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
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
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 nanotechnology 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
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.
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.”
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.
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 Tong Li
Faculty of Medicine and Health (Health Sciences)

Dr Diana Chester
Faculty of Arts and Social Sciences (Media and Communication)

Dr Jiao Jiao Li
Faculty of Medicine and Health (Northern Clinical School)

Dr Maria Rumjansetva
Sydney Business School (Strategy, Innovation and Entrepreneurship)

Dr Mohammad Mirkhalaf
Faculty of Engineering (Biomedical Engineering)

Dr Alessandro Tuniz
Faculty of Science (Physics) and Sydney Fellow

Dr Ben Carey
Sydney Conservatorium of Music (Composition)

Dr Karla Straker
School of Architecture, Design and Planning (Design)
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.

The Sydney Nano structure

- Our structure brings together nearly 800 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.

Total number of University of Sydney staff engaged

792

17% Member
18% Participant
65% Community
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
Science 41%
Engineering 32%
Medicine and Health 16%
Arts and Social Sciences 4%
Business 3%
Architecture, Design and Planning 2%
Sydney Conservatorium of Music 2%

Academic level
Level A 6%
Level B 17%
Level C 17%
Level D 17%
Level E 43%
“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.
Expanding the Academic Framework

3 Themes and 4 Domains

- **Schemes**
- **Networks**

**Academic framework**

**Infrastructure and Enabling capabilities**

**Translational outcomes and impact**

**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

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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 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.

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 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 Inerdisciplinary 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.

**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.

**GeneNano**

Chief Investigators: Professor Robyn Jamieson

Providing new approaches in therapies for genetic retinal disorders using novel carbon nanoparticle carriers.

**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 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’

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

Dr Cathy Foley, CSIRO, ‘Quantum Sensing’
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

Eureka Prize for Promoting Understanding of Science
- A/Professor Alice Motion

2020 WH “Beattie” Steel Medal
- Professor Ben Eggleton: recognised for his outstanding leadership and exceptional research in optics and photonics

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.

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.

Vice Chancellor’s Award for Excellence
- Professor Fariba Dehghani
- Dr Lining Ju
- Professor Philip Gale
- Professor Martijn de Sterke
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.

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
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.

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 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 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.
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,

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

“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
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.

Public Events - Highlights

‘Nano Revolution: Taking ’: Public Lecture with Paul Weiss, University of California, and founder of Elastagen

With Sydney Ideas, Sydney Nano hosted nano scientist Professor Paul Weiss, University of California, and founder of Elastagen. 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.

“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
**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

**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).

**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”.

Chairied 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 the 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
“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-Bealille, 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-Coooper, 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 Kuhlme, 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 Rickerson, 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 Brael, 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 Arandiyar, 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 Thilakarathana, Faculty of Engineering
Katrina Jolliffe, Faculty of Science
Lamiae Azizi, Faculty of Science
Lauren Macreade, 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
Marcella Bilek, Faculty of Engineering
Margaret Sunde, Faculty of Medicine and Health
Maria Rumiyantevea, The University of Sydney Business School
Mark Gillies, Faculty of Medicine and Health
Markus Muehler, 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
Rontu Sun, Faculty of Science
Rongkun Zheng, Faculty of Science
Rongkun Zheng, Faculty of Science
Rongkun Zheng, Faculty of Science
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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-Sheng Chen, Faculty of Engineering
Yi Shen, Faculty of Engineering
Yu Heng Lau, 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’
- 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
- 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 Biek, ‘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-Iillan 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’

Workshops and Seminars
- 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’

Grand Challenge Seminar/Event
- 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)

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