

Welcome to the second edition of the DSI newsletter of 2024. One of the key events that I would like to highlight and am incredibly proud of was our inaugural "Digital Transformation" colloquium in May. The event showcased the collaborative spirit that is central to DSI, bringing together researchers, industry leaders, and policymakers to explore the impacts of digital transformation across a range of sectors. It was an invaluable opportunity for us to come together to explore the latest developments in digital sciences. The event featured an impressive lineup of speakers, showcasing our existing projects and fostering new conversations across the span of our activities.

Our seminar series remains a vital platform for knowledge exchange and interdisciplinary dialogue. To encourage more interactive sessions, in the upcoming seminar series we have included a panel discussion focused on closing the gap for people with disabilities in the workplace through digital media. This panel will discuss how digital technologies and forward-thinking policies can create more inclusive and equitable environments, a topic that resonates deeply with our commitment to societal impact.

In addition, we have dedicated resources to building robust networks, securing grant funding, and enhancing international collaborations. I encourage all of you to stay engaged and contribute your ideas to the DSI. We are embarking on the development of a DSI White Paper that will articulate our strategic contributions to critical technologies and align with national priorities, shaping the future direction of our research and innovation efforts.

I want to express my gratitude to all who contribute to the DSI's mission. Your dedication and passion are what make our achievements possible. We look forward to further the participation and engagement from academics as we continue to support work from across the University that pushes the boundaries of digital sciences research, education and engagement.

Prof. Stefan B. Williams
Director, Digital Sciences Initiative



Inaugural Digital Transformation Colloquium

The Digital Sciences Initiative proudly hosted the inaugural colloquium on **Digital Transformation** on May 29th, 2024, on campus. With an impressive array of speakers and 25 young researchers presenting their work, the event offered insightful perspectives on digital transformation across Agriculture, Health, Energy, Infrastructure, and Society.

The event featured two engaging keynote speeches, theme talks, and panel discussions on digital transformation, lightning talks from our students and ECRs, poster presentation, laboratory tours and networking opportunities.

The social media posts and comments, our survey results and overall feedback has been very positive. The panel discussions were a resounding success with the choice of panel members and the very engaging discussions earning high praise from attendees.

For more details on the presenters, including the event recordings and photos, please check [here](#).

DSI supported future activities - Get involved



Aligned with DSI's strategic focus on fostering collaboration, industry engagement, multidisciplinary research that addresses key societal concerns and large-scale research grants, we have several upcoming initiatives and invite participation from anyone interested.

1. Trust in human AI interactions

The Faculty of Arts and Social Sciences (FASS) is developing a collaboration with the [Schwartz Reisman Institute for Technology and Society](#) at the University of Toronto. The initial focus is on trust in human-AI interactions with an intended visit to UoT later this year. If there is anyone who would be interested in being part of discussions about this area and collaboration please contact Prof. [Kalervo Gulson](#) (kalervo.gulson@sydney.edu.au). DSI will be supporting the collaboration through travel funds.

2. Med-tech and Disability

DSI is hosting a workshop in October 2024 to explore the future of technological interventions for people living with disabilities. The workshop will focus on early childhood support, workplace empowerment, and advanced assistive technologies to empower people with disabilities, promoting inclusivity and enhance quality of life. Outcomes will include a white paper with key findings and recommendations, as well as the formation of new collaborative projects and teams to drive further innovation in this critical area. We are seeking interest from academics, Med-tech companies, government organisations, policy makers, insurance companies or any organisation with interest to support or having a conversation on disability. If you are interested to be involved, please contact [Prof. Alistair McEwan](mailto:alistair.mcewan@sydney.edu.au) (alistair.mcewan@sydney.edu.au) or dsi@sydney.edu.au.

3. Sensing Technologies for Australian Resilience (STAR) CRC

DSI is contributing resources to support the University of Sydney led Sensing Technologies for Australian Resilience (STAR) CRC bid for Round 25, to be submitted in March 2025. STAR CRC aims to enhance Australia's resilience and security through advanced sensing technologies, focusing on real-time data for proactive prevention and effective preparation to national security threats and natural hazards.

The research covers sensor development, actionable data insights, smart infrastructure, situational awareness & communication, and education & training, with plans to engage diverse industry partners. We are currently stepping up industry engagement across a wide range including but not limited to partners across sectors like defence, infrastructure, telecom, tech SMEs, energy, emergency response, law enforcement, environmental agencies, and government. We are interested in your (and your industry partners) participation in the CRC

To register your interest please complete the short survey [here](#) or reach out to Andrew Kemp – Andrew.k@sydney.edu.au for further information.

Funding Success

Congratulations to all!

Defence Innovation Network (DIN) projects



DSI supported 2 of the 3 DIN projects awarded across NSW Universities.

1. [Fluorine-free repellency options for CBRN protective garments](#) – Led by [Prof Chiara Neto](#) from the Faculty of Science.
2. [Mitigating denial of service vulnerabilities in machine learning algorithms](#) - This application is led by UNSW with [Dr. Kanchana Thilakarathne](#) and [Professor Albert Zomaya](#) from Faculty of Engineering.

DIN Strategic Investment Initiative funding

DIN only awarded one application across all

NSW universities and USYD was part of winning team.

[Advanced Design and Rapid Manufacture of Composite Propellers for Large Underwater Vehicles](#) -

This application is led by UNSW with [Prof. Simon Ringer](#), Dr Kevin Sisco and [Mr. Daniel Connell](#) from USYD.

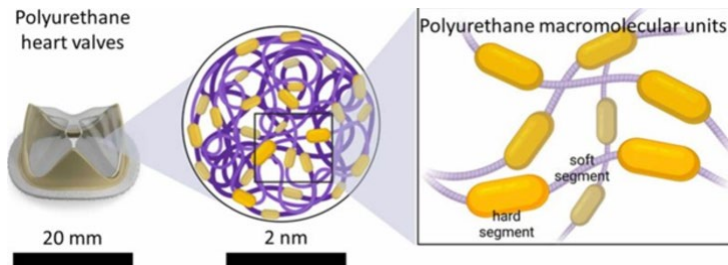
NSW Smart Sensing Network (NSSL)

The project on [New Sensor-based Monitoring System for the Early Detection and Improved Management of Heart Failure](#) secured funding from the NSSL's Grand Challenges Fund this year and is being supported by industry partner Medical Monitoring Solutions. The project is led by the University of Western Sydney with DSI members [Dr. Anusha Withana](#) and [A/Prof. Tongliang Liu](#) (School of Computer Science) as co-lead CIs.

Australian Economic Accelerator (AEA)

[Prof. Stefan Williams](#) and Dr. Lachlan Toohey were awarded a Seed Grant for 2024 for the project [Sovereign Autonomous Underwater Vehicle capability](#).

The project will be conducted at the [Australian Centre for Robotics](#) and will continue the development of a novel Autonomous Underwater Vehicle (AUV) capable of operating over complex regions of seafloor and collecting high resolution benthic imagery.



Polyurethanes combine superior mechanical properties with improved biological stability. Paired with parallel advancements in design and manufacturing capabilities, polyurethanes now offer significant clinical potential in the development of biomimetic HVRs.

[Dr. Sina Naficy](#) from the School of Chemical and Biomolecular Engineering was also awarded funding through the AEA Seed program for work on the development of an [Automated Robotic System for Seamless Manufacturing of Polymeric Heart Valve Replacements with Enhanced Longevity and Possibility for Personalisation](#). This project aims to advance the development of next generation heart valve replacements

with a fully automated robotic manufacturing system.

Defence White Paper

As part of the recent review of the Australian Defence Department, the Australian Defence Force (ADF) has been conducting a review of its Innovation Science and Technology (IS&T) strategy and policy. The Australian Defence Science and Universities Network (ADSUN) has been tasked with presenting the policy and receiving reactions.

In response to the request for feedback to the draft IS&T strategy presentation and discussion to ADSUN stakeholders, DSI supported a workshop to discuss the proposed strategy organised by the University of Sydney. Twenty academics from diverse disciplines across the university were brought together to support the ADF in defining problems and developing innovative solutions that will offer capability advantage for the warfighter. This workshop resulted in a white paper that was submitted to Nigel McGinty, the CTO, Science Strategy for DSTG, outlining University recommendations on the proposed strategy.

The white paper was well-received by DSTG, and we received very positive feedback from ADSUN, McGinty, and the Defence research community. We were assured that our input will be taken into consideration for the final strategy document, to be released at the ADSTAR conference in September.



The Australian Rocket Systems Training Network

Since its launch in April, [Prof. Matthew Cleary](#) and his team have been building a nationwide collaboration through the Australian Rocket Systems Training Network (ARSTN). Key achievements include forming an international partnership with the UK's R2T2 network, to enhance skills development in the space launch industry. Australian Defence Scientist Roger Lough has also been appointed as Chair of the Network. The first ARSTN meeting is scheduled for early September, with strong engagement across industry, defence, space, and education. Upcoming in-person events are planned for Land Forces 2024 in Melbourne and the ADSTAR Summit in Canberra. To join ARSTN [click here](#).



Primex 2024

The DSI and ACFR Ag/Environment group participated in the PRIMEX 2024 to showcase agriculture robotics for industry engagement and public awareness. The team was invited to talk about the future of the agricultural technologies in *Farms of the Future - AgTech Talks*. Interest and subsequent inquiries from the industry were testament of the outreach and impact our presence had during the PRIMEX Expo.

DSI Seminar Series



Our June seminar was presented by Presented by [Dr. Jose-Miguel Bello Villarino](#) on *Keeping up with the Joneses – an insight into the comparative dynamics of the regulation of AI*.

Jose-Miguel is a Senior Research Fellow at the University of Sydney Law School and a Research Fellow at the ARC Centre of Excellence for Automated Decision-Making & Society (ADM+S).



[Prof. Fabio Ramos](#), Principal Research Scientist at NVIDIA gave an excellent talk on the ***Probabilistic Robotics 2.0: Leveraging Differentiability and Parallelism for Diversity in Planning and Perception under Uncertainty*** as part of the August seminar.

The talk was very popular with over 80 in attendance (in-person + online)

Our seminars are held at the Sydney Knowledge Hub on a monthly basis. Keep updated with all our future events [here](#).

We are seeking expressions of interest from researchers to talk about their exciting research. If your work is related to Digital Sciences and Technology or has an impact in this field, we would like to hear from you. If you would like to present your research in this series or subscribe to the email list, please contact the [DSI Team](#).

Upcoming DSI seminars

Wednesday 11 Sept 2024

12:00pm-1:00pm

Rm 277, Sydney Knowledge Hub, University of Sydney

Human potential for digital sciences

This session will be organised as a mini panel discussion on the disability and care policy and economy of Australia, our region and the world. The speakers will introduce solutions through true user led co-design, communication and cognitive assistive technologies and the vital role of digital sciences

Presented by [Prof. Alistair McEwan](#), [Prof. Jen Smith-Merry](#), [Ms. Dalal Baumgartner](#) and [A/Prof. Shane Clifton](#)

More details about the upcoming seminars can be found [here](#).

No registration is required. All are welcome.

Researcher in the Spotlight

Professor Gwénaëlle Proust

Gwénaëlle Proust is a Professor of Materials Engineering at the University of Sydney (School of Civil Engineering) and the Director of the Sydney Manufacturing Hub (SMH). Her research focuses on understanding the relationships between material properties and their microstructure, aiming to improve material performance by optimising manufacturing processes.

Gwénaëlle is currently serving as the 2024 Vice President of Materials Australia and is a member of the ARC College of Experts (CoE). Prof. Proust leads the Advanced Manufacturing and Materials Mission of DSI.

Could you very briefly tell us about your journey to become a leader in engineering?

My journey into leadership in engineering began with my first leadership role in my school, as the Director of Postgraduate Coursework in the School of Civil Engineering. I used this opportunity to network with the entire faculty, which fuelled my desire to be more involved and make a difference at the school, faculty and university levels. After spending six years in this role, I transitioned to the Deputy Director position at SMH in 2020, followed by the Director role, which I've held since May 2022. This path eventually led me to DSI. Throughout my career, I've focused on



taking on new challenges, making an impact and learning something different at each stage, rather than quickly moving from one role to another.

What do you enjoy most about your role and research?

What I enjoy most about doing research at the university is the freedom to explore new ideas and work with a dynamic pool of people. I find it particularly exciting to mentor students and Early Career Researchers, helping them develop new research skills and ideas.

In my role as a Director, I love the diversity it brings—every day is different. I get to engage with a wide range of stakeholders, including industry partners, government representatives, and engineers in the lab. Whether it's discussing technological advancements or managing various relationships, the variety and diversity of the role are what keep me passionate about my work.

In your opinion, how will AI impact the Advanced manufacturing and Materials research?

AI has the potential to significantly impact Advanced Manufacturing and Materials research by enhancing the reliability of manufacturing techniques. Through in-situ monitoring, AI can detect defects and make real-time decisions to optimise processes and correct defects, ultimately leading to better product quality.

The vast amount of data generated in manufacturing and research can be efficiently analysed using AI, enabling us to extract valuable insights and correlations that drive progress. With the volume of information and research papers out there, AI can be a critical tool to sift through and synthesise knowledge that would be impossible to process manually.

Can you share a project or accomplishment in your career you're particularly proud of?

One project I'm particularly proud of is my involvement in the Sydney Manufacturing Hub. I was part of the team that designed it in 2019 and saw it through to its successful delivery. Being part of the user community that now benefits from it is incredibly rewarding, as I was able to contribute to something meaningful from its inception to its ongoing impact to the users.

What motivated you to lead the Advanced manufacturing and materials mission with DSI? What has worked well for you and are there any challenges?

I was motivated to lead the Advanced Manufacturing and Materials mission with DSI because of its multidisciplinary framework. DSI has the potential to break the silos that the schools represent and to team together researchers who would not have had the occasion to do so otherwise. It was also a great opportunity for me to meet researchers in the Faculty of Engineering and at the University with whom I had previously no connection.

What has worked well for me is tapping into the expertise of others, particularly in Computer Science. DSI has enabled new connections, working on grant applications together with talented researchers working in different fields and opportunities for co-supervision of students in other schools. However, a key challenge has been figuring out how to foster collaboration and generate interest among potential collaborators when everyone is busy.

What difference do you think DSI can make here at the University of Sydney?

I believe DSI can make a significant difference at the University of Sydney by fostering stronger connections between the different faculties like other MDIs, enabling more interdisciplinary collaboration. We're also facilitating important conversations with the Faculty of Science and the Business school, addressing critical issues like data protection and safeguarding people. We often do not know who is doing what, and the legislations around AI. By bringing together diverse stakeholders like FE, Faculties of Science, School of Law, FMH etc. under one umbrella, DSI can drive innovation and create a more integrated approach to tackling complex challenges.

What has been the most significant barrier to female leadership in your career? What in your opinion are the benefits to having women in leadership?

One of the most significant barriers to female leadership, in my experience, has been the mentality that many women have of underestimating themselves—we can often be our own barriers. While I don't feel as I faced barriers in my career, I'm aware that some colleagues have encountered resistance due to family responsibilities and the outdated perception that engineering isn't suitable for women.

Having women in leadership is crucial because we have a duty to encourage and mentor other women, helping to break down these barriers and foster a more inclusive environment. Women leaders can bring diverse perspectives and drive positive change, making leadership more representative and effective.

What do you do when not doing research?

When I'm not doing research, I enjoy looking after my cats and diving into books. I'm an avid reader, and lately, I've been re-exploring French classics.

Funding opportunities

[NVIDIA Academic Grant Program](#) - This funding opportunity from NVIDIA's Academic Grant Program is now accepting proposals on Generative AI & LLMs, and Simulation & Modelling. Deadline 30th of Sept.

[The Australia-India Strategic and Technology Policy Initiative](#) - Seeks to encourage collaboration between Australian and Indian research organisations and to promote greater understanding of strategic and technology policy matters. Deadline: 29th Sep 2024

[Industry Growth Program](#) - The program provides an Advisory Service for startups and small and medium enterprises (SMEs) undertaking innovative commercialisation and/or growth projects that are within the priority areas of the Australian Government's National Reconstruction Fund (NRF) and help build Australia's manufacturing capability for the future.

[Contact us](#) if you are interested in applying.

Engage with the DSI team

Learn more about how we can help you to engage with key external stakeholders by [contacting our friendly team](#). If you would like to be added to our seminar series email list or to find out more about any of the above DSI funding opportunities, please [register your interest](#).



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