JAMES COOK UNIVERSITY AUSTRALIA

Celebrating 50 YEARS 1970 - 2020

JCU Innovation Strategy 2020 – 2022

Message from the Vice Chancellor and President

Importance of innovation for the future of the university

Innovation has always been part of JCU's DNA. One of the distinguishing features of our University – and potentially one of our main competitive advantages – is the strength of our research, addressing the challenges and opportunities for the Tropics world-wide.

With three tropical campuses – Cairns, Singapore and Townsville – JCU is unique among Australian universities, woven into the intellectual, economic and social fabric of our tropical locations and set amid irreplaceable ecosystems and cultures that fire the intellects and imaginations of our students and staff.

At JCU we understand that innovation is not just about how science and technology can be applied to solve problems. The human dimension, how any innovation is developed, understood and applied by those whom it seeks to help, is critical to the success of any innovation.

Towards that end and to build upon this vibrant ecosystem, JCU's innovation centres are places to translate our research, our spirit of inquiry and our store of youthful talent and ambition, into products and processes with real commercial application, driving enhanced understanding as well as economic growth and vitality for northern Australia and the Tropics. Our engagement with and support for innovation, positions JCU at the forefront of what we consider to be the major growth opportunities in our region and beyond.

Professor Sandra Harding AO

Vice Chancellor and President

Messages from the Executive

In support of our commitment to investing in future enabling infrastructure and technologies we are deepening our engagement with northern Queensland to make it easier to do business with JCU. This is part of our long-term strategy to build 'innovation with impact' in northern Queensland through partnerships with industry. We are geared towards outcomes and so our aim is to provide the best possible environment to support innovation. We have a significant capability as one of the world's leading research universities. By working collaboratively, new ventures can be launched, partnerships established and significant economic outcomes can be achieved.

Professor Chris Cocklin
Provost and Deputy Vice Chancellor, Research and Innovation

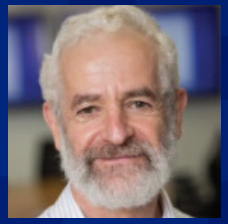
Universities, and particularly those in regional areas such as ours, have the ability to provide education, research, and innovation to help address issues and needs within our communities. Universities play a key role in society as knowledge creators, and are seen as impartial actors that are able to work with community and industry to develop interdependent innovation processes. Within the university's learning and teaching activities, we strive for innovation and are fortunate to provide facilities such as the JCU Ideas Lab, to encourage our students to explore new concepts, to look at challenges from all sides, and to engage and inspire the next generation of innovators and researchers. In turn, as our future leaders and professionals, they become linked in to networked processes of innovative knowledge creation.

Professor Maree Dinan-Thompson
Deputy Vice Chancellor, Students

The Division of Services and Resources embraces innovation in the provision of our services and continually strives for transformation in our service delivery. The importance of continual service delivery improvement lies at the heart of our remit where we aim to deliver innovative capability to support and enable the core functions of learning, teaching and research from the buildings we work in, the technology that supports our operations, a mobilised and flexible workforce, safe work places and services designed to deliver meaningful outcomes, more effectively and efficiently.

Tricia Brand
Deputy Vice Chancellor, Division of Services and Resources

Messages from the Executive



The Division of Tropical Health and Medicine's commitment to innovation has positioned JCU as a leader in tropical health and medicine. The Division has an exceptional record in the delivery of innovative, high-quality person- and community-centred human and animal health professional education and research for regional, rural, Indigenous and tropical communities. The rapid development and expansion of the Public Health and Tropical Medicine training program in the early 1990s; the roll-out of a comprehensive suite of health professional programs in human and animal clinical sciences in the late 90s and early 2000s; the establishment of the JCU Medical School, not only the first in Australia in 25 years but the first to be entirely located in a regional and remote area; and the establishment of the Australian Institute of Tropical Health and Medicine (AITHM) and the Tropical Australian Academic Health Centre (TAAHC) has been characterised by innovation, adaption and continuous improvement in education and research to meet the needs of the communities we serve.

Professor Ian Wronski AO
Deputy Vice Chancellor, Division of Tropical Health and Medicine

The record of achievement in research and innovation in the disciplines which make up the Division of Tropical Environments and Societies is long and storied. Since the very inception of James Cook University, and across a disciplinary spectrum which encompasses science and engineering, the social sciences, humanities, business and law, the intellectual endeavours of our scholars and scientists have played an indispensable role in establishing JCU as a globally-esteemed research University. Any contemplation of JCU's work in history, engineering, and marine science, to use three specific examples, reveals legacies that can only be described as profound. Our understanding of our national history has been entirely re-shaped by the colonial histories relations penned by Henry Reynolds; our nation's building codes have benefited from fifty years of engineering by the Cyclone Testing Station; and JCU's pre-eminence in marine biology has provided internationally significant insights into the management of tropical marine systems. Fifty years on, the Division's commitment to research and innovation is not merely unfettered - it is energised by new opportunities to partner with industry, civil society and government.

Professor Marcus Lane
Deputy Vice Chancellor, Tropical Environments and Societies

Innovation is a critical agenda for JCU at all of our physical locations since it supports our mission to support local economic growth; it also delivers enrichment for our students and staff and supports employability skills. Greying the boundaries between Academia and Business by leveraging our business networks can bring inspiring individuals into our classrooms leading to joint research projects, internships whilst enhancing the talent pipeline for business. Prior, to joining JCU Singapore I have worked in and with industry throughout my career as a Professor of Engineering and have an unequivocal commitment to innovation and entrepreneurships. I have established successful business incubators and angel networks in Europe and Asia and enjoy the stimulus that comes from working with innovative individuals and organisations.

Professor Chris Rudd
Deputy Vice Chancellor and Head of Campus Singapore

Vision for Innovation at JCU

Build and support a vibrant innovation ecosystem, expanding our innovation activity and partnerships regionally, nationally and internationally.

JAMES COOK UNIVERSITY AUSTRALIA

Celebrating 50 YEARS 1970 - 2020

FOUR FOCUS AREAS

- Innovative Culture
- Systems Optimization
- Enabling Environments
- Collaborative Innovation

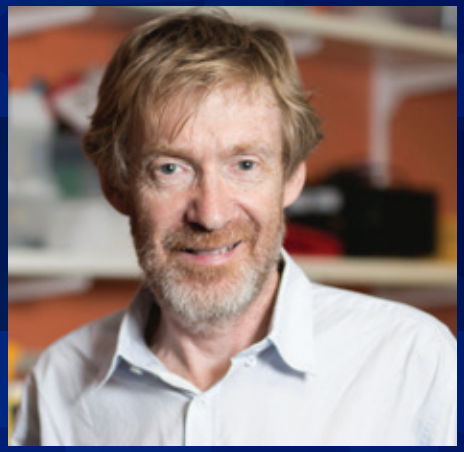
ENABLERS

- Talent
- Collaborative Partnerships
- Facilities
- Activated Innovation Ecosystem

SINGAPORE

CAIRNS

TOWNSVILLE



Professor Ian Atkinson

LIXIA - Living Infrastructure

Professor Ian Atkinson is a Tropical Leader and Director of the eResearch Centre at James Cook University. As Director of the JCU eResearch Centre he has the privilege of working with researchers to apply new and ever changing information and communications technology tools and methods to their research and amplifying their impacts.

Ian is a Director and Co-founder of LIXIA, a spin-off from Rockfield Technologies Australia and its collaboration with James Cook University. Mentored by the CSIRO ON Runway program, LiXiA is a 4th Industrial revolution (Industry 4.0) company that closely aligns with the Queensland Advanced Manufacturing 10-year Roadmap. LiXiA has a mission to accelerate the world's transition to safe, intelligent infrastructure.

The LiXiA Platform is a low-cost Internet of Things device (LiXiA-PUK) which collects engineering and environmental data from infrastructure assets. The data is transferred to the cloud where AI and physics are used to predict if the asset is safe and secure. Ian is one of four LiXiA co-founders who bring together over 50 years of experience from academic research organisations around the world, with expertise spaning science, engineering, business, informatics and IoT.

LiXiA is revolutionising infrastructure by developing low-cost, low-energy, wireless-based sensors for installation on critical infrastructure such as structures, utilities and light poles. Our sensors collect data and process it with cloud-based artifical intelligence, alerting you with key details.

FOCUS AREA

1

Create and support a culture of innovation which embraces the involvement of management, staff and students

Realise the potential of our people

Support and develop staff throughout the employment lifecycle, understanding that in doing so we are developing the leaders of the future. By nurturing our people ,we enable them to fulfill their ambitions and make a difference to tropical societies.

INITIATIVES

1.1. Develop and nurture a high performing, diverse and inclusive workforce.

1.2. Support an innovative attitude and culture within the organisation.

1.3. Embrace new career patterns expected by next generation employees and encourage a growth mindset.

Be a catalyst for innovation, connecting our region to the global knowledge economy

JCU is a part of the national and international innovation ecosystem, delivering foundation knowledge and applied research to support communities, industries and government.

INITIATIVES

1.4 Facilitate community-focused innovation events and programs to support entrepreneurship and regional development.

1.5 Facilitate global connectivity and seek to enhance our strategic education and research partnerships.

1.6 Develop stronger alliances with State of the Tropics partner universities to facilitate joint programs, reciprocal exchanges and knowledge transfer opportunities for staff and students.

Develop a culture at JCU that fosters idea creation and innovation across the university

Facilitate and support innovation and entrepreneurship as integral elements of our core business – education and research.

INITIATIVES

1.7 Improve innovation communication, coordination and advocacy.

1.8 Create an 'Innovation at JCU' visible presence in partnership with relevant internal and external stakeholders.

1.9 Establish flexibility and agility as operational priorities.

Dr Narayan Gopalkrishnan

Building and Sustaining Social Enterprises and Social Entrepreneurs

Dr Narayan Gopalkrishnan has been the driving force in the establishment and development of the Social Enterprise Network for the Tropics [SENT]. This network works with organizations and individuals in Far North Queensland and more broadly across Northern Australia, to build and sustain social enterprises and social entrepreneurs that can promote positive change in these areas.

SENT promotes the creation and enhancement of social and ecological value by using a market orientation and maintaining a clear focus on the primary social, cultural and ecological goals of social enterprises. JCU has played a key role in the establishment and further development of SENT, which continues to grow and support the Queensland social enterprise eco-system.

FOCUS AREA

2

Create and adopt processes and procedures to enable JCU to be a catalyst for innovation and connection

Create a vibrant internal innovation ecosystem supported by systems and processes.

JCU aims to develop and integrate innovative strategies to help diversify and simplify processes, develop new collaboration avenues and broaden commercialisation prospects.

INITIATIVES

2.1 Find new and innovative ways to support the commercialisation pipeline.

2.2 Refine and improve ways of working.

2.3 Create an 'Innovation at' JCU web page that provides information and resources for students, staff and our communities.

Innovate and Experiment

JCU aims to successfully exploit digital technologies for growth, for inspiring digital experiences, and for improving productivity and efficiency.

INITIATIVES

2.4 Grow existing research tools, platforms and partnerships to continue to enable world leading research.

2.5 Maximise our ability to adapt and adopt digital capabilities including cloud, Internet of Things (IoT) and mobile through engendering an agile and smart risk-taking culture of technology development and use.

2.6 Embed emerging technologies into our digital experience, including: artificial intelligence (including machine learning) and; augmented, virtual, and mixed reality.

Establish processes to support a culture of innovation

JCU will seek to refine processes to support and encourage the co-design of innovative solutions relevant to Tropical industries and research funding partners.

INITIATIVES

2.7 Create a flexible environment that encourages staff, students and partners to design, test and pivot or preserve ideas.

2.8 Develop and maintain collaborations with industry to aid our students in developing skills that will be crucial in their professional and personal development.

2.9 Equip and support our staff with digital tools and technologies that support agile and collaborative ways of working.

JCU Design Sprint

The JCU Technology Design Sprint provides students from a variety of disciplines with the opportunity to apply design thinking and experimentation to solve real-world challenges. The Sprint has been running for a number of years and is an engaging, fast-paced, iterative design process based on the model developed by Google Ventures.

JCU students from IT, Engineering and Science put their heads together to introduce innovative solutions to real-world challenges, with the topic changing each year. Students receive mentorship from industry members across the international, national, and local business sectors. These established relationships assist JCU students making industry connections and showcase the incoming talent expected to enter the workforce in the coming years.

FOCUS AREA

3

Create environments to inspire innovation and collaboration

Establish Innovation Centres on the Townsville and Cairns Campuses.

Build environments that inspire innovation and collaboration, where students, staff and the community are welcomed.

INITIATIVES

3.1 Facilitate co-location of industry within innovation centres.

3.2 Cultivate an environment within the innovation centres that challenges operating constraints and seeks to respond to commercial operating contexts.

3.3 Create vibrant learning and innovation hubs at JCU locations that bring students, industry and the community together.

Create a vibrant knowledge community inspired by our place in the Tropics.

Establish JCU as a valuable member of the innovation ecosystems in which we operate, locally, nationally and internationally

INITIATIVES

3.4 Create and foster partnerships and linkages with local, state, national and international organisations and governments to support our research and innovation ambitions.

3.5 Develop opportunities for students to engage with innovation and entrepreneurship through, for example, start-up workshops, research internships and the new innovation centres.

3.6 Support our local communities through strategic partnerships, sponsorships and professional development programs.

Bring global perspectives to our regions

JCU aims to provide global perspectives and connection through strategically selected collaborations and partnerships that work to strengthen our local communities.

INITIATIVES

3.7 Present JCU's narrative and stories in a compelling way to strengthen our brand, create engagement and to bring students, researchers and staff to the Tropics.

3.8 Bring opportunities to our region by facilitating connections with Singapore.

3.9 Facilitate development and exchange of innovations that contribute to livability in our region.

CITY LAB

Urban Thinkers Campus: Urban Design, Economic Growth and the Jobs of the Future in the Tropics

In the last 10 years, the population of the Cairns region has grown on average 1.9 per cent annually. Predictions are that two thirds of future population growth in Tropical North Queensland will be in the Cairns region, presenting unique challenges for urban and economic development. JCU's Dr Taha Chaiechi, Australian Director of the Centre for International Trade and Business in Asia (CITBA), is spearheading a collaborative approach to these challenges with the 2019 Urban Thinkers Campus (UTC).

Taha, an applied economist, says she has one clear goal. "My ultimate goal is that we understand a framework, or develop a toolkit, that we can use for the future in order to create climate resilient cities. Cities that are not only a place to live but places that are business destinations, and social destinations, so everything together."

The difference of the UTC model is the required inclusion of a diverse cross-section of the population in the discussion of issues and the formulation of solutions. "You have to involve the local authorities, you have to involve academia, private organisations, women, children, youth, and older persons, professionals, businesses, farmers, Indigenous peoples, so it has to be participatory and inclusive."

While the Cairns UTC event formulates solutions to local issues, it will contribute to a constellation of events that create change on a global scale. "The report [from the Cairns UTC] goes back to the United Nations Habitat and everybody can see it becomes a learning tool as well for other areas and regions, so it's a dialogue that starts at a small scale and becomes really huge and global."

This event forms part of a larger collaborative project between JCU's Three Tropical Campuses, Jacob Wood, Associate Dean of Research for the College of Business, Law and Governance (CBLG) and and Taha Chaiechi, CITBA Australian Director, lead a team of academics from the CBLG and the College of Science and Engineering that researches the issue of "Community empowerment, transformative cities, and building a climate-resilient economy".

Directly aligned with Sustainable Development Goals (SDG) 8, SDG11, SDG13 and SDG17, the flagship project seeks to examine two key objectives.

Explore the hidden relationships that exist between socio-environmentally responsible communities and their ability to unlock inclusive and sustainable growth capacities.

Provide empowered solutions for capacity building within communities so as to facilitate climate-change actions, and achieve our vision for the development of transformative cities.

FOCUS AREA

4

Collaborative Innovation

Develop strategic partnerships

Our aim is to provide global perspectives and connection through strategically selected collaborations and partnerships that work to strengthen our local communities.

INITIATIVES

4.1. Engage with industry, community, and public sector partners to accelerate our capacity for innovation.

4.2 Deliver innovation challenges in key industry sectors such as agriculture, health, tourism and the environment.

4.3 Build and strengthening partnerships with key industries within our local communities and build leadership capacity to support them to compete on a local and global scale

Deliver experiential learning

Facilitate opportunities for the delivery of experiential learning across the whole innovation cycle from ideas to impact.

INITIATIVES

4.4 Facilitate experiential learning opportunities in the art of innovation, entrepreneurship and intrapreneurship.

4.5 Provide intellectual leadership around the challenges and opportunities facing the Tropics.

4.6 Cultivate opportunities for staff and students to develop solutions to emerging issues faced by the university and our partners.

Global Connectivity

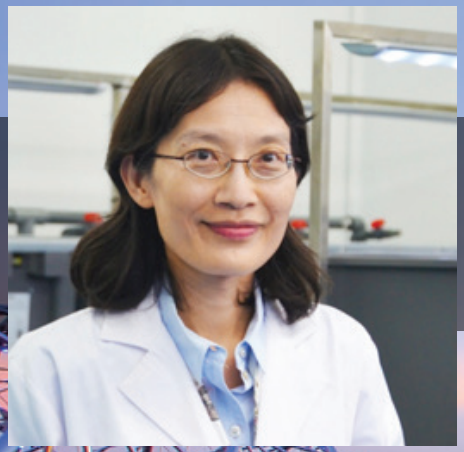
Develop and foster linkages with the global innovation ecosystem in support of commercalisation and entrepreneurship.

INITIATIVES

4.7 Establish an incubator program designed to support and foster regional start-ups.

4.8 Establish linkages with global landing pads and avenues for venture capital to support internationally focused spinouts, start-ups and scale-ups.

4.9 Increase collaborative research through international partnerships.



Dr. Katheline Hua

Associate Professor and Principal Research Fellow in Aquaculture

Dr. Katheline Hua, Associate Professor and Principal Research Fellow in Aquaculture at the Singapore campus of James Cook University, is an expert in aquaculture nutrition. Her primary research interests are to achieve a better understanding of nutrient requirement and utilisation of fish and crustacean, to develop cost-effective feeds to enhance growth and health of aquaculture species, and to investigate nutritional strategies to promote sustainable aquaculture practice.

Katheline developed a series of nutrient digestibility models to estimate digestibility values of lipid, starch and phosphorus. The models are being used as feed formulation tools by academic researchers and feed producers. The phosphorus digestibility model is the first nutrient digestibility model that has been developed and published in the fish nutrition field.

Dr Hua developed growth models and nutrient requirement models that estimate nutrient requirements and utilisation of feeds throughout life stages of different fish species. By taking into account the effects of biological and dietary factors, requirements of nutrients are made dynamic and flexible based on the response of fish at a defined life stage to a specific dietary composition to achieve a certain growth performance. Her recent recommendations of essential amino acids requirement are made for fish of different body sizes for the first time in fish nutrition, instead of the common practice of using single values across all life stages.

Paragen Bio: *Northern Queensland biotech company targeting autoimmune diseases with Hook Worms*

Paragen Bio, the first biotech startup from James Cook University (JCU) is focused on treating autoimmune diseases. Paragen's technology is based on research with parasitic hookworms which was conducted at JCU's Australian Institute of Tropical Health and Medicine (AITHM) by Professor Alex Loukas and team.

The technology was developed at JCU with support from the Australian Research Council, Queensland Government, and National Health and Medical Research Council (NHMRC).

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