

Notable Researchers



Nicholas Jose

Research Fellow, C4T

Nicholas began his PhD in Chemical Engineering at Cambridge in 2015, graduating in 2019. His research focuses on new synthesis techniques for nanomaterials, with an emphasis on scalability and highly anisotropic materials. This research has resulted in a new microreactor that was published in Nature Communications (<https://doi.org/10.1038/s41467-018-07395-4>).

Following this, a SMART Innovation Centre Grant of SGD250K was awarded in 2018 to develop a proof-of-concept materials development platform incorporating this reactor. The resulting project has commenced under the name of RINGs (Rapid Industrialisation of Next Generation Nanomaterials). The objective is to develop an accelerated commercial platform for nanomaterial development, which will be used to found a service company for bespoke nano-manufacturing. To showcase this platform, the team is collaborating with A*STAR to develop ZnO nanoparticle antimicrobial coatings.

Nicholas has a patent application in progress for the microreactor ('Constant shear continuous reactor device') and one patent already approved from work in a previous job ('Compositions and methods for producing high purity filter aids').



Li Xian

Research Fellow, E2S2

Dr. Li's research outcomes on the gasification-based Combined Cooling Heating and Power (CCHP) system is able to provide a guideline for the design, optimization, and deployment of such a decentralized system in the building sector of Singapore.

- Outstanding reviewer of Renewable and Sustainable Energy Reviews, Energy, Solar Energy, Applied Energy, and Renewable Energy.
- 2016, Guest Editor of Special Issue of Energy
- 2016, Executive Committee Member of 15th International Conference on Sustainable Energy Technologies
- 2016, Executive Committee Member of 8th Global Chinese Chemical Engineers Symposium



Prof Veronique Angeli

PI, SHARE MMID

Achievements in past 5 years:

- Award: in 2015 National University Health System-Mochtar Riady Pinnacle Young Achiever Award
- Grant: PI on DYNAMO: Diabetes study in Nephropathy And other Microvascular cOmplications NMRC-OFLCG
- Work from her publications was featured in the media
 - ❖ Channel NewsAsia, 14 August 2018
 - ❖ Channel 5 News, 14 August 2018
 - ❖ Channel 8 News, 14 August 2018
 - ❖ Channel U News, 14 August 2018
 - ❖ Vasantham News, 14 August 2018
 - ❖ Suria News, 14 August 2018
 - ❖ 938NOW, 14 August 2018
 - ❖ Capital 95.8FM, 14 August 2018
 - ❖ Warna 94.2FM, 14 August 2018
 - ❖ Oli 96.8FM, 14 August 2018



Prof Chen Xiaodong

PI, SHARE NEW

As one of the most innovative scientist in nanomaterial, Prof Chen is an expert in topics ranging from nanochemistry and biomaterials synthesis and engineering, and his research has important implications in applications spanning energy storage to medical diagnostics. Professor Chen's achievement in research and innovation was recognized nationally and internationally with his many awards, namely the Friedrich Wilhelm Bessel Research Award (2018) from the the Alexander von Humboldt Foundation, the Mitsui Chemicals-SNIC Industry Award in Materials and Nano-chemistry (2018), Nanyang Research Award (2017), NRF Investigatorship (2016), Small Young Innovator Award (2015), Lubrizol Young Materials Science Investigator Award (2015), NRF Fellowship (2009), and so on.

So far, Prof Chen has published over 260 high profiled articles, including in Nature Communications, Angewandte Chemie, and Advanced Materials. His papers have been cited more than 16,300 times with an H-index of 62. His research work was highlighted by more than 100 local and overseas' media. Professor Chen's research work on generating industrial impact is evident from his 22 patents, four of which had been licensed for commercial development. He is also the co-founder of a spin-off company, Quickcharge Pte Ltd, commercializing cutting-edge energy storage technology.



Prof David Engelberg

PI, SHARE MMID

PI on an 'Israel Science Foundation' grant on: "Revealing the function of a newly discovered mode of p38 regulation (trans-autophosphorylation and trans-isoform phosphorylation) in vitro and in vivo." USD 480,000

PI on an Ministry of Science grant on: "A New System for the discovery and evaluation of anti-viral drugs" (together with Prof. Shy Arkin). USD 130,000.



Alice EH Lee Sie

Research Associate, SHARE NEW

In her research work, she has developed reversible electrochemical mirror device that offers reversible switching between transparent, blue, and mirror states via a judicious selection of electrolyte and controllable electrodeposition. She has pushed the advances in reversible electrochromic mirror and established solid frameworks for flexible electrochromic devices. Her work provides extensive insights on the prerequisites, challenges, strategies, and prospects in the field of electrochemical devices. In addition, she has contributed scientifically in research related to electrochromic devices, including multifunctional smart windows and stretchable electronics, in which she has published her work in the Journal of Materials Chemistry and co-authored several top-tier journals like Chemical Science, Advanced Materials, Nano Energy, and ACS Nano. She is the first-author in an invited review "Recent Advances in Flexible Electrochromic Devices: Prerequisites, Challenges, and Prospects" in Energy Technology, which was named one of the top articles in the year as "Best in 2018", and an invited book chapter "Advances in Polymer Electrolytes for Electrochromic Applications" with the publisher Wiley-VCH Verlag GmbH & Co. KGaA. In addition to scientific publications, she has gained rich experience in communicating her works in reputable conferences like European Materials Research Society (E-MRS) Spring 2019, Materials Research Society (MRS) Fall 2017, and Commonwealth Science Conference 2017.

In her capacity as a research associate, she is working closely with the industry partners, focusing on the electrochromic projects. Additionally, she is highly competent in the polymer electrolyte formulation, which enhances the cycling stability of the electrochromic smart windows. She is also actively engaging with the angel investors, technology seekers, and potential industry partners by participating as exhibitor at the TechInnovation 2018 and 2017, as well as NTUitive Homecoming 2017, as part of SHARE program in promoting entrepreneurship among their researchers.

In recognition of her strong expertise, she was awarded the Methrohm Singapore Young Chemist Award 2018 (First Prize) and Women in Engineering, Science, and Technology Conference Grant Recipient 2019 (WiEST@NTU, Micron prize).



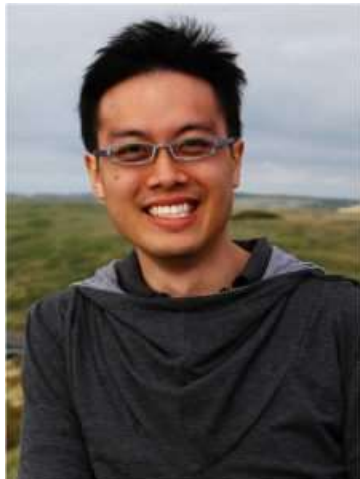
Ertem Esiner

Postdoctoral Researcher, TSCP

Dr Esiner and his TSCP colleagues have implemented two working prototypes for next-generation cybersecurity technologies to secure communication in industrial control networks. Both technologies developed as a result of his studies have been approved for provisional patent filing.

The first technology Dr. Esiner and his colleagues have prototyped is F-Pro: a Fast and Flexible Provenance Scheme for Industrial Control Systems. This system provides the first bump-in-the-wire provenance checking mechanism that is applicable to Industrial Control Systems (ICS). Conventional solutions such as the ones used for internet routing are not suitable for ICS due to their high latencies. F-Pro has been deployed and tested at the Singapore University of Technology and Design in the Electric Power and Intelligent Control (EPIC) testbed.

The second technology, which builds on the foundation of F-Pro, addresses risks posed by commercial-off-the-shelf devices that may be connected to a secure infrastructure system for configuration or maintenance. Dr. Esiner and the TSCP team prototyped a mobile application that imposes a second factor (an authenticator as a possession factor) added to the conventional username-password authentication for legitimate access. The unique features of the technology are that the authenticator works offline during the code generation and the scheme is fully distributed in the sense that it does not require a trusted third party.



Dr Kerwin Kwek Zeming

Postdoctoral Associate, SMART BioSyM

Kerwin is a recipient of the SMART Innovation Grant (August 2018) to develop system for the rapid prognosis and screening of sepsis for patient admissions in emergency department. This work is in collaboration with Dr Win Sen Kuan, Research Director at National University Hospital (NUH) emergency department (ED). Clinical tests and recruitment are on-going. Preliminary results showed promising results for low cost, rapid (5 mins) and decentralised diagnosis of sepsis. Kerwin establishes himself in Singapore and globally in microfluidic cell sorting using DLD. He has investigated fundamental principles in DLD which led to interesting engineering and bio-physical discoveries. These discoveries enabled him to publish in top tier journals microfluidics, lab-on-chip and inter-disciplinary journals such as nature communications.

In SMART, Kerwin steers current research towards developing systems for applications in immune cell sorting and profiling. His projects target both clinical and biomanufacturing needs for rapid immune cell profiling and isolation.



Dr Ekta Makhija
Senior Postdoctoral Associate, BioSyM

In her 2.5 years as a post-doc in BioSyM, Ekta has published 3 research articles on using mechanical strain to promote differentiation of neuroglial stem cells. Together with MIT lab colleagues, Ekta has shown that stretching the neuroglial stem cells in vitro enhances their ability to make myelin. This work has implications in promoting myelination when the insulating myelin layer around neuronal axons gets damaged with ageing or in neurodegenerative diseases such as multiple sclerosis. Ekta has worked on upgrading the previous cell stretching technology, which was custom built in lab, to incorporate high resolution single cell imaging of stretched cells as well as to automate the stretching device. With a Master's degree in Physics and a PhD degree in Biophysics, Ekta has diversity of scientific talents ranging from designing and building experimental setup, microscopy, programming, image processing, data processing, statistical analysis to cell culture, molecular biology, and biochemistry. Ekta is also very proactive in teaching, mentoring and helping out with various academic and non-academic events at SMART. Since 2014 she has been assisting in teaching programming and microscopy to fresh graduates at the MBI-SMART mechanobiology bootcamp (held annually for 10 days in August). She gave 2 guest lectures on "Physical Concepts in Biology" in April 2019 to 2nd year undergraduates in NUS. At BioSyM, Ekta has mentored 4 undergraduate students, 1 PhD student and 1 research assistant. In her role as a SMART mentor, since May 2018, she has befriended 3 new employees (1 BioSyM, 1 CENSAM, 1 FM) and keeps in touch for any help they need as they settle down in new city and new workplace.



Dr Daniel Kondor
Postdoctoral Associate, SMART FM

Daniel Kondor joined SMART FM as a postdoctoral researcher in August 2017, after spending two years at the Senseable City Lab at MIT. Recently, his research has mainly focused on optimizing urban mobility and characterizing possible outcomes of new technologies in transportation. Since joining SMART, he published several papers focusing on the privacy aspects of big data [1,2] and on estimating the impact of shared autonomous vehicles (AVs) in Singapore [3,4]. The latter work focused specifically on the diminishing demand for parking in the age of AVs that will have a profound effect on how urban spaces should be designed and can be used. Results from these works were featured multiple times in the press, bringing public awareness to the issues related of sharing large-scale mobility data [5,6,7]. Further research impacts are expected to inform the future of urban planning by better anticipating the changes that the large-scale adoption of AVs can bring to cities. Beside these publications, Daniel Kondor was an invited speaker at the 5th International Conference on Data and Software Engineering in Lombok, Indonesia, and an invited panelist in the Transforming Asia Pacific conference organized by the UNEP in Bangkok, Thailand. He is currently leading a project that investigates the possible application of autonomous scooters as an alternative to shared bikes. Preliminary results show a large potential impact on cities by transforming first- and last-mile mobility.



Dr Ravi Seshadri

Research Scientist, SMART FM

Dr Ravi Seshadri is currently a research scientist at the Future Urban Mobility IRG at SMART. He is the lead-PI of the L2NIC project titled 'Autonomous Mobility-On-Demand Systems Impact on Transportation in Singapore', the manager of the DynaMIT2.0 project and co-manager of the SimMobility (Mid-term/Short-term) project. As part of these and other projects arising from work in CREATE, he has made several contributions to research and innovation that have implications for Singapore and beyond. These include

- Development of methodologies for online calibration of real-time dynamic traffic assignment systems that improve scalability and computational performance and have important applications in making simulation based tools for real-time traffic management operational in large urban networks (Zhang et al, 2017; Prakash et al. 2017, Prakash et al. 2018b)
- Behavioral modelling and agent-based simulation methods for emerging mobility services such as Automated Mobility-On-Demand; the findings from this study have important implications and are being used by policy makers (such as the MOT, LTA, URA) in planning for the future (Basu et al. 2018).
- Development of methodologies to compare congestion pricing and tradable mobility credits; the findings from this study highlight the advantages of tradable credit schemes that have important implications for travel demand management in urban networks (de palma et al. 2018)
- Development of methodologies for traffic assignment that provide planners with tools for transportation planning that incorporate uncertainty (Seshadri and Srinivasan, 2017, Prakash et al., 2018a)
- Awards: Best Simulation Application Paper Award at the 97th Transportation Research Board (TRB) Meeting on January 8, 2018. The award was presented by the TRB Joint Traffic Simulation Subcommittee (SimSub)