



RESEARCH BULLETIN

Aug 2025 - July 2026

NUS Computing ranked







for Computer Science & Information Systems



Dean's Foreword

This year marks the 50th anniversary of computing at the National University of Singapore — a significant milestone that invites both reflection and celebration of our research journey. Since the establishment of the Department of Computer Science in 1975, our research has evolved from a modest set of early initiatives into a dynamic and globally recognised engine of innovation and impact.

Over five decades, our research has expanded considerably in scale, depth, and influence. What began with a modest portfolio of projects has grown into a vibrant ecosystem of more than 420 cutting-edge research initiatives, spanning fields such as artificial intelligence, cybersecurity, data science, and sustainable computing. We have also forged strong collaborations with global leaders like Google, IBM and Microsoft, with more partnerships in development.

Our growth extends beyond research output to community and capability. With research funding exceeding SGD 230 million and a faculty that has expanded from just over 40 to 222 research staff, we are well-positioned to advance the frontiers of computing. Our researchers continue to make meaningful contributions and receive international recognition — including 25 best paper awards at renowned international conferences in 2024 alone. These achievements reflect the strength of our academic community and its leadership in driving innovation across key research domains.

Looking ahead, the opportunities before us are immense. The rapid pace of technological advancement — from generative AI and machine learning to quantum computing and beyond — calls for bold, innovative solutions to complex societal challenges. We remain committed to pushing the boundaries of research while deepening collaborations with industry and government, ensuring that our work delivers real-world impact.

The coming years promise to be even more transformative, and we are excited about the role our research will play in tackling global challenges. The NUS School of Computing will continue to lead in shaping the future of technology and its application for the betterment of society.

As the technological landscape evolves, we remain steadfast in driving meaningful innovation and delivering lasting societal impact. Through bold, interdisciplinary research and strengthened partnerships, we aim to ensure that our work not only leads in academic excellence but also contributes to the public good.

Thank you for your continued support and interest. I invite you to explore the exciting research featured in this bulletin and join us as we shape the future of computing — together.

Professor Tulika Mitra Dean, School of Computing



Research Partnership Unit At a Glance

~\$201M

Total Research Funds (usually spread over 3-5 years)

370

Total Number of Projects

119

Total Number of Principal Investigators

222

Total Number of Research Staff **540**

Total Number of PhD Students

31

Total Number of Invention Disclosures

Research Partnership Unit - The Powerhouse -

Universities are increasingly expected to conduct research in collaboration with industry partners, while also broadening their international reach to include policymakers and leading technology organisations. Such collaborations bring significant benefits that enhance the quality and impact of research.

It enables breakthroughs in AI, science, medicine, engineering, and beyond. Countries and companies that invest in advanced technologies often lead global markets in creating new industries and jobs, boosting economic growth and competitiveness.



Fuels Innovation and Discovery Together —

Collaborations with industry serve as powerful drivers of innovation and discovery. Through these partnerships, universities gain access to cutting-edge equipment, proprietary datasets, and specialised facilities that are often beyond the reach of academic institutions alone.

In turn, companies working with the School of Computing benefit from early exposure to emerging technologies and pioneering research, enabling them to explore new market opportunities and reinforce their standing as leaders in their domain fields.



A Wider Lens -

At the School of Computing Research Partnership Unit, we adopt a broad spectrum of partnership models to establish and sustain collaboration with industry stakeholders. These include contract-based research, co-developed research initiatives, large-scale joint or corporate laboratories, and participation in multi-member industry consortia.

We bridge the gap between research and real-world challenges by transforming laboratory discoveries into innovative technologies, accelerating their adoption and impact across industries.



Cutting-edge technology without real-world application is like a rocket without a launchpad. The bridge ensures it lifts off, and lands where it matters most.



Source: https://nus-ncs.nus.edu.sg/



Representatives from NUS and Google exchanged strategic collaboration agreements during NUS School of Computing's 50th Anniversary Gala Dinner.

Front row, left to right: **Ms Serene Sia**, Country Director, Singapore of Google Cloud and **Prof Tulika Mitra**

Back row, left to right: **Ms Yolyn Ang**, Vice President, APAC Business Development of Google, Guest-of-Honour **Mr Tan Kiat How**, and **Prof Tan Eng Chye**

Source: https://news.nus.edu.sg/new-google-nus-partnership/



Professor Tan Eng Chye (fifth from left), NUS President, met **Dr Lidong Zhou** (fourth from left), Corporate Vice President and Managing Director of MSRA, and **Ms Lee Hui Li** (sixth from right), former Managing Director of Microsoft Singapore, in 2024.

(Photo: Microsoft Research Asia)

Source: https://news.nus.edu.sg/nus-microsoft-research-asia-advance-ai -research-cultivate-computing-talent/

AI with a Shield: Cybersecurity at the Core, the Bedrock of Modern Technology

AI is reshaping industries, automating decisions, and powering innovation, yet cybersecurity remains the silent force beneath it all. Every intelligent system, every predictive model, every autonomous process is only as trustworthy as the security it's built upon. AI may be the trend, but without robust cybersecurity, it's a risk.

NUS and NCS have established a joint lab to conduct research in three broad areas of cybersecurity that hold strategic relevance to NCS's business. The three broad areas are AI Security, Cyber-Physical System Security and Data Security and Privacy.

A Journey with Us —

The Research Partnership Unit undertakes strategic initiatives such as bite-sized technical workshops for participating industry partners and annual events aimed at enhancing research visibility and promoting sustained engagement. These efforts are integral to strengthening and maintaining long-term partnerships.

At our 2025 Gala dinner, we launched one of our major partnerships, **Google-NUS**, to advance applied AI research and talent development in Singapore. Such collaboration accelerates AI applications in education, law, and healthcare. The key pillar of this partnership is talent development — through endowed professorships, mentorship, training programmes, and hands-on research projects.

NUS and Microsoft Research Asia Collaborate on AI Research -

Microsoft Research Asia – Singapore, its first lab in Southeast Asia, is aimed at driving cutting-edge AI research, co-innovating AI-powered solutions for key industries, and nurturing the next generation of AI talent across the region.

Through strategic research projects and workshops, NUS and Microsoft Research Asia strive to strengthen Asia's integration with the global AI research community and amplify the region's impact on international technological innovation.

Contact: SoC Research Partnership Unit (RPU) Email: soc-rpu@nus.edu.sg

Department of Computer Science

The Department of Computer Science offers four undergraduate programmes in Computer Science, Computer Engineering, Artificial Intelligence, and Information Security.

The department also offers three Master's programmes in Computer Science, Artificial Intelligence, and Infocomm Security, as well as a PhD programme in Computer Science.



The department's faculty members perform pioneering research in eight research areas:

- Algorithms and Theory
- Artificial Intelligence
- Computational Biology
- Databases
- Media
- Programming Languages and Software Engineering
- Security
- Systems & Networking

Research Areas

Algorithms and Theory

At the heart of all computer programs lie the mathematical foundations of computer science - theory and algorithms.

We delve into these theoretical concepts, understanding the fundamental abilities and limitations of the computational tools we work with, and use these insights to develop improved software and algorithms.

Artificial Intelligence

As advances in machine learning have grown exponentially in recent years, artificial intelligence has become one of the fastest-moving fields in computer science.

From robot vacuum cleaners to machine learning augmented online shopping recommendations and search engine predictions, our work drives innovations that are now part of our everyday lives.

Computational Biology

The modern biology researcher faces vast amounts of data produced by high-throughput analytical technologies for DNA, RNA, and proteins. This rich and complex mix of data is also confounded by a variety of biological and nonbiological factors, which makes it difficult, inefficient, and inaccurate to draw the right research conclusions.

By understanding and exploiting properties of the underlying biology, instruments, technologies, and experiment designs, we develop advanced methods to process and analyse these large amounts of complex, biological data – which help solve problems in biology, biotechnology, and medicine.

Databases

By the year 2025, the amount of digital data generated by both humans and machines is expected to reach hundreds of exabytes – that is over a hundred billion gigabytes.

We design, as well as study, database management systems and techniques that process, store, manage, and update these large amounts of data efficiently and effectively.

Media

With the rapid increase in volume and variety of user generated content on the web, the way that people seek and consume information and knowledge is changing.

Besides conducting research on multimedia technologies, we also design exciting new ways to experience and interact with content involving various media – from video games to smart glasses and sketch animation interfaces.

Programming Languages & Software Engineering

Software consists of programs written in programming languages. The flexibility and power of software enables billions of people around the world to connect, collaborate, and solve problems.

However, as one of the most complex artifacts designed by humans, it is theoretically challenging and practically difficult to correctly program software. We study all aspects of the software development process, with the aim to improve the performance and reliability of these programs.

Security

As our everyday lives become increasingly digital, it is crucial to ensure that our data and privacy is secure.

From blockchain security and cryptography to infrastructure security, we design, develop, and deploy solutions for improving security and privacy across both software and hardware computer systems.

Systems & Networking

Since its creation in 1983, the Internet has grown exponentially – becoming an essential part of our daily lives and connecting billions of people and devices across the world.

We tackle the challenges facing such large-scale interconnections of computing devices, exploring how these computing devices can work together, often in a distributed manner, to perform computations and disseminate information from one device to another.

Department of Information Systems and Analytics

The Department of Information Systems and Analytics has a long track record of grooming prominent leaders for the digital economy and IT workforce.

It offers undergraduate programmes in Business Artificial Intelligence Systems, Business Analytics, and a PhD programme in Information Systems.



The department faculty members conduct research in six key areas:

- ► Computational Social Science
- Data Science & Business Analytics
- Digital Transformation, Platforms & Innovation
- Financial Technology (FinTech)
- ► Healthcare Informatics
- ► Intelligent Systems

These six areas represent critical intersection of technology, business, and human domains — defining both the present and future of the digital economy.

Research Areas

Computational Social Science

With an explosion of data in every aspect of our social and economic activities, we can leverage advanced data analytic techniques and technologies to measure and understand human behaviour with a precision that was largely impossible back then.

Researchers working on this research area aspire to apply scalable computational tools to collect and analyse large demographic, behavioural, and networked data to better understand humans at the micro level and society at the macro level. The concerted goal is to uncover patterns, infer causality, and deduce insights into individual and collective human behaviour.

Data Science & Business Analytics

Researchers in Data Science and Business Analytics seek to examine and exploit the myriad promises of big data.

A concerted interest is in utilising and improving data-driven methods, statistical analysis, machine learning, and analytics techniques to extract meaningful insights and inform organisational decision-making. For example, an enduring interest is in forecasting and predicting potential relationships between variables and outcomes of concern so that organisations can better chart their future and achieve their goals.

This interest is intertwined with the fundamental big data challenges, e.g., entity resolution, missing value imputation, high-dimensional clustering, and models for transfer learning.

Digital Transformation, Platforms & Innovation

The researchers working on the research area of digital transformation, platforms, and innovations are at the forefront of the economic and societal shift toward digitalisation. They seek to develop and test models, frameworks, and solutions contributing to knowledge creation and refinement.

Of particular interest is to provide actionable insights to practitioners on managing and designing digitalisation efforts and digital platforms for innovation through strong partnerships and collaboration with industry players (digital and non-digital native organisations).

Financial Technology (FinTech)

The Financial Technology (FinTech) research area encompasses the study of innovative technologies and digital solutions transforming the financial industry.

A concerted effort is to investigate how technological innovations (e.g., blockchain cryptocurrency and algorithmic trading) impact traditional financial systems, regulatory frameworks, consumer behaviour, and financial inclusion, ultimately reshaping how people manage, access, and interact with financial services in a digital age.

Healthcare Informatics

The research area of healthcare informatics focuses on addressing current and future healthcare issues and challenges, such as the aging population and recurring geographical/economic/societal disparity in accessing healthcare services.

Researchers take a contextually grounded and problem-based approach to developing and testing models and solutions to address the challenges. Empirical investigations are built on collaborative partnerships with healthcare institutions and advanced analytics techniques for large datasets.

Intelligent Systems

The intelligent systems research area focuses on the applications and implementations of artificial intelligence (AI) and machine learning-based methods and techniques to address various organisational, business and societal problems and issues.

The concerted goal is to push the limits of intelligent tools and propose novel AI/machine learning constructs, models, methods, or instantiations with implications for human augmentation for economic and societal purposes.

Research Highlights

NUS Computing is strongly committed to research excellence in all its dimensions: Searching for fundamental results and insights, developing novel computational solutions to a wide range of applications, building large-scale experimental systems and improving the wellbeing of society.

In this research bulletin, we feature several recent efforts in:



Programming Languages & Software Engineering



Algorithms & Theory



Media



Systems & Networking



Data Science & Business Analytics



FinTech



Digital Transformation, Platforms & Innovation

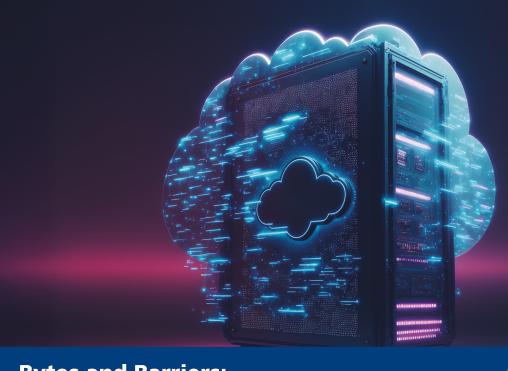


For research efforts in other areas, please visit: https://www.comp.nus.edu.sg/features/

(The following articles will be arranged in descending order according to the latest release date)







Bytes and Barriers:
Overcoming the Challenges of
Integrating Electronic Health Records

Atreyi Kankanhalli (DISA)

Understanding the tensions and their mitigations is key to effectively managing the challenges involved in creating a seamless system of patient records.

Amidst all this exhaustion and stress, the last thing you want to do is to keep repeating yourself (your symptoms, medical history, current medications, drug allergies, lab tests, and so on) to every new doctor you encounter in every new healthcare facility you visit. Fortunately these days, patients in a growing number of countries don't have to — thanks to health records being digitised and shared among multiple service providers.

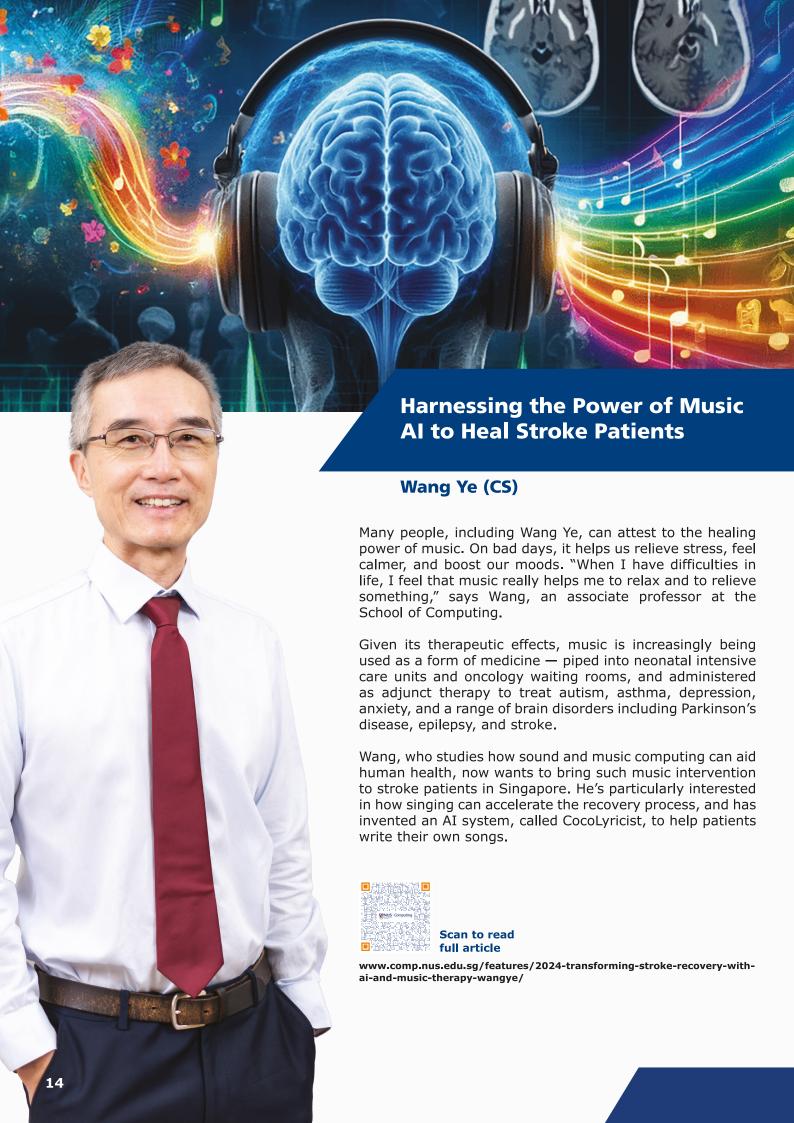
It's clear that such integrated electronic health records bring about many benefits, says Atreyi Kankanhalli, Provost's Chair Professor at NUS Computing, who has been studying the topic of healthcare information systems for more than a decade. Patient convenience aside, doctors can make crucial decisions more quickly when comprehensive and accurate patient information is readily available at their fingertips, thus improving efficiency and enhancing care.



Scan to read full article

www.comp.nus.edu.sg/features/2024-bytes-and-barriers-overcoming-the-challenges-of-integrating-electronic-health-records-atreyik/







Chang Yi-Jun (CS)

Imagine you're planning the fastest route to work, navigating through a city or even across a massive internet network. The shortest path problem isn't just an abstract mathematical puzzle—it has real-world applications in GPS navigation, internet routing, and artificial intelligence. NUS Presidential Young Professor of Computer Science Chang Yi-Jun and his team have been developing faster and more efficient ways to solve this problem, and a recent breakthrough algorithm is setting new standards for speed and practicality.

Shortest Path Calculations

The ability to find optimal routes quickly is crucial in numerous domains. From ride-sharing apps and delivery services to data transmission across the internet, efficient pathfinding can reduce congestion, improve response times, and lower costs. Traditional algorithms can be slow when applied to large-scale networks, which is why new approaches are so exciting.



Scan to read full article

https://www.comp.nus.edu.sg/features/finding-the-fastest-route/



Research Centres



Established in July 2024, the Centre for Computational Social Science and Humanities (CSSH) serves as a nexus for interdisciplinary research, blending the methodologies and tools of computing with the theories and inquiries of social science and humanities disciplines.

CSSH aims to address a diverse range of problems in areas such as social media, digital platforms, health and social care, environment, and heritage and culture, thereby advancing knowledge, informing decision-making, and addressing pressing societal challenges.

cssh.nus.edu.sg

Led by Provost's Chair Professor Atreyi Kankanhalli

Centre for Holistic Inquiry into Lifelong Learning (CHILL)

The Centre for Holistic Inquiry into Lifelong Learning (CHILL) at the NUS School of Computing is a research centre focused on advancing understanding and practices in lifelong learning through interdisciplinary collaboration and digital innovation.

CHILL brings together researchers from diverse fields—such as computer science, education, psychology, and the social sciences—to investigate how technology can support holistic, continuous learning across all stages of life. The centre's initiatives include the development of intelligent learning platforms, studies on learning behaviours and outcomes, and partnerships with educational institutions and industry.

chill.nus.edu.sg

Led by Associate Professor Suranga Nanayakkara

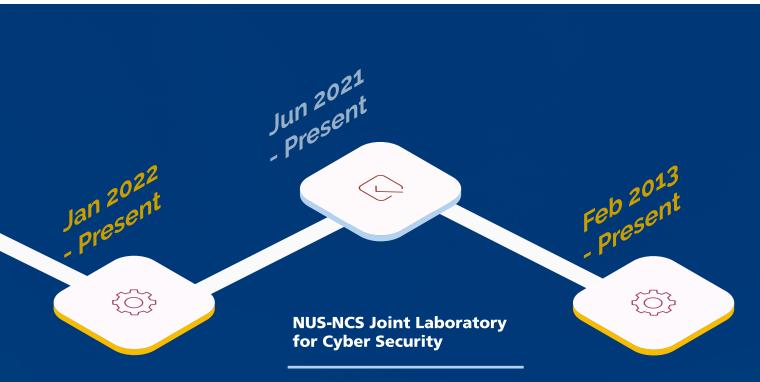
Technologies (AICET)

Established in 2023, the AI Centre for Educational Technologies (AICET) is grant-funded by the Smart Nation and Digital Government Office (SNDGO). The Centre is focused on developing technologies to support teaching and improve learning.

AICET collaborates actively with the Ministry of Education (MOE) on various projects to build systems that provide immediate personalised feedback to the students, providing content that adapts to their performance, and improve assessment and grading efficiency and effectiveness.

aicet.comp.nus.edu.sg

Led by Associate Professor Ben Leona



SIA-NUS Digital Aviation Corporate Laboratory

In January 2022, SIA and NUS launched the SIA-NUS Digital Aviation Corporate Laboratory which aims to create and commercialise innovative technologies that could accelerate the digital transformation of Singapore's aviation sector, redefine the air travel experience and ensure safety and security in air travel.

This will be achieved by leveraging NUS's world class deep tech and multi-disciplinary research expertise across artificial intelligence, machine learning, data science, operations research and analytics, optimisation, automation, sleep studies and design to develop digital technologies. These technologies will be evaluated and potentially be adopted for use by SIA.

siacorplab.nus.edu.sg

Work Package 3 – Employee Wellness led by Professor Teo Hock Hai

NUS and NCS Pte. Ltd. (NCS) have established a joint research lab that is hosted in NUS to conduct research, develop capabilities and innovative digital solutions to protect individuals, businesses and public agencies in Singapore from a wide range of cyber threats.

The joint lab is governed by a Management Committee comprising members from NUS and NCS to conduct research in three broad areas of cyber security having strategic relevance to NCS's business: (1) AI Security; (2) Cyber-Physical System Security; and (3) Data Security and Privacy.

nus-ncs.nus.edu.sg

Led by Professor Chan Mun Choon

Advanced Robotics Center (ARC)

ARC is an interdisciplinary research centre, established by the NUS Computing and NUS Engineering, to lead and support robotics research in NUS and Singapore.

The centre focuses on developing human-centred collaborative robotics, with the goal of refining the scientific foundations, technologies, and integrated platforms to enable human-robot interaction and collaboration.

arc.nus.edu.sg

Led by Professor David Hsu

Research Initiatives

Mar 2024 Till Present

NUS AI Institute (NAII)

Established on March 25, 2024, the NUS Artificial Intelligence Institute (NAII) serves as a unifying hub for AI researchers across the entire NUS community. With over 20 principal investigators spanning diverse fields such as business, computer science, data science, engineering, medicine, law, and sustainability, NAII is spearheading more than 10 research programs.

The institute aims to foster a vibrant ecosystem that promotes synergistic AI research and applications, grow the AI talent pool, engage government and industry in partnerships, and expand entrepreneurship opportunities.

ai.nus.edu.sg

Led by Professor Mohan Kankanhalli

Oct 2021 Till Present

DesCartes

The five-year DesCartes Programme, established in October 2021, which is funded by the National Research Foundation, Singapore (NRF), aims to enhance real-time decision-making in urban-critical systems, with a focus on individuals and society at large.

One of the Co-Directors of the DesCartes Programme is Professor Abhik Roychoudhury from NUS Computing, who will focus on the foundations of intelligent computing and its translation in the different case studies, for trustworthy integrated decision making in smart cities. He and his NUS team will validate techniques involving formal methods, intelligent control, smart data, and human-AI collaboration on a large number of industrial case studies including electricity network, smart building and future transportation networks. They will also work with the other partners to ensure that the foundational concepts are translated via industrial collaboration.

cnrsatcreate.cnrs.fr/descartes/

Work Package 1 led by Professors Abhik Roychoudhury & Blaise Genest Work Package 4 led by Professor Christophe Jouffrais & Associate Professor Ooi Wei Tsang

Jul 2020 Till Present

Centre for Trusted Internet and Community (CTIC)

CTIC is a university-level research centre dedicated to the interdisciplinary study of the Internet and its implications on the society of the future. It adopts a unique approach of integrating three different perspectives - technology, human and policy - to develop a set of insights, tools, policies and best practices around the use of the Internet to promote digital well-being and responsible public discourse.

ctic.nus.edu.sg

Led by Professor Lee Mong Li, Janice

Nov 2019 Till Present

NUS Fintech Lab

Established in 2019 with a generous donation from Ripple, the lab aims to create a collaborative environment that encourages dialogue, experimentation and creativity. NUS FinTech Lab is committed to generating new ideas that can help solve Fintech's most complex and pressing challenges.

As a hub for interdisciplinary dialogue, research, and education, it leverages faculty members' expertise at NUS Computing to stay ahead of fintech developments and to influence the trajectory of new developments for a responsible and safe fintech.

fintechlab.nus.edu.sg

Led by Professor Hahn Jungpil

May 2017 Till Present

Al Singapore

Al Singapore (AISG) is a national Al programme launched by NRF to develop national capabilities in artificial intelligence, thereby creating social and economic impact, growing local talent and building an Al ecosystem. AISG is hosted by NUS and brings together research institutions and the vibrant ecosystem of Al start-ups and companies to conduct use-inspired research, and develop the talent to power Singapore's Al efforts.

aisingapore.org

Led by Professors Ho Teck Hua, Mohan Kankanhalli & Chen Tsuhan

May 2016 Till Present

Institute of Data Science (IDS)

IDS is a university-level research institute established to develop integrated data science solutions and to nurture the next generation of data scientists for Singapore's Smart Nation initiative. Within the span of 5 years, IDS has successfully built up a core team with a portfolio of transdisciplinary and translational data science projects and strategic partners.

IDS has been ahead of the curve to become a world-class institute in data science research and innovation, establishing the first AI industry research lab in NUS with Grab in 2018. The institute focuses on establishing a core research agenda for data science, thematic flagship programmes, international profile and networks; and developing a cross-cutting data science platform.

ids.nus.edu.sg

Led by Professor Wynne Hsu

Nov 2015 Till Present

National Cybersecurity Research & Development Laboratory (NCL)

Many communities and informal businesses in developing nations typically lack proper service from existing technology vendors and telecommunication companies. To meet this need, COSMIC aims to empower underserved communities through social media innovations to improve the way they live, work, and play.

The centre is a collaborative initiative between NUS, the Nanyang Technological University (NTU), and the Indian Institute of Technology Bombay. Projects from this centre include an intelligent pest-control mobile app solution for farmers and creating a musical habilitation framework for children with post cochlear implantation.

ncl.sg

Led by Associate Professors Chang Ee-Chien & Liang Zhenkai

Apr 2007 Till Present

Smart Systems Institute (SSI)

Led by NUS Computing, SSI is an interdisciplinary research institute and an experimental "playground" for human-centered AI engineering. The research at SSI focuses on AI and robotics technologies for interaction design and embodiment, with the aim to enable situated AI assistance for every human to work, play, and learn.

ssi.nus.edu.sg

Led by Professor David Hsu

Oct 1998 Till Present

Image & Pervasive Access Lab (IPAL)

IPAL is a Franco-Singaporean International Research Laboratory formed via partnerships between the French National Center for Scientific Research (CNRS), the Agency for Science, Technology, and Research (A*STAR) and the National University of Singapore (NUS). First established in 1998 as a special CNRS overseas laboratory, IPAL serves as a framework for collaborations between NUS, A*STAR, and French researchers.

The IPAL partnership is joined by French institutions over the years (Joseph Fourier University (later as Grenoble Alpes University), Institut Mines-Télécom, University Pierre et Marie Curie (later as Sorbonne University), and National Polytechnic Institute of Toulouse).

ipal,cnrs,fr

Led by Associate Professors Christophe Jouffrais, Ooi Wei Tsang & Dr Lim Joo Hwee



nus.edu/computing

