JAMES COOK
UNIVERSITY
SINGAPORE

Information Technology at James Cook University in Singapore

JAMES COOK
UNIVERSITY

Brisbane | Cairns | Singapore | Townsville

1 university • 2 countries • 4 distinct locations
Creating a brighter future for life in the tropics world-wide through graduates and discoveries that make a difference

Research in Information Technology

Information Technology has been a saviour for many problems in the world. It leverages analytical capabilities and efficient processing capabilities to provide solutions in various forms such as the Internet of Things (IoT), robotics and game design, among others. Information Technology research at James Cook University in Singapore is vibrant and varied, spreading across game design and development, machine learning to help alleviate rural poverty and health, or innovative methods for software design.

James Cook University, strategically located in northern Australia and Singapore, especially focuses on tropical issues. James Cook University in Singapore researchers partner with industry, government bodies, universities and other stakeholders to conduct high quality research which contributes to tropical societies and more broadly to societies worldwide.

For further information or expression of interest to collaborate with James Cook University in Singapore, or to pursue a higher degree by research with us, please send an email to researchsupport-singapore@jcu.edu.au.

Profile ◣

Dr Roberto Dillon

Associate Professor, Information Technology
James Cook University (Singapore)

PhD, Electrical & Computer Engineering, University of Genoa, Italy
Meng, Electrical and Electronics Engineering, University of Genoa, Italy

Background

Dr Roberto Dillon is the author of several well received game related books published by AK Peters, CRC Press and Springer and has been invited to speak at the most important game conferences around the world (e.g., GDC, GameConnection, Casual Connect, Develop, GMGC, KGC etc.), as well as more general events like TEDx (Milan, Italy) and Wired (Manila, Philippines).

Dr Dillon is active both as an independent video game (Indie) developer and as an academic in the field of game design and development. His games have been showcased at events like Sense of Wonder Night in Tokyo, FILE Games in Rio de Janeiro and the Indie Prize Showcase at Casual Connect Asia. Dr Dillon's games have also received high positions on Apple's App Store and Google Play across several countries and categories.

Dr Dillon currently lectures on game design and project management. In 2013 he founded, and has directed since then, the very first Museum of Video and Computer Games in South East Asia. Before joining James Cook University in Singapore, Dr Dillon was the Chair of the Game Software Design and Production Department at DigiPen Singapore, teaching a variety of courses ranging from Games History to Game Mechanics, with his students gaining top honors at competitions like the IGF both in San Francisco and Shanghai.

Dr Dillon was also featured in the documentary "Inside the Storm 2, Episode 4: Nintendo," aired on Channel News Asia in 2017, and in several TV news reports and newspapers in Singapore, Italy and the USA.

Areas of expertise

- Game Design and Development
- Formal models for game analysis
- Serious games (training, rehabilitation, etc.)
- Physical and Affective Computing
- Digital Humanities and History of Technology

Impact of research and Achievements

- Formalized new models for game analysis and design (AGE and 6-11 Frameworks), now adopted in the industry and referenced in game education curricula in several universities worldwide

- Developed experimental games selected for international events like "Sense of Wonder Night" at the Tokyo Game Show and FILE Games in Rio de Janeiro

- Developed commercial games that reached top positions across several categories and countries on the AppStore and Google Play

- Certified Scrum Master (2008), Certified Unity Developer (2016), Certified Unity Instructor (2018)

Top five publications

- Dillon, R. (2010). On The Way to Fun: An Emotion Based Approach to Game Design. Boca Raton, FL: AKPeters/CRC Press.

- Dillon, R. (2011). The Golden Age of Video Games: The Birth of a Multi-Billion Dollar Industry. Boca Raton, FL: CRC Press.

- Dillon, R. (2014). Ready. A Commodore 64 Retrospective. Singapore: Springer.

- Dillon, R. (2016). Towards the definition of a framework and grammar for game analysis and design. In M. J. P. Wolf, (Ed): Video Games and Gaming Culture (Critical Concepts in Media and Cultural Studies) (pp.188-193). London: Routledge.

- Dillon, R., & Lundberg, A. (2017). Vampires in video games: Mythic tropes for innovative storytelling. eTropic: electronic journal of studies in the tropics, 16(1), 46-67.

Further Information

JCU Research Profile

Dr Insu Song

Senior Lecturer, Information Technology
James Cook University (Singapore)

PhD Computer Science, University of Queensland, Australia
BInfoTech (Hons I), Griffith University, Australia
BSc Physics, Chung-Ang University, Seoul, Korea

Background

After completing his undergraduate studies in Physics in Korea in 1991, Dr Song followed up with an Honours degree in Information Technology in 2004, and completed his PhD studies in Computer Science in 2008. Dr Song's research interests include biomedical engineering, health informatics, mental health informatics, knowledge engineering, and text mining. He has more than 15 years of industry experience in information systems design, embedded system design, industrial control system design, electronics engineering, signal processing, patent analysis, and multimedia/game software development. Dr Song has published over 60 peer reviewed papers.

Areas of expertise

- Information systems design
- Embedded system design
- Industrial control system design
- Electronics engineering
- Signal processing
- Health Informatics
- Certified TAA for RTOs (Registered Training Organizations in Australia)

Impact of research

- In 2011, Dr Song was awarded a prestigious international grant (Global Grand Challenges) from the Bill and Melinda Gates foundation to work on mobile applications for providing "Early Child Health Intervention Using Breathing Sound."

- In emerging markets with vast populations, mobility is the key to health services. Mobile-focused healthcare advances simplify the way new technology is adopted by medical professionals and organisations.

Top five publications

- Huang, Y., Song, I., Rana, P., & Koh, G. (2017, May). Fast diagnosis of bowel activities. In Neural Networks (IJCNN), 2017 International Joint Conference on (pp. 3042-3049). IEEE.

- Chandrasekaran S., & Song I. (2016) Sustainability of big data servers under rapid changes of technology. In: Kim K., Joukov N. (eds) Information Science and Applications (ICISA) 2016. Lecture Notes in Electrical Engineering, vol 376. Springer, Singapore. doi: 10.1007/978-981-10-0557-2_15

- Tam N.T., & Song I. (2016) Big data visualization. In: Kim K., Joukov N. (eds) Information Science and Applications (ICISA) 2016. Lecture Notes in Electrical Engineering, vol 376. Springer, Singapore. doi: 10.1007/978-981-10-0557-2_40

- Song, I. (2015, July). Diagnosis of pneumonia from sounds collected using low cost cell phones. In 2015 International Joint Conference on Neural Networks (IJCNN) (pp. 1-8). IEEE. doi: 10.1109/IJCNN.2015.7280317

- Song I. (2015) Gaussian Hamming Distance. In: Arik S., Huang T., Lai W., Liu Q. (eds) Neural Information Processing ICONIP 2015 (pp. 233-240). Lecture Notes in Computer Science, vol 9491. Springer, Cham.

Further Information

JCU Research Profile

Dr Eric Tham

Senior Lecturer, Data Science
James Cook University (Singapore)

PhD (Finance), EDHEC Business School, France
MSc. Business Analytics, National University of Singapore, Singapore
MSc. Financial Engineering, Columbia University, USA

Background

Dr. Eric researches at the intersection of technology and finance. He has a wealth of industry experience having worked in various roles in the financial sector for 15 years. His recent publications are in top A rated finance journals – Journal of Financial Research and Journal of Behavioral Finance. He has also presented at the European Financial Management Association (2021), Miami Behavioral Finance conference (2019), the American Economic Association conferences at San Diego (2020), the Australasian Banking and Finance conference (2018) and the NUS Risk Management conference (2019).

Areas of expertise

- AI/ML in Finance

- Behavioural Finance

- Climate and ESG finance

- Educational Economics

- Crypto markets

- Asset Pricing

Impact of research

- News from social media and news media are frequently conflicting and offer differing views. The paper developed model of ambiguity in asset prices to explain how agents make these decisions under uncertainty. It further showed that social media impacted asset prices during the post Lehman crisis period more so than the mainstream news media.

- How do sentiment and habits interact and affect asset prices? This study shows that sentiment makes consumer more habit sensitive. It provides an economic mechanism for sentiment to drive asset prices, but find its impact to be relatively minor compared to actual fundamentals. The paper shows that the COVID-19 asset depreciation was largely driven by consumption shocks and less so by sentiment.

Top five publications

- Eric Tham (2022). Ambiguous Text. Journal of Behavioural Finance, https://doi.org/10.1080/15427560.2022.2037600

- Eric Tham (2022). Habits or Sentiment, why not both? Journal of Financial Research (forthcoming).

Further Information
JCU Research Profile

Dr Jusak Jusak

Senior Lecturer Internet of Things
James Cook University (Singapore)

PhD (Communications Engineering), RMIT University, Australia
B.Eng (Electronics Engineering), Brawijaya University, Indonesia

Background

Dr Jusak Jusak has research experience across Australia, New Zealand, and Indonesia through which He has gained solid skills in both theoretical and practical knowledge in distributed wireless sensor networks and Internet of Things technologies. This experience contributes significantly to accumulating his knowledge in which his research goal has been directed towards designing IoT systems and devices for monitoring, identification and interpretation signals from broad areas of disciplines with main focus in the implementation of IoT for tele-healthcare.

Equally important, He also focus on the identification medical signals utilizing machine learning methods such as the convolutional neural networks to provide a more accurate signal identification. He has published papers in several top tier journals and conferences. He received several national level research competitive grants, from 2011 to 2020, and the best paper award in the International Conference on Information Technology Applications and Systems, in 2018.

His research interest includes signal processing for biomedical, Internet of Things for medical applications, and its security.
His current research goal is directed towards development of a lightweight blockchain architecture to achieve the need for a scalable, fault-tolerant, secure, traceable private blockchain network to match with the requirements for healthcare Internet of Things.

Areas of expertise

- Internet of Things infrastructure design

- Internet of Things embedded system design

- Internet of Things for healthcare

- Internet of Things communication protocols

- Biomedical signal processing

- Communication networks security

- Blockchain technology

Impact of research

- Development of Internet of Medical Things (IoMT) system using Zigbee networks to measure and monitor heart sound signal.

- Development of lightweight algorithm to identify heart sound signal. The proposed system has been successfully implemented in a real Internet of Things device while eyeing its contribution to the future of the smart healthcare system.

- Development of an anonymization algorithm to obscure patient's cardiac information during transmission and to protect information stored in the cloud database. The proposed scheme offered a secure non-cryptographic model for transmission and storing clinical data in the cloud.

Top five publications

- Jusak J, Mahmoud S, Laurens R, Alsulami M and Fang Q (2022) A new approach for secure cloud-based Electronic Health Record and its experimental testbed. IEEE Access, 10. pp. 1082-1095

- Jusak J, Puspasari I and Kusumawati W (2021) A semi-automatic heart sounds identification model and its implementation in Internet of Things devices. Advances in Electrical and Computer Engineering, 21 (1). pp. 45-56

- Jusak J and Mahmoud S (2018) A novel and low processing time ECG security method suitable for sensor node platforms. International Journal of Communication Networks and Information Security, 10 (1). pp. 213-222

- Puspasari I, Kusumawati W, Oktarina E and Jusak J (2020) A new heart sound signal identification approach suitable for smart healthcare system. Proceedings of the 2nd International Conference on Applied Engineering. In: ICAE 2019: 2nd International Conference on Applied Engineering, 2-3 October 2019, Batam, Indonesia

- Jusak J, Pratikno H and Putra V (2017) Internet of Medical Things for cardiac monitoring: paving the way to 5G mobile networks. Proceedings of the IEEE International Conference on Communication, Networks and Satellite. In: COMNETSAT 2016: IEEE International Conference on Communication, Networks and Satellite, 8-10 December 2016, Surabaya, Indonesia

Further Information

JCU Research Profile

Dr Steve Kerrison

Senior Lecturer, Cybersecurity
James Cook University (Singapore)

PhD (Computer Science), University of Bristol, UK
MEng (Computer Systems Engineering), University of Bristol, UK

Background

With a history of expertise in systems from the cloud right down to chip micro-architectures, Steve's current research interests focus on how to make cybersecurity easy, efficient and effective, aiming to create a safer, smarter and more environmentally friendly world.

Steve's research highlights include designing a formally verifiable time-deterministic network-on-chip for safety critical embedded multi-core systems, and creating an energy model that enables embedded software developers to understand how much energy their code consumes. More recently, Steve has hacked smart padlocks to turn them into fingerprint-stealing devices and is exploring deploying measures against such IoT-borne cyber-threats.

He has collaborated in various research projects in both Europe and Singapore. The EU-funded FP7 FET "ENTRA" comprised three academic institutions and one commercial chipmaker to explore energy reduction measures for modern embedded systems. The ARTEMIS Joint Undertaking project "EMC2" brought one hundred European academic and industrial organisations together to research mixed-criticality multi-core embedded real-time systems for space, aviation and automotive innovations. Steve conducted research into IoT for Industry 4.0 at A*STAR's "Model Factory @ ARTC", later participating in projects under Singapore National Research Foundation's National Cybersecurity R&D Programme whilst working at an IoT cybersecurity start-up, where he also co-authored a PKI-related patent.

Areas of expertise

- Multi-core embedded systems
- Computer micro-architecture
- Cybersecurity for Internet of Things
- Public Key Infrastructure

Impact of research

- Patent PCT/SG2019/050382 is used in products securing IoT communications in systems ranging from smart homes to city infrastructure.

- Members of ENTRA project subsequently joined the coordination action "ICT-Energy", a group of cross-disciplinary researchers, receiving EU funding for fostering interdisciplinary dialogue.

- Demonstrated a formally-verified time-deterministic communication model for multi-core systems, overcoming drawbacks of unpredictable "best-effort" systems that are not acceptable in real-time embedded safety-critical environments.

- Created a 480-core real-time embedded system, the largest of its kind, contributing tools and designs publicly through an open-source model.

Top five publications

- Kerrison, S. (2022). IoT Droplocks: Wireless Fingerprint Theft Using Hacked Smart Locks. In: The 15th IEEE International Conference on Internet of Things (IEEE iThings-2022), 22-25 August 2022, Helsinki, Finland.

- Morse, J., Kerrison, S., and Eder, K. (2018). On the limitations of analyzing worst-case dynamic energy of processing. ACM Transactions on Embedded Computing Systems, 17 (3). 59. DOI: 10.1145/3173042.

- Kerrison, S., Buschoff, M., Nunez-Yanez, J., and Eder, K. (2017). Measuring energy. In: Fagas, Giorgos, Gammaitoni, Luca, Gallagher, John P., and Douglas, Paul, (eds.) ICT - Energy Concepts for Energy Efficiency and Sustainability. IntechOpen, London, UK, pp. 59-82. DOI: 10.5772/65989.

- Georgiou, K., Kerrison, S., Zbigniew, C., and Eder, K. (2017) Energy transparency for deeply embedded programs. ACM Transactions on Architecture and Code Optimization, 14 (1). 8. DOI: 10.1145/3046679.

- Kerrison, S., May, D., and Eder, K. (2016). A Benes based NoC switching architecture for mixed criticality embedded systems. In: IEEE International Symposium on Embedded Multicore Socs (MCSoC), 21-23 September 2016, Lyon, France. DOI: 10.1109/MCSoC.2016.50.

Further Information

JCU Research Profile

Dr Randy Zhu

Lecturer, School of Science and Technology
James Cook University (Singapore)

PhD (Information Technology), James Cook University, Australia
MSc (Information Systems), Nanyang Technological University, Singapore
BSc (Computer Science), The University of Adelaide, Australia

Background

Dr Randy's primary research focus is in the area of human-computer interaction (HCI) for people with disabilities. Wearables, IoT and advanced computer techniques like Machine Learning have led to the upsurge of innovative applications within the healthcare sector. Randy's focus is on the adoption of community-based co-design in assistive software development: using a Participatory Action Research (PAR) approach in co-design to increase usability and adoption of assistive technology.

Dr Randy possesses strong skillsets in qualitative workshop and product design for people from marginalised communities. These skillsets allowed him to co-design and develop human-centered products. His work is characterized by a strong technical component to address the problems faced by the communities. Prototypes were implemented to empirically evaluate the adapted HCI techniques and tools suited for respective marginalised communities.

Areas of expertise

- Design and develop qualitative workshops for people from marginalised communities

- Development of human-centered products

- Conduct and evaluate qualitative research

- Participatory Action Research

- Assistive technology

Impact of research

- Developed a framework and structured approach to engage adolescents with ASD for research through a support group

- Ethnographic study that provided insights into the implications of group culture and practices have on the co-design process.

Top five publications

- Zhu, R., Hardy, D., & Myers, T. (2022). Community led co-design of a social networking platform with adolescents with Autism Spectrum Disorder. Journal of Autism and Developmental Disorders, 52(1), 38-51.

- Zhu, R., Hardy, D., & Myers, T. (2019, December). Co-designing with adolescents with autism spectrum disorder: From ideation to implementation. In Proceedings of the 31st Australian Conference on Human-Computer-Interaction (pp. 106-116).

- Zhu, R., Hardy, D., & Myers, T. (2018, October). Building applications that matter: Co-designing with adolescents with autism spectrum disorder. In International Conference on Health Information Science (pp. 167-174). Springer, Cham.

Further Information
JCU Research Profile

Dr Shailey Chawla

**Adjunct Lecturer Information Technology
James Cook University (Singapore)**

PhD Computer Science, University of Delhi, India
BSc Applied Science, University of Delhi, India

Background

Dr Shailey Chawla specializes in the field of Software Engineering. She has more than 15 years of experience as an academic in both teaching and research. Dr Chawla has taught various subjects of computer science to postgraduate and undergraduate students in Singapore, Hong Kong and India. Her primary areas of interest have been programming, data structures, database management and agile development.

Dr Chawla worked as a Postdoctoral Fellow at The Hong Kong Polytechnic University, where her area of research was fields. She helped mentor other PhD students and research staff during her tenure there, focusing on data mining and Internet of Things research for smarter cities. Currently, her research interests are block chain and secure agile development.

Areas of expertise

- Requirements Engineering

- Agile Development

- Big Data Analysis

- Block chain development

Impact of research

- Developed a goal oriented requirements analysis model for creating web applications so that the applications are aligned to stakeholder expectations and require fewer iterations. This model bridges the gap between the web designer and stakeholder visualizations of the web application specially focusing on the non-functional aspects of the application.

- Elucidated different programming platforms for big data analysis focusing on the specific features each platform provides and their adaptability towards different applications.

Top five publications

- Cao, J., Chawla, S., Wang, Y., & Wu, H. (2017). Programming platforms for big data analysis. In A. Y. Zomaya, & S. Sakr (Eds.). Handbook of Big Data Technologies (pp. 65-99). SpringerLink. doi:10.1007/978-3-319-49340-4

- Chawla, S., Srivastava, S., & Bedi, P. (2016). Improving the quality of web applications with web specific goal driven requirements engineering. International Journal of System Assurance Engineering and Management, 8(Suppl 1), 65-77. doi:10.1007/s13198-015-0385-z

- Chawla, S., Srivastava, S., & Bedi, P. (2015). A qualitative forward reasoning approach for evaluation of WebGRL diagrams. Journal of Information and Systems Management, 5(1), 1-15.

- Chawla, S., Srivastava, S., & Bedi, P. (March, 2014). Evaluation of web-specific goal oriented requirements language models with quantitative reasoning. ACM SIGSOFT Software Engineering Notes, 39(2), 1-9. doi:10.1145/2579281.2579295

- Chawla, S., Srivastava, S., & Malhotra, D. (2013). Goal based requirements analysis using WebURN. International Journal of Computer Information Systems and Industrial Management Applications, 6, 248 - 256.

Further Information
JCU Research Profile

Information Technology teaching programs at James Cook University

The Singapore campus of James Cook University offers undergraduate and postgraduate programs in Information Technology and Game Design. As an IT student, you will be entitled to membership with two professional bodies: The Institute of Electrical and Electronics Engineers (IEEE) and the Singapore Computer Society (SCS).

Bachelor of Information Technology

This course brings together the knowledge and skills that are essential for professional IT careers along with subjects in interactive visualisation, games, big data and data mining, interactive 2D/3D graphics and web technologies, mobile technologies, programming and design thinking, and programming.

This course is accredited by the Australian Computer Society (ACS). Graduates are eligible to apply to join the ACS.

Bachelor of Information Technology graduates will be able to:

• Demonstrate essential knowledge for a career in technology related professions and practice;

• Synthesise industry standard and underlying principles and concepts for decision making;

• Critically evaluate data & resources in the context or relevant academic literature;

• Apply critical thinking to address IT related issues;

• Demonstrate the ability to work collaboratively

For further information on our courses, email admissions-singapore@jcu.edu.au or visit www.jcu.edu.sg

Master of Information Technology

Our Master of Information Technology program provides practical and relevant skills to allow graduates of different disciplines to move into the IT industry. Students have an opportunity to specialise in Business Informatics, Computing and Networking or Interactive Technologies and Games Design.

In the expanding e-Business/e-Commerce industry, there is a growing global demand for graduates skilled with a mix of marketing, management, internet, multimedia, computing, networking, software technologies and business operation skills.

Our Master of Information Technology program is fully accredited by the Australian Computer Society at the 'Professional Level' (its highest level).

Doctor of Philosophy (PhD) and Master of Philosophy

The Doctor of Philosophy (PhD) is a program of supervised original research. It culminates in the submission of a thesis that demonstrates the ability for critical analysis and research that makes a significant and original contribution to the knowledge and understanding of the field of study.

The Master of Philosophy offers postgraduate research supervision on a smaller scale than the PhD, towards which it can provide a pathway.

IT Activities @JCUS ◣

The IT department offers lots of activities for the students to experience and engage with the industry while studying at James Cook University in Singapore. Aspects of the curriculum require students to work with industry on real-world projects. Guest lectures from industry experts, academicians and practitioners are conducted during the course of study to enhance the subject knowledge of students and expose them to the applications of their knowledge from time to time. There are various other special events organized like Game Jam and Hackathons wherein students from other universities and institutions also participate and compete. The students meet their peers and relevant personalities from the industry for valuable feedback and networking. Another regular two-day event is Design Sprint which is conducted at the end of term. This event is based on the Google Ventures Design Sprint methodology where our students work in randomly allocated teams across various levels of study and collaborate to develop a design solution for a real-world problem posed by industry.

Your Local Representative:

— James Cook University ——————————————————

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