

Emma Letitia Johnston (1973–2025) AO FRSN FAA FTSE

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Emma Johnston's life exemplified what was possible for a smart and accomplished person to achieve in what was perhaps a golden age in universities in Australia. She was the product of a superb tertiary education system, and she used her learning and talents to give back and make our world better.

One can see a pattern of dedication and excellence at every stage of Emma's life, with her capabilities and commitment providing opportunities for leadership, and her leadership making significant contributions to education, to the environment, and to the advancement of society, particularly in the area of science, and the advancement of women and of inclusion more generally.

Her early years were spent in Williamstown, a seaside suburb of Melbourne. Like many Australian kids she enjoyed the outdoors, especially swimming, snorkelling, and sailing. Her parents were well-educated.

Her father was an applied mathematician with a doctorate in chemical engineering. Her mother was also qualified in chemistry, but had broad interests, including painting. Emma was a gifted student. She attended one of the few selective public high schools in Melbourne, University High School, and ended up being Dux of School. From this early age she was already committed to conservation and reform, and campaigned against a carpark that threatened green space in the school, successfully. Today, one of the School Houses is named in her honour.

The pattern of seeking leadership, not through vanity, but through a desire to preserve and improve the world, continued at university. She studied science at the University of Melbourne, and she engaged in student politics. She was deeply committed to the student newspaper *Farrago* and ended up being elected as the President of the Student Union. Like many students, for Emma the campus was not enough, and she led efforts to improve human rights in East Timor, an international trouble spot at the time.

I have spoken to many who knew her when she was a student and they talked of her charm, talent, drive, focus, purpose, and above all an emerging charisma. As her capability and knowledge developed, this charisma would become increasingly evident and would allow her to engage, inspire, and influence throughout her career.

After graduating in 1997, with a first-class Honours degree in marine biology, that included other subjects, such as the history and philosophy of science, Emma embarked on her PhD at the University of Melbourne. She formally graduated in 2002, and even before the ceremony had been engaged as an Associate Lecturer (Level A) at the University of New South Wales (UNSW), in the Centre for Marine and Coastal Studies, in the School of Biological, Earth, and Environmental Sciences, known locally as BEES. She was to spend 21 formative years at UNSW.

Level A is the lowest academic rank, and often new junior staff are given heavy teaching loads and charged with updating the curriculum. Emma was no exception, and she “dived in” and set about reforming and improving the curriculum, engaging colleagues across the School. It is often hard to quantify and make visible the contributions that top academics make via teaching (whereas research can be measured by agreed though often contested metrics). Nevertheless, I would calculate that perhaps 10,000 students benefited from the teaching reforms that Emma introduced, and from the inspiring dedication to teaching that she embodied in the early years of her career. The whole culture of teaching in her School benefited.

She was promoted to Lecturer (Level B) in 2004, then went, as a Visiting Researcher, to the Marine Biology Association, Plymouth, UK in 2007. She was promoted to Senior Lecturer in the same year. Moreover, in 2007 she received a New South Wales Tall Poppy Award for excellence in both science and the communication of science. Her future would unfold along these lines.

I first met Emma properly in 2010 when I joined UNSW as Dean of Science, a role in which she would succeed me. The first thing I noted was her smile — she always lit up a room. She was always quick to smile and had a playful, energetic, and often cheeky demeanour. I’ve observed elsewhere that if Emma had been an animal, she would have been a dolphin.

The next thing I noted about Emma was her humility. She was a naturally modest person — I think the Australian culture often tends to embed humility in talented people — but fortunately she was already growing in confidence and in strength, as she enjoyed success after success. Thus, though modest and self-effacing, she would ultimately become a fearless academic leader and reformer.

2010 was an important year for Emma. By this time, she had developed a strong research profile. She became Deputy Director of the Evolution and Ecology Research Centre at UNSW (one of the many impressive local academic centres in the university), and she became an Australian Research Council Fellow. This was very important, as it provided time for research, and beyond that it marked her as a “research star.” There are very few of these fellowships, so they serve as distinctions, almost prizes, that signal excellence. Emma’s excellence, which was easy to see if you were at UNSW, was about to become increasingly widely evident.

The Sydney Institute of Marine Science was established in Chowder Bay, not far from Sydney Taronga Zoo, in 2005, making use of various buildings on the beautiful Sydney foreshore. It was supported by a collaboration between four local universities (UNSW, the University of Technology Sydney, Macquarie, and Sydney). Emma was

always a prominent scientist there; in 2012, she was formally appointed Director of the Sydney Harbour Research Program. This project was a dedicated and comprehensive effort to capture the biology, ecology and human interactions of our remarkable harbour, a place that boasts more species than the entire Mediterranean Sea. The work required a gifted and collaborative leader as it would involve multiple universities, government agencies, and our nation's oldest museum, the Australian Museum. A large number of influential people came to know Emma at this stage. Her contributions beyond the university were just beginning to unfold.

I want to list and then expand on the range of activities that underpinned Emma's impact. Her undergraduate teaching and supervision of research students and post-doctoral researchers, though perhaps less visible, should be mentioned first. Second, her leadership in formal academic science, which I will detail below. Third, her outreach and science communication, for which she won multiple awards. And fourth, her contributions through formal leadership positions, in universities, and on government and other committees.

As a local group leader at UNSW, Emma had a huge impact in her discipline. The School she worked in — BEES — is very highly respected, with a clear purpose and multiple internationally recognised research stars. They happily co-exist in distinct specialities, so the School is somewhat less prone to the ego-driven competitions that beset some academic environments.

But beyond that, Emma and her colleagues deliberately set out to generate a culture of support and inclusion in their School. The 40 or more post-graduate

research students and research fellows Emma supervised attest to the culture of her group, as does the pride they had in seeing their work unfold. Their simple dedication to doing good science properly, often with very small budgets, necessitated the creation of equipment from household waste and repurposing old material lying around the department.

Specialised academic contributions often go unreported, perhaps because contributions to leadership and communication are more visible and more accessible. I will, however, list four of her most significant academic projects here.

First, she was an expert in ecotoxicology: how waste, particularly industrial chemicals in sediments, affects the biology of ecosystems. She showed that dredging up settled waste that had been laid down, long before many restrictions of chemical effluents were in force, could make matters worse. Her work on dredging and waste informs current practices on dredging in Sydney Harbour and beyond.

Second, Emma was an expert on invasive species. Australia has strict border security rules in an attempt to limit such invasions, but ships from abroad arrive every day. Emma noted that invasive species often gained footholds in the most polluted local environments. This is because the species had often pre-adapted to polluted conditions in more heavily polluted regions abroad. Her approach was unique, in that she relied on field observations and combinations of stressors to provide results that reflected the real-world situation. Her insights have ensured that monitoring for invasions focusses on areas where pollution is known, because these are likely to be the first places to be colonised.

Third, Emma studied the impacts of desalination plants. With annual rainfalls diminishing across the south of Australia, desalination has become a priority; across the world with population growth in areas with little rainfall, more and more such plants are being built. But desalination plants discharge high-salinity water into the sea, as they extract fresh water for civic purposes. The question was: would this high salinity water be detrimental to the local ecosystems? Emma's work showed a surprising result: no. Coastal ecosystems were quite resilient to high salinity through flows, but very fast flow rates could damage the environment. This knowledge now informs how desalination plants are planned, with saline discharge allowed, but flow rates carefully monitored.

Finally, Emma helped formalise systems for measuring the health of coastal ecosystems. Historically, labour-intensive observations and collections by individual researchers were necessary, with key indicative species being counted. Emma developed structured processes; significantly, she started using "environmental DNA sequencing," which allows the extraction of DNA from sea water samples and its total sequencing. This can reveal both the range and abundance of different species, large and small, and can give an almost instant and comprehensive snapshot of the ecosystem. Her approach, together with traditional sampling, can be particularly useful in detecting impacts of environmental events such as large bushfires, and Emma's work on their effects was particularly well received.

For her research, Emma won the 2012 Premier's Prize for Science and Engineering for Excellence in Biological Sciences (Environmental Science); in 2014, she won the

Australian Academy of Science's Inaugural Nancy Millis Medal for Women in Science; and in 2015, the Society for Environmental Toxicology and Chemistry AU Mid-Career Medal. In 2016, she gave the Canadian Rivers Institute Distinguished Hynes Lecture, and in 2018, she won the Royal Society of New South Wales Clarke Medal for Zoology.

Most people who knew Emma would have known her, not through her actual science, but via her scientific outreach. In 2012, she was invited to be interviewed by the producers of *Coast Australia*, a documentary series that would be shown initially on the BBC and Foxtel. Her stage presence and knowledge were so instantly captivating that she was invited to feature as a scientific expert as the series unfolded. She was a writer and presenter from 2013 through to 2021, throughout all four series of the show. She managed all this while maintaining her teaching, her research, her administrative roles, and, of course, while supporting her family.

Emma won an Australian Museum Eureka Prize for Promoting the Understanding of Scientific Research in 2015. She was also a member of the team that won the 2018 Eureka Prize for Science Journalism for a one-hour documentary on the Great Barrier Reef that she wrote and presented.

All these highly visible achievements now increasingly led to invitations to apply and be appointed to important leadership roles. It is notable that in each case she assumed such roles with her usual view of conserving and improving the world, rather than, as is sometimes the case, to feed a burning ambition to be in charge.

From 2012 to 2016, she was a member of the NSW State Government Marine Estate Expert Knowledge Panel. In 2016, she was

the lead author of the Australian Government's "Australia State of the Environment 2016: Coasts" report, and later in 2021, the co-chief author of the entire report. She became a Director of the Great Barrier Reef Marine Park Authority in 2016, and she contributed to overseeing another great marine sanctuary as Deputy Chair of the Antarctic Science Foundation from 2017 to 2021. She was also a lead investigator on the Australian Research Council's 2021 Special Research Initiative, "Securing Antarctica's Environmental Future." She made invaluable contributions via both hands-on studies and leadership in Antarctica.

Many of her most prominent contributions to science strategy, policy, and the community came via her roles in Science and Technology Australia, a national peak body that represents over 100 different scientific societies and 200,000 professional scientists and technologists in Australia. From 2012 to 2019, Emma served as a Council member, then Deputy President, and finally as President of this organisation. She gave a speech at the National Press Club in 2018 about the importance of science and support for science in Australia, and she was instrumental in initiating and supporting a range of new projects.

Perhaps the most notable initiative is the Superstars of STEM (Science, Technology, Engineering, and Mathematics). She had a very strong appreciation of the importance of role models, and wanted to ensure that the next generation was inspired by seeing junior women and non-binary scientists succeeding in their professions. Emma firmly believed that "you cannot be, what you cannot see," or at least that seeing your destination helped to get you there. The Superstars of STEM programme started

showcasing around 30 up-and-coming scientists each year and was so successful that it expanded in following years. She also worked very closely with Lisa Harvey-Smith, Australia's Women in STEM Ambassador, who did important work, not only on strategies to improve access but on the efficacy of those strategies.

Finally, I come to Emma's leadership roles in universities. She was promoted to Associate Professor in 2011 and to Professor in 2014. In 2015, she was made an offer by another top Australian university; I was charged with retaining her at UNSW. We discussed what might keep her here. Her primary concern was neither salary nor research resources: it was the opportunity to mentor and develop up-and-coming academics. This work lay primarily with the Pro-Vice-Chancellor Research; she explained to me how that was the job that could keep her at UNSW. I understood at once but explained that we already had someone in that role. She confidently said that she was sure we'd find a way. Indeed, through collegial discussions, we did find a way forward, and she served as PVC Research until 2017.

At that stage, the Dean of Science role had become vacant and I, as the former Dean, was again charged with identifying suitable candidates. Again, my conversation with Emma did not unfold as I had envisaged — I considered the role of Dean of Science at UNSW to be one of the best jobs in the sector, because science is such a strong faculty at UNSW — but this time Emma was hesitant. She was well aware of the commitments required and the need to balance bureaucratic heavy lifting with many ceremonial occasions, while also keeping in touch with her own research and teaching. But happily, she was eventually convinced

to apply for the role. She was appointed and served as one of the most loved and admired Deans UNSW has ever had — and it has had some very good Deans.

Now, Emma was one of the most visible scientists in Australia.

When the job of Deputy Vice-Chancellor Research at the University of Sydney became available, she was snapped up in 2022, and did excellent work in the role. I know that the injection of a new face with so many practical ideas and such a positive outlook was very much appreciated by many of my own former colleagues still at Sydney. In 2024, she was identified as the new Vice-Chancellor of the University of Melbourne, and returned to her alma mater to help guide that outstanding institution.

Again, Emma's time at Melbourne was appreciated by all those I have spoken to there. Melbourne has always been a leading Australian university, but morale had faltered during the many COVID lockdowns in Melbourne. Furthermore, student politics and protests, especially around the awful crisis in the Middle East, had become more and more visible and divisive.

It is hard to imagine anyone better equipped to restore positivity in Melbourne. As a former student leader, it was hard to frame her as an out-of-touch or self-interested manager. As a star researcher, she represented hope for those committed to building Australia's capacity in research and belief in science. As an inspiring, award-winning university teacher and science communicator, it was clear that teaching would be highly valued on her watch. And finally, as a superb mentor and supporter of women and disadvantaged groups, it was also clear that Melbourne would continue with its efforts to throw open its doors and

provide opportunities for students of potential wherever it could. Morale at Melbourne soared.

At the excellent commemorative event held at Wilson Hall at the University of Melbourne, where Emma (and indeed I) had sat tens, if not hundreds of exams long ago, Emma's former students, colleagues, mentors, and even the Education Minister Jason Clare, spoke of her contributions and her capabilities, and recounted heart-warming and heart-wrenching stories of her life and achievements. Her husband Sam Maresch, an expert in renewable energy systems, spoke superbly, at this and other events held in Sydney. The then-Chair of the Australian Tertiary Education Commission and former NSW Chief Scientist and Engineer, Mary O'Kane, also spoke in Melbourne and later in Sydney. At the events were: many of Emma's mentors; Peter Steinberg, who had been inaugural Director of the Sydney Institute of Marine Science; Rob Brooks, who had set the standards for supportive lab cultures in his Evolution and Ecology Research Centre; her students, most notably Katherine Dafforn; and her colleague Kylie Walker from the Science and Technology Australia, who had helped found Superstars of STEM. Her children Amelia and Antonin and their friends also attended several of the events. There were others, of course, who had worked with Emma, or had been led by Emma, or had learnt from Emma.

Emma was a star and she was recognised as a star, being welcomed as a Fellow of the Australian Academy of Science, the Academy Technological Sciences and Engineering, the Royal Society of New South Wales, and she was appointed as an Officer of the Order of Australia in 2018.

She was taken away from us too soon, and we lost future contributions she might have made when she died from complications of cancer.

But her story was not taken away. It is a story of dedication to learning, of seizing of opportunities, of focus and hard work, of using leadership to give back, of inspiring through purpose, and of growing confidence through application and success. It is an inspiring story. It shows what can be done and what should be done. It shows the importance of teaching and the importance of science, and the importance of excellence. It shows also the importance of

humanity and of putting support for others first. The achievements of any single day are often invisible — even the achievements of a lifetime can be hard to identify — but good work does have good impacts. Australia is a good place to live, and it has an environment which is still, in many places, like the Garden of Eden, and is the envy of the world. Emma saw all that from an early age and worked to try to ensure that in this garden the opportunities that it offers would be available to all and forever. She never stopped talking about saving the planet. We should also continue to learn and work to deliver what we can.

