana Postnova and Dr Lamiae Azizi

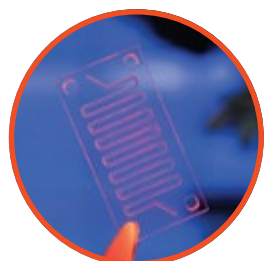
Computational Nano-Medicine is the key to mobilizing the next generation of health technology. The cluster aims to advance our understanding of the mechanisms, diagnosis and treatment of human diseases.



Sensors and Diagnostics

Dr David Martinez Martin and Professor Corinne Caillaud

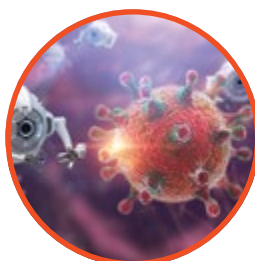
The cluster guides clinical decisions for better treatment outcomes by using and creating nanoscale sensors to detect pathogens, cellular responses, molecules of interest and vital signs.



Lab/Organ On-Chip

Dr Daniele Vigolo and Associate Professor Stefano Palomba

The cluster develop 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 Wojtek Chrzanowski

The team is developing new generation multifunctional nanoparticles such as up-conversion nanoparticles and nanorobots, enabling more sensitive disease detection, diagnosis and therapies.

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 newly formed Network, NanoHealth. 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.



Annual Retreat

Our Annual Retreat provided a sanctuary of space, allow us time to reflect on the year and strategically plan, together.

Distinguished Lectures

Our Distinguished Lecture series was introduced to connect world-class researchers and thought-leaders with the Sydney Nano community. We hosted:



Professor Kourosh Kalantar-Zadeh, UNSW, 'Liquid based Electronics and Optics'



Dr Cathy Foley, CSIRO, 'Quantum Sensing'



Professor Maria Kavallaris AM, Australian Centre for NanoMedicine, ARC Centre for Excellence at University of New South Wales, 'Cancer Nanomedicine – Small things with a big bang'



Professor Linda F. Nazar, Waterloo Institute for Nanotechnology (WIN) University of Waterloo (Canada) on 'Unravelling the complexities of electrochemical energy storage at the nanoscale'



Professor John A. Rogers, Northwestern University on 'Semiconductor Nanomaterials for Neural Interfaces'

Workshops and seminars

We held 16 workshops and seminars in 2020, covering scientific, training, and networking. We launched early-career researcher-focused seminar series, Meet the Author and Meet the Inventor to enhance early-career engagement, participation, learning, and networking opportunities.

See full list in appendix.

Scientific seminar highlights:

- Dr Niels Quack, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland, ‘Silicon Photonic MEMS – Coupling Mechanics and Photonics at the Micro- and Nanoscale’

Other Engagements

Support during COVID-19

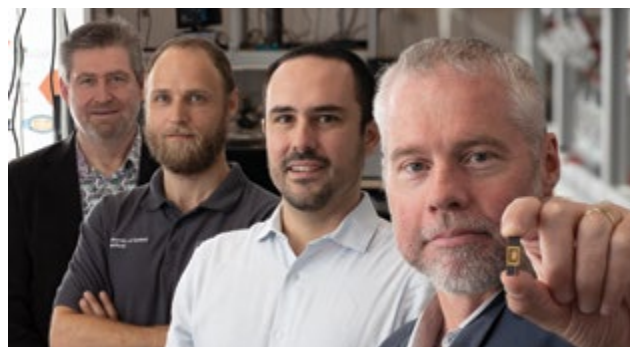
We facilitated online gatherings with open-discussions on the impact of COVID-19.

Awards and achievements

Many of our members were awarded with significant grants and prizes in 2020, highlighting the breadth, depth, and quality of our research. Some highlights:

Eureka Prize recipients:

In recognition of their excellent scientific research, leadership and engagement, congratulations to:



Eureka Prize for Outstanding Science in Safeguarding Australia:

- Jericho Smart Sensing Lab team: Professor Benjamin Eggleton, Dr Eric Mägi, Dr Moritz Merklein, Dr Alvaro Casas Bedoya and Dr Yang Liu



2020 WH “Beattie” Steel Medal

- Professor Ben Eggleton: recognised for his outstanding leadership and exceptional research in optics and photonics

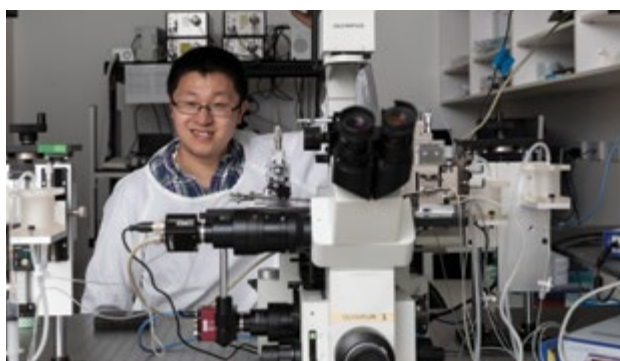


Dr Niels Quack



Eureka Prize for Promoting Understanding of Science

- A/Professor Alice Motion



Eureka Prize Finalist

- Dr Lining Ju

Prime Minister's Prize for Innovation

- Professor Thomas Maschmeyer
The Prime Minister has recognised Thomas Maschmeyer for his work taking fundamental science to commercialisation in fields that address environmental problems: plastic-waste recycling and safe, scalable storage for renewable energy.



Professor Thomas Maschmeyer

Other highlights:

- \$2.5m federal funding for solar energy research – Professor Anita Ho-Baillie
- Sydney Nano Grand Challenge ACWA team wins Bridge Hub 2020 Water Challenge
- Professor Stephen Bartlett elected Fellow of the American Physical Society

See appendix for full award list.



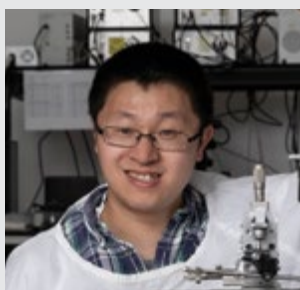
Professor Anita Ho-Baillie



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



Associate Dean (Research) in the Faculty of Science, Professor Stephen Bartlett



Vice Chancellor's Award for Excellence

- Professor Fariba Dehghani
- Dr Lining Ju
- Professor Philip Gale
- Professor Martijn de Sterke



Photos (clockwise from top left): Professor Fariba Dehghani, Dr Lining Ju, Professor Martijn de Sterke, Professor Phillip Gale



18 Prizes and **34** Members received awards



Sydney Nano was awarded:

3 Publication Awards

2 Early Career Researcher Support Awards

20 Sydney Nano Members have been promoted



Members have received several prestigious awards:

2 Eureka Prizes (6 recipients) and **1** Finalist

3 DECRA's

1 Prime Minister's Prize for Innovation



Sydney Nano held:

5 Distinguished lectures
attended by **200** attendees

16 Sydney Nano seminars and workshops

Academic Partnerships

Strategic partners of Sydney Nano

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

Our new academic partnerships



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, our main function of the Network is the promotion of nanotechnology advancement for sustainability.

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. Our 2020 workshop identified two key areas of collaboration: energy and bioconvergence.

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. In 2020, WIN's Director visited Sydney Nano.

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.'

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-bio-info-cogno networks.

University of Massachusetts

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

We continue to foster and grow established partnerships

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 neuro-functionality 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.

University-wide MoU with Yonsei University

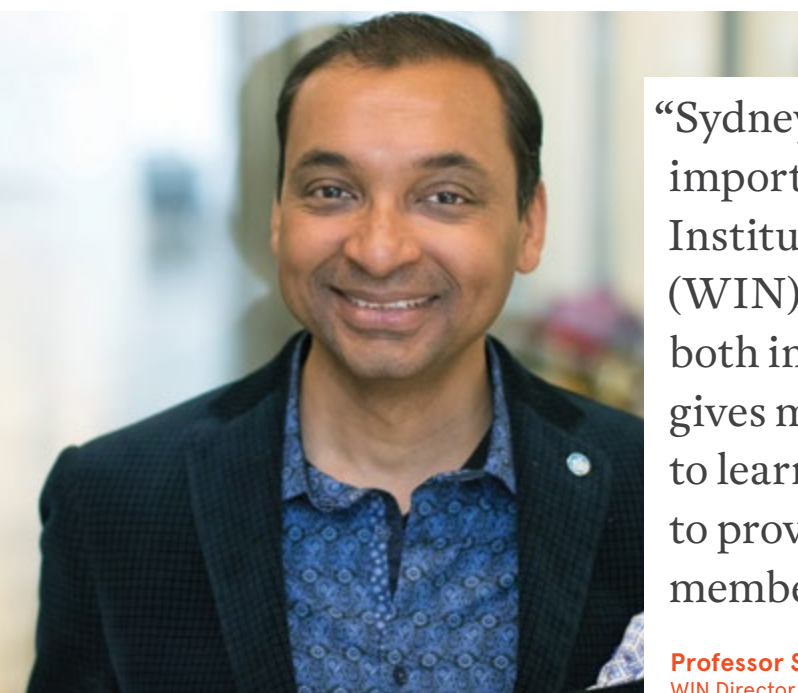
We continue to collaborate with Korea’s premier university, aiming to foster greater collaboration in research, teaching, learning and knowledge exchange.

Pusan National University

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

IISc Bangalore

A roundtable discussion was hosted by IISc Bangalore and further collaboration was established.



“Sydney Nano is a strategic and important partner for the Waterloo Institute for Nanotechnology (WIN). The operation model of both institutes is very similar and gives me an excellent opportunity to learn from Sydney Nano how to provide value-addition to our members further.”

Professor Sushanta Mitra
WIN Director



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 co-led discussions to facilitate the establishment of the 'Australia-China Joint Research Centre for Sustainable Environment' with Zhejiang University, to be launched in 2021



International strategic partnerships

10
universities

8
countries

3
continents

Office of Global Engagement projects and Sydney Nano

11 Sydney Nano Members received six collaboration awards from the Office of Global Engagement (OGE) enabling collaboration with four world-renowned partner universities of the University of Sydney:

- IIT Bombay, India
- National University of Singapore, Singapore
- Yonsei University, South Korea
- University of Glasgow, Scotland

The full list of recipients is included in the Appendix.



Photos from top: SRI International delegation visit, Yonsei University; University of Sydney Workshop on Nanoscience and Applications in Seoul (Occurred in 2019)

Partnership Collaboration Awards 2020

Congratulations to Sydney Nano members who received the Partnership Collaboration Awards, enabling them to lead joint projects with strategic partner institutions, including the University of Glasgow and Yonsei University.

- Dr Shelley Wickham – ‘Self-assembling optical metasurfaces for ultrasensitive diagnostics’ – University of Glasgow
- Dr Girish Lakhwani – ‘Chiral optoelectronics’ – Yonsei University
- A/Professor Vincent Gomes – ‘Quantum composite for energy conversion and storage’ – Yonsei University



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 nano-photonics and sensing technologies:

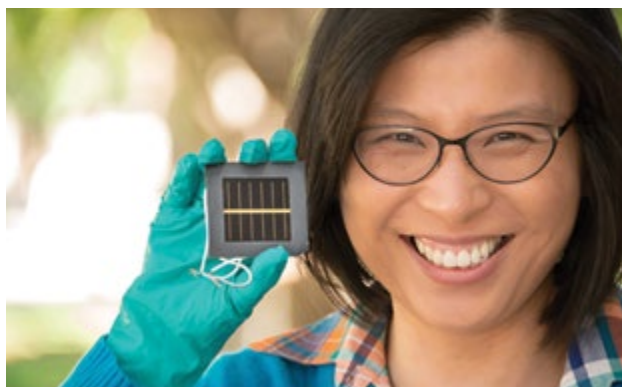
- Professor James Rabeau and Dr Omid Kavehei are supported by the **Defence Innovation Network** and the US Air Force Research Labs to develop new Quantum Sensing technology

- The **Photonic Research Group**, 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): Natasha Rawlings, UniSeed, presented Commercialisation Seminar - 'Investing in deep tech - what investors look for'; Professor Anita Ho-Baillie; Dig Howitt, CEO and Founder Cochlear spoke at a Fireside Chat on 'Innovation, manufacturing, research commercialisation in Australia'; Jericho Smart Sensing Lab 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) (A/Professor Deanne D'Alessandro/Professor Cameron Kepert).
- 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 Reilley, 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 was commissioned by the NSW Department of Industry/Office of Chief Scientist and Engineer to conduct a study on establishing a semiconductor industry. The report outlines the capabilities, opportunities and challenges for NSW's meaningful participation in the global semiconductor value-chain, collates input from more than 100 companies,

“Ultimately, with long-term and deep commitment, success in semiconductor research and translation will lead to increased knowledge, jobs, prosperity and security for NSW and Australia”

Professor James Rabeau
Deputy Director, Industry, Innovation
and Commercialisation

Developing expertise in translational research highlights

- Sydney Nano and the Pro Vice Chancellor for Enterprise and Engagement provided expert advice for the **Western Parklands City Authority**. Professor James Rabeau provided Semiconductor Scoping study expertise, led and facilitated a workshop discussing growth in this field
- 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 from top: Gelion Technologies;
Jericho Smart Sensing Lab team



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 2020, our inaugural two-year Sydney Nano Ambassador program entered its second year. Mentored by Deputy Director Outreach, A/ Professor Alice Motion, four PhD students continued with their in-depth understanding of the interdisciplinary nature of nanoscience, including its current and potential contributions to society. The group were involved in science communication activities and facilitated school workshops, adding to their professional portfolio. Congratulations to the group.



Student Ambassadors with A/Professor Alice Motion: Mr Christopher Vega and Ms Jiarun (Veronica) Lin from the School of Chemistry, Mr Pradeep Murthy from the School of Chemical and Biomolecular Engineering, Mr Pooria Lesani from the School of Aerospace, Mechanical and Mechatronic Engineering



“I feel a strong responsibility as a Sydney Nano student ambassador to show school kids and the general public the importance and practical value of STEM and nanotechnology.”

Mr Pradeep Murthy
Student Ambassador

Public Events – Highlights

‘Nano Revolution: Taking health and medicine to a new level’: Public Lecture with Paul Weiss, University of California

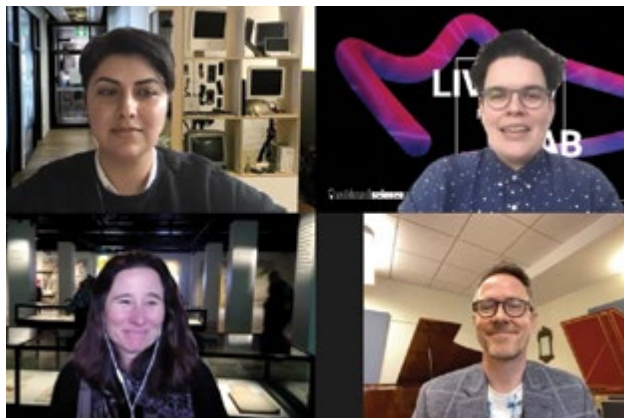
With Sydney Ideas, Sydney Nano hosted nano scientist Professor Paul Weiss, University of California. Professor Weiss spoke to over 300 attendees on insights into the wide-ranging applications of nanotechnology in fields such as neuroscience and microbiome studies. Dr Anna Waterhouse, Dr Shelley Wickham, and Professor Julie Ciarney joined the panel to conclude the event with Q&A.

‘Future Foods and Nano Foods & Food Nanotechnology – How Modern Science is Transforming the Way We Eat’: Two Public Lectures with Professor David Julian McClements

Professor David Julian McClements, University of Massachusetts, presented how gene editing, nanotechnology and artificial intelligence can be used to address food challenges such as sustainability, growing global population, waste reduction and greenhouse gas emissions. This was a collaborative event series with the Centre for Advanced Food Enginomics.

Live from the Lab | FBi Radio Podcast

To celebrate National Science Week, Deputy Director Outreach A/Professor Alice Motion produced and co-hosted 'Live from the Lab' (LFTL), an original project that aired each weekday morning on FBi Radio, hosted on subsequent podcast.



Our researchers undertaking Grand Challenges were partnered with musicians who composed six original tracks inspired by an emotional response to their science at some of the smallest scales.

Artist in Residence Program

Sponsored by the Sydney Nano Early Career Researcher (ECR) Forum, we awarded two inaugural Artists in Residence. 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.

- Joyce Hinterding from Sydney College of the Arts
- Dr Luke Hespanhol from the School of Architecture, Design and Planning

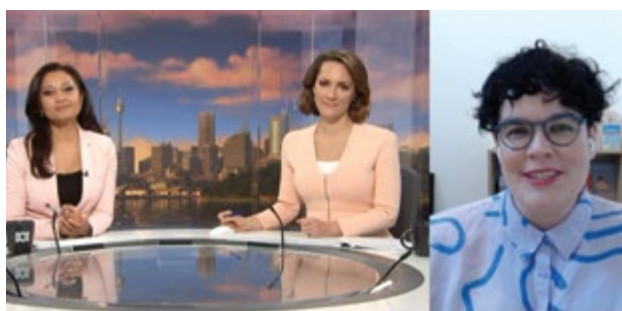


Dr Luke Hespanhol and Joyce Hintedring

Media Engagement

Through stories for Chemistry World Magazine and appearances on ABC Breakfast News, FBi Radio and other media outlets, Alice Motion has shared stories from Sydney Nano throughout the year.

Additionally, Sydney Nano featured across in a diverse selection of media outlets, reach of 5.7m globally (iSenita, 2020).



A/Professor Alice Motion appeared on ABC Breakfast News

Other student engagements

Sydney Nano continues to support multi-disciplinary units of study hosted by schools and faculties, such as Introduction to Nanoscience, Nanotechnology in Chemical Engineering, and a Physics Interdisciplinary Unit, at both undergraduate and post-graduate levels. We also coordinated:

- ARC Bioengineering Launch
- Physics HABITAT Welcome Week
- Visit by students from Imperial College Quantum Engineering Programme

“What inspired me most about this project was the generosity of knowledge sharing across disciplines... musicians and scientists felt incredibly seen by each other in the song reveals. We are all connected, and Live From the Lab reminded me of this.”

Courtney Ammenhauser
Host on FBi Radio

Training and Education

Taste of Research awards

In 2020, Sydney Nano launched the inaugural Taste of Research awards, awarding two high-achieving undergraduate students. Their six-week research engagement was supervised by Professor Xiaoke Yi from Engineering, and Professor Wojciech Chrzanowski, Medicine and Health. The students, Annmaree Kenny and Adam Bova successfully gained hands-on experience to undertake world-class research in the nanoscale, gaining valuable experience for their academic journeys.

Secondary Scholarships for Student Ambassadors

4 secondary scholarships were awarded to PhD students to complete the inaugural two-year Student Ambassador Program. This Scholarship has been established to provide the opportunity for students to learn about and gain practical experience in research communication.

Academic Training

Sydney Nano focused on training and development of the next generation of academic leaders through leadership opportunities, mentoring and seminars in fields like grant writing, commercialisation, or hearing about careers from accomplished academics through member engagement opportunities.

Studying Nano

While courses and units of study are offered by the Faculties, Sydney Nano Members play key roles in the development and delivery of nanoscience and technology related educational offers.

Examples are the multidisciplinary undergraduate course NANO2002-Introduction to Nanoscience coordinated by A/Professor Stefano Palomba, Faculty of Science, and CHNG5008-Nanotechnology in Chemical Engineering lectured by Professor Jun Huang, Faculty of Engineering.



“The Taste of Research Award allowed me to engage in an enjoyable research experience that I believe will instil skills essential for my academic development and later career.”

Annmaree Kenny
Student

“The University of Sydney Nano Taste of Research Award was an invaluable experience that exposed me to new and exciting areas of research and allowed me to gain practical experience in developing solutions for real world problems.”

Adam Bova
Student







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.

In 2020, we welcomed Professor Anita Ho-Baillie's research group to the Sydney Nanoscience Hub. Professor Ho-Baillie joined the University of Sydney as the inaugural "John Hooke Chair of Nanoscience". The team strives to develop a wide-range of world-transforming energy efficient and clean energy generating devices and systems via thin-film optoelectronics and photovoltaics (TOP) materials and devices.

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)



149
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

GLOBAL BENCHMARK STUDY

In 2020, we conducted a Benchmark Study to comparatively map global nano institutes to identify key success factors, enabling a better-informed future strategy.



Key objectives included:

- Understand governing and funding models of other nano institutes
- Identify key success factors of other institutes
- Compare fields of activities and performance metrics to benchmark Sydney Nano globally
- Identify and select potential academic partnerships

We conducted a comparative analysis of:

- 123 Global Nanotechnology Institutes
- 50 Directors' Forum on Nanotechnology
- + gained 18 survey respondents across the globe

Nano Industry partners are mostly



Energy



Health



Medicine



HOW WE'RE UNIQUE

Multidisciplinary

Almost all institutes are focused solely on STEM disciplines. Sydney Nano is one of only 2 institutes that actively engage across social sciences

Education

We work uniquely with Faculties and Schools to facilitate nano-learning, most Nano Institutes that offer educational programs are situated within Faculties

Governance and Funding

Sydney Nano is one of only 2 institutes that are totally funded by discretionary funds. Most institutes are funded by internal and external revenue

followed by



Communication



Environment



Manufacturing



Computing

YEAR 3 REVIEW

In 2020, Sydney Nano underwent its year 3 review. The review panel included industry experts and University leaders who concluded “Sydney Nano to be aspirational in its vision, and well-placed to achieve this vision”.

Chaired by Professor Kathryn Refshauge, former Dean of the School of Health Sciences, the panel included Dr Cathy Foley, CSIRO Chief Scientist (currently serving as Australia’s Chief Scientist), Professor Annamarie Jagose, Executive Dean Faculty of Arts and Social Sciences and Professor Phil Gale, Head of School, Chemistry.

Their overall assessment was very positive, concluding that Sydney Nano is well placed to achieve its mission and is fulfilling its purpose. Of significance is the recognition of our impact in research excellence, and commendations on our engagement, development, and support for our early-career academics.

OUTLOOK 2021

In 2021, we will continue to pursue our vision and explore new and innovative ways to foster the multidisciplinary research made possible by the Institute, in accordance with our strategic pillars.

As we continue to strive for research excellence with impact, we look forward to selecting the new generation of Grand Challenges due to commence in 2022, as the inaugural challenges transition to self-funded research projects. We anticipate welcoming 3-4 new nodes as part of our Frontier, Catalyst and Kickstarter schemes. Particularly, we will be focusing on the development and growth of the recently launched NanoHealth network, whilst finalising scoping studies for more networks to come.

Our academic partnership portfolio will enter an exciting phase of growth, thanks to our joint-partnership with the Waterloo Institute for Nanotechnology (WIN) as we work on the Global Network 4 Sustainable Nanotechnology project; an opportunity to unite the world’s research community to deliver nanotechnology solutions for a healthy and sustainable world.

Global impact, cross-institutional research and fostering our international networks will continue to be a priority, and we are committed to supporting our Members and their collaborators’ in their research programs.

We continue to support the commercialisation and entrepreneurial activities of our Members and will actively engage with enterprises to strengthen our collaboration with the industry and other external partners.

We look forward to growing our training initiatives to develop the careers of future academic leaders in nano technology and will introduce a HDR and Early Career Researcher training program, leadership opportunities, and mentoring activities for Mid-Year researchers.

While we expect Outreach activities will continue to be influenced by COVID-19, we are actively seeking innovative and digitised ways to communicate our research and increase awareness and accessibility of nanotechnology to the general public.

Overall, we see another exciting year ahead... Stay tuned, follow us, and get engaged!

Professor Ben Eggleton
Director, Sydney Nano

A person wearing a white lab coat, a white hairnet, and a white face mask is seated at a desk in a laboratory. They are wearing white gloves and are using a computer mouse with their right hand. The desk has a keyboard and a computer monitor. The background is a bright, yellowish-orange color, possibly a wall or a light source. The overall tone of the image is warm and professional.

“Significantly, the pandemic has shown how scientific research is not only the driver of technological advancement, but is also key to protecting our physical, social and economic lives.”

Professor Ben Eggleton
Director, Sydney Nano

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.

- Professor Albert Polman, University of Amsterdam
- Dr Cathy Foley, CSIRO Chief Scientist
- Dig Howitt, CEO Cochlea
- Professor Feng Pang, Peking University, China
- Professor John A. Rogers, Northwestern University
- Dr Katerina Agostino, DST Chief
- Professor Kourosh Kalantar-Zadeh, UNSW
- Leibniz Association of Research Institutes (Germany) Delegation visit and workshop
- Dr Luca Sapienza, University of Southampton (UK)
- Professor Maria Kavallaris, Australian Centre for Nanomedicine; ARC Centre for Excellence, UNSW
- Dr Niels Quack, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland
- Professor Paul Weiss, University of California
- Professor Uri Sivan, Technion President – Israel Delegation
- Professor Song Jin, University of Wisconsin-Madison
- Professor Sushanta Mitra, Executive Director of the Waterloo Institute for Nanotechnology



Photos from top left (clockwise): WIN Director Professor Sushanta Mitra with Sydney Nano team (Left); Dr Omid Kavehei with Professor Maria Kavallaris AM; Professor Thomas Maschmeyer; Sydney Nano and Sydney Ideas public lecture

APPENDIX

List of Members

Ahmad Jabbarzadeh, Faculty of Engineering
 Albert Zomaya, Faculty of Engineering
 Alejandro Montoya, Faculty of Engineering
 Alessandro Tuniz, Faculty of Science
 Ali Abbas, Faculty of Engineering
 Ali Hadigheh, Faculty of Engineering
 Alice Motion, Faculty of Science
 Alistair McEwan, Faculty of Engineering
 Amandeep Kaur, Faculty of Medicine and Health
 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
 Anusha Withana, Faculty of Engineering
 Arne Grimsmo, Faculty of Science
 Asaph Widmer-Cooper, Faculty of Science
 Axel Spahr, Faculty of Medicine and Health
 Behnam Akhavan, Faculty of Engineering
 Benjamin Goldys, Faculty of Science
 Benjamin Brown, Faculty of Science
 Benjamin Carey, Sydney Conservatorium of Music
 Benjamin Eggleton, Faculty of Science
 Boris Kuhlmei, Faculty of Science
 Brian Hawkett, Faculty of Science
 Brian Jones, Faculty of Science
 Cameron Kepert, Faculty of Science
 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 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
 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
 Hak-Kim Chan, Faculty of Medicine and Health
 Hala Zreiqat, Faculty of Engineering
 Hamidreza Arandiyan, Faculty of Science
 Helen Bramley, Faculty of Science
 Hien Duong, Faculty of Medicine and Health
 Ivan Kassal, Faculty of Science
 Iver Cairns, Faculty of Science
 James Der Derian, Faculty of Arts and Social Sciences
 James Rabeau, Faculty of Science
 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
 Jun Huang, Faculty of Engineering
 Kanchana Thilakarathna, Faculty of Engineering
 Katrina Jolliffe, Faculty of Science
 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

Liam Bray, The University of Sydney School of Architecture, Design and Planning
 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
 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
 Mary Tara Christie, Faculty of Science
 Maryanne Large, Faculty of Science
 Matthew Cleary, Faculty of Engineering
 Michael Kassiou, Faculty of Science
 Mohammad Mirkhalaf, Faculty of Engineering
 Naseem Ahmadpour, The University of Sydney School of Architecture, Design and Planning
 Nicholas Hunt, Faculty of Medicine and Health
 Nicholas King, Faculty of Medicine and Health
 Omid Kavehei, Faculty of Engineering
 Pegah Varamini, Faculty of Medicine and Health
 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
 Ralph Holz, Faculty of Engineering
 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
 Sergio Leon-Saval, Faculty of Science
 Shelley Wickham, Faculty of Science
 Siegbert Schmid, Faculty of Science
 Simon Fleming, Faculty of Science
 Stefano Palomba, Faculty of Science
 Stephen Bartlett, Faculty of Science
 Steven Maguire, The University of Sydney Business School
 Steven Wise, Faculty of Medicine and Health
 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:

Jun Huang, Faculty of Engineering
 Wojciech Chrzanowski, Faculty of Medicine and Health
 Corinne Caillaud, Faculty of Medicine and Health
 Margaret Sunde, Faculty of Medicine and Health
 Siegbert Schmid, Faculty of Science
 Daniel Tan, Faculty of Science
 Deanna D'Alessandro, Faculty of Science
 Elizabeth New, Faculty of Science
 Rongkun Zheng, Faculty of Science

Level D:

Yixiang Gan, Faculty of Engineering
 Alejandro Montoya, Faculty of Engineering
 Girish Lakhwani, Faculty of Science

Level C:

Liwei Li, Faculty of Engineering
 Ralph Holz, Faculty of Engineering
 Ling Zhu, Faculty of Medicine and Health
 Arne Grimsmo, Faculty of Science
 Cornelius Hempel, Faculty of Science
 Yu Heng Lau, Faculty of Science
 Alessandro Tuniz, Faculty of Science

Level B:

Yi-Sheng Chen, Faculty of Engineering

Fellowships and Chairs

ARC Future Fellowship

- Markus Muellner, Faculty of Science

Fellow of the American Physical Society

- Stephen Bartlett, Faculty of Science

Westpac Fellowship

- Alice Motion, Faculty of Science
- Yu Heng Lau, Faculty of Science

Robinson Fellowship

- Anna Waterhouse

Awards

Eureka Prize

- Alice Motion
- JSSL team: Benjamin Eggleton, Dr Eric Mägi, Dr Moritz Merklein, Dr Alvaro Casas Bedoya, Dr Yang Liu

Discovery Early Career Researcher Award (DECRA)

- Amandeep Kaur
- Behnam Akhavan
- Mohammad Mirkhalaf

Prime Minister's Prize for Innovation

- Thomas Maschmeyer

SOAR Prize

- Alice Motion
- David Martinez Martin
- Lining Ju

Eureka Prize Finalist

- Lining Ju

Partnership Collaboration Awards

- Shelley Wickham
- Girish Lakhwani
- Vincent Gomes

Australia's most innovative engineer 2020

- Anusha Withana
- Hala Zreiqat
- Jun Huang

Young Tall Poppy Science Award

- Alice Motion
- Lining Ju

WH "Beattie" Steel Medal

- Benjamin Eggleton

Sydney Nano Publication Award

- Nicholas Hunt
- Hansheng Chen
- Stefano Bernadi

LeFevre Memorial Award AAS/RACI

- Ivan Kassal

RACI Applied Research Award

- Michael Kassiou

Vice Chancellor's Awards for Excellence

- Fariba Dehghani
- Lining Ju
- Philip Gale
- Martijn de Sterke

Early Career Researcher Support Fund

- Matthew Cabral
- Jiao Jiao Li

HDR Development Award

- Pooria Lesani
- Hunter Windsor

Australian Synchrotron Lifetime Contribution Award

- Peter Lay

Academy of Technology and Engineering (ATSE)

- Hala Zreiqat

2021 ACS Sustainable Chemistry and Engineering Lectureship Awards

- Jun Huang

Taste of Research Award Supervisor

- Xiaoke Yi
- Wojciech Chrzanowski

AFR Higher Education Award

- Thomas Maschmeyer

Linkage Project Awards

- Cara Wrigley and Karla Straker

Office of Global Engagements

India Development Fund

- Christopher Ling
- Girish Lakhwani
- Pegah Varamini
- Vincent Gomes
- Gurvinder Singh
- Hala Zreiqat

Partnership Collaboration

- Vincent Gomes
- Asaph Widmer-Cooper
- Girish Lakhwani
- Alejandro Montoya
- Ali Abbas
- Shelley Wickham

All Events and Engagements

Public Lectures

- Professor Paul Weiss, University of California on 'Nano Revolution'
- Professor David Julian McClements, University of Massachusetts, 'Future Foods and Nano Foods & Food Nanotechnology – How Modern Science is Transforming the Way We Eat'

Distinguished Lectures

- Professor Kourosh Kalantar-Zadeh, UNSW, 'Liquid based Electronics and Optics'
- Dr Cathy Foley, CSIRO, 'Quantum Sensing'
- Professor Maria Kavallaris AM, Australian Centre for NanoMedicine, ARC Centre for Excellence at University of New South Wales, 'Cancer Nanomedicine – Small things with a big bang'
- Professor Linda F. Nazar, Waterloo Institute for Nanotechnology (WIN) University of Waterloo (Canada) on 'Unravelling the complexities of electrochemical energy storage at the nanoscale'
- Professor John A. Rogers, Northwestern University on 'Semiconductor Nanomaterials for Neural Interfaces'

Workshops and Seminars

- Professor Tony Weiss, Elastagen, 'Commercialisation Story'
- Professor Antonio Tricoli, Australian National University, 'From Nanomaterials to multi-scale devices for future health and energy systems'
- Professor Sushanta Mitra, Waterloo Institute for Nanotechnology
- Natasha Rawling, Uniseed, Sydney Nano Commercialisation seminar: 'Investing in deep tech – what investors look for'
- Fireside chat: Dig Howitt, CEO and Founder, Cochlear, 'Innovation, manufacturing, research commercialisation in Australia'
- Professor Anita Ho-Baillie, Sydney Nano Inaugural Lunchbox Series, 'From sun to cell: the evolution of shrinking solar cells to the nanoscale'
- Fireside chat: Professor Hala Zreiqat and Professor Marcela Bilek, 'Stories that Inspire'
- Professor John Close, Australian National University, 'Atom Interferometry for practical quantum sensing'
- Professor Ben Eggleton and Dr Rui Hoo: Sydney Nano Research Leadership – 'What it takes to win?'
- COVID19 Sensor CO-Design Workshop
- Joint e-workshop with Bar-Illan Institute of Nanotechnology and Advanced Materials (BINA) – multiple speakers
- Professor Albert Polman, University of Amsterdam, 'Nanoscale (in)-coherent optical excitations in the electron microscope'
- Leibniz Association of Research Institutes (Germany) Workshop, 'Grow your research'
- Meet the Author-Inventor: Mohammad Mirkhalaf, USYD, 'Stereolithography 3D-4D printing of ceramics for diverse applications'
- Dr Niels Quack, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland, 'Silicon Photonic MEMS – Coupling Mechanics and Photonics at the Micro- and Nanoscale'
- Dr David Pile, Nature Photonic and Dr Esther Levy, Advanced Materials Technologies and Consulting Editor, Advanced Intelligent Systems, 'Getting Published'

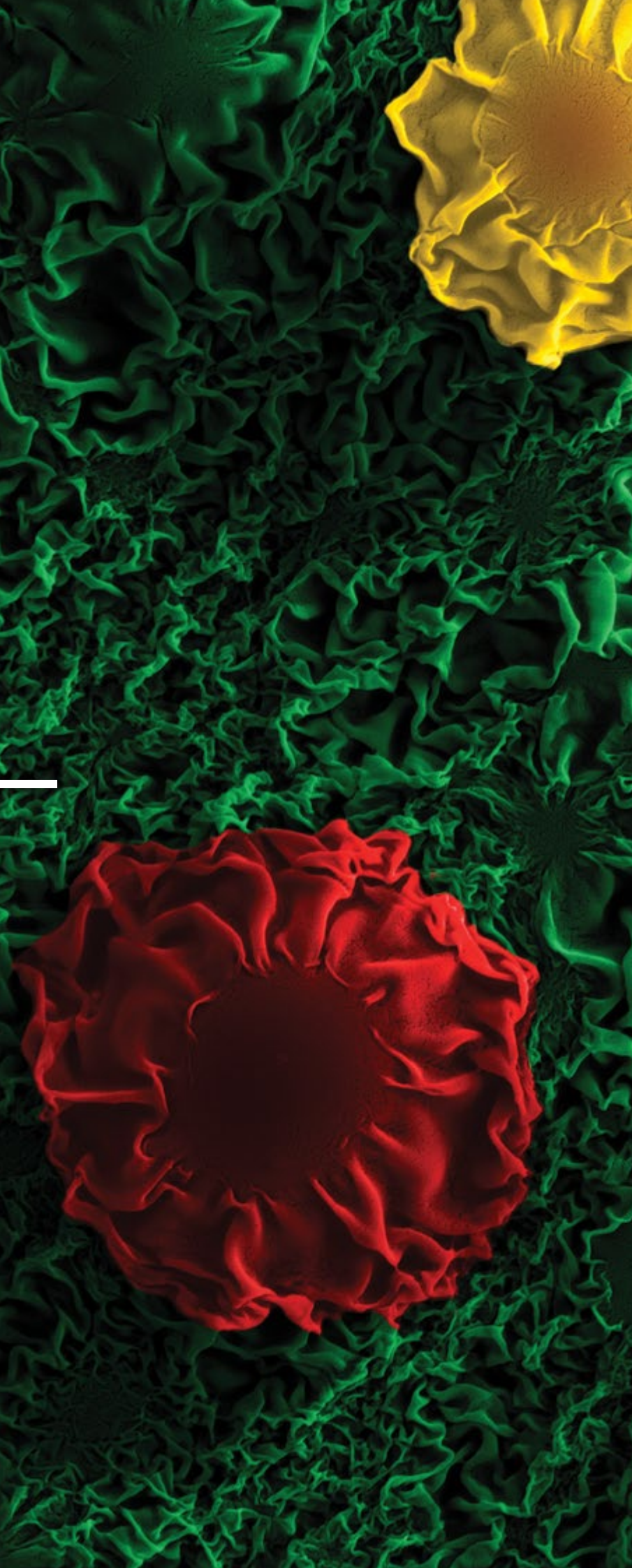
- Dr Luca Sapienza, University of Southampton (UK), 'Controlling light-matter interactions down to the single-photon level with integrated photonic devices'
- Sydney Nano Virtual Retreat
- Sydney Nano Town Hall (held twice)

Grand Challenge Seminar/Event

- Professor Song Jin, University of Wisconsin-Madison, Grand Challenge Seminar on 'Designing Electrocatalysts for Efficient and Selective Electrocatalytic and Photoelectrochemical Conversion of Energy and Chemicals'
- Professor Feng Pang, Peking University, Grand Challenge Seminar on '"Material Genes" and structure chemistry of Li-ion Battery'

Visits

- Dr Katerina Agostino, DST Chief
- Professor Uri Sivan, Technion President – Israel Delegation
- Physics HABITAT: Welcome Week events
- Visit by students from Imperial College Quantum Engineering Programme



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