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Scott William Sloan 1954–2019

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Scott Sloan (1954–2019) was a leader of academic engineering in Australia and beyond, as evidenced by his numerous professional accolades and important research achievements, which have had significant impact on his chosen profession of geotechnical engineering. Educated in Australia and the United Kingdom, he returned to Australia in 1984 and developed a large and active research group at the University of Newcastle, and tackled a wide range of important problems in civil and mining engineering. These include the development of computational methods to predict the mechanical behaviour of soil and rock masses, and his pioneering methods to predict the collapse states of structures made of, on, and in, earth materials, allowing engineers to design cheaper and safer civil infrastructure around the globe. Sloan established long-standing international collaborations and was awarded many honours for his research achievements. He was also a keen and skilful fisherman and a more than competent blues guitar player.

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Introduction

Professor Scott William Sloan died suddenly on 23 April 2019, on board a charter fishing boat, while on a family sports-fishing holiday along the coast of the Gulf of Carpentaria in far north Queensland. His unexpected demise, while pursuing one of his great passions, in one of his favourite locations on the planet, was a shock to all who knew him, and robbed the international geomechanics community of one of its most talented members.

Sloan was distinguished for his service to geotechnical science and engineering, engineering mechanics, his contributions to higher education and industry, and his roles in a range of national and international professional organisations.

He was one of the most eminent engineering academics in Australia and beyond. From the late 1970s onwards, he was a pioneer of modern research methods in the discipline of geotechnical engineering that is often considered to be a sub-discipline of civil engineering but has broader application, particularly in mining engineering, environmental engineering and the resources sector. He was an academic at the University of Newcastle from 1984 until his untimely demise in 2019, and head of a very large research team comprising academic and support staff from the University of Newcastle as well as the University of Western Australia and the University of Wollongong. He had an outstanding academic career, as described in more detail below.

Sloan is survived by his wife, Denise Hayes, and his three children, Erica, Oscar and Rory, of whom he was immensely proud.

Early life

Scott Sloan (Figs 1, 2 and 3) was born in the Murray River town of Mildura, on the New South Wales (NSW)/Victoria border, on the second day of July in 1954. He was the first child of Bill and Iris Sloan. Being born under the water sign of Cancer, the Crab, was probably an omen for an important aspect of his later life, his passion for fishing. Sloan had a younger sister, Lesley Ann, who died soon after her birth in 1957. So, for most of his upbringing, Sloan was effectively an only child.

Fig. 1. Scott Sloan on his election to the Australian Academy of Science, 2007. Photographer unknown. Reproduced with the permission of the Australian Academy of Science.

Little is known about Sloan's childhood, other than the snippets he would occasionally reveal to family and friends in private conversations. Indeed, he was a very private person, to the extent of even being somewhat mysterious—at least about his early life.

It is known that he undertook his early schooling in Mildura and spent a lot of time fishing in the Murray River for Murray Cod and

other local fish species. It is reasonable to assume that there on the Murray is where his life-long love of fishing was nurtured, and his considerable skill and knowledge of sports fishing were developed. From an early age he loved dogs, and when he was a child his family kept Fox Terriers.

On his own admission, Sloan was a 'weedy asthmatic' as a child and was bullied at school. However, his mother encouraged him to read, which he did avidly, and became 'bookish'. Words provided a sound defence and comfort to him. He also spent an extended period as a young boy living with his grandmother in Paddington in Sydney, while his parents grieved for his dead sibling. It would have been exciting for a country boy to live, albeit temporarily, in the inner suburbs of a big city on Australia's east coast and he later reflected fondly on the experience.

Fig. 2. Scott Sloan as a boy in the 1960s. Photographer unknown. Reproduced with the permission of Denise Hayes.

Around the time Sloan entered his teens, the family moved to Clarkefield, near Sunbury, north of Melbourne in Victoria. When he was in year six of his schooling, Sloan won a scholarship to attend the prestigious Geelong Grammar School, but his mother would not let him go to boarding school, something Scott regretted. Instead, he completed his high school education at Sunbury High in 1971.

While living at Clarkefield, Sloan's involvement with pet dogs continued. His truck-driving father kept, bred and raced greyhounds, and he had a small training track for them on the family property. Sloan was undoubtedly a keen lover of dogs, but there is no evidence he shared the same passion as his father for dog racing.

University studies

Sloan entered Monash University in Melbourne in 1972, where he graduated a Bachelor of Civil Engineering with first-class honours in 1975. He taught himself to play blues guitar and briefly considered following a musical career. He subsequently obtained a Master of Engineering Science at Monash in 1978, where he was supervised by the late Professor Ian Donald, an important early influence on him and his chosen career trajectory.

At the end of his time at Monash, Sloan won a competitive scholarship to study at the University of Cambridge. He was a postgraduate student at Trinity College, and conducted research within the Cambridge Soil Mechanics research group, under the supervision of Dr Mark Randolph (who later was appointed as a professor at the University of Western Australia). He graduated with an MPhil and a PhD in 1982, the latter for his original research on numerical analysis of incompressible solids.[1]

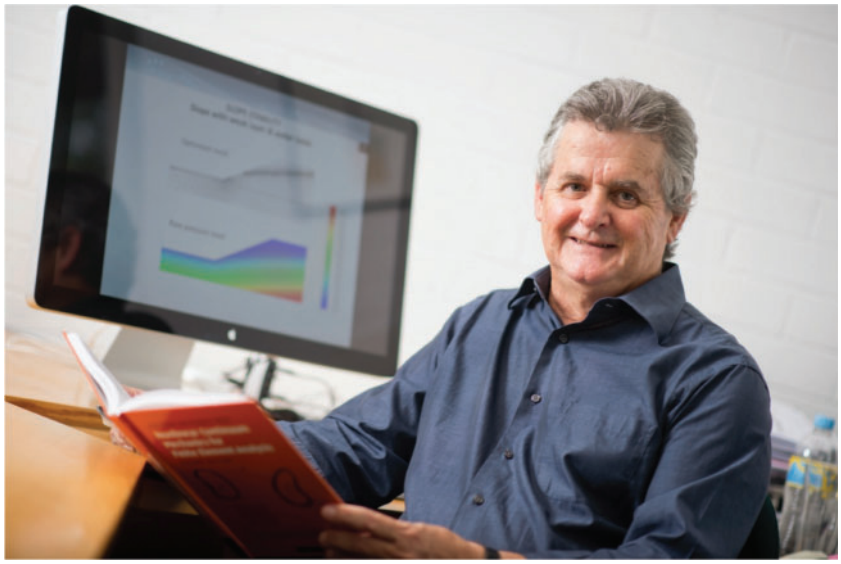

Fig. 3. Scott Sloan *c*. 2015. Photographer unknown. Reproduced with the permission of the University of Newcastle.

[1] Sloan (1982).

After Cambridge, Sloan moved to the University of Oxford to continue his engineering research career under the supervision of Professor C. Peter Wroth, who had moved from Cambridge to Oxford to head the Department of Engineering Science a few years earlier. Sloan held a W. W. Spooner Research Fellowship at New College, while at Oxford. He also spent a brief period at the University of Sydney working with one of his mentors, the late Professor John Booker.

In 1984, Sloan moved to Newcastle, NSW, as a lecturer in civil engineering. He met Denise Hayes in Newcastle in 1988 and they were married in 1996. He remained an academic member of the University of Newcastle for the rest of his life.

Newcastle academic

Sloan rose rapidly through the academic ranks at the University of Newcastle being promoted to senior lecturer in 1989, associate professor in 1993 and a full professor in 1998. For much of his career at Newcastle he taught undergraduate courses in geotechnics and engineering mechanics. He was a talented teacher and did much to update the undergraduate curriculum and contributed (with others) to making it one of the most respected civil engineering degree programs in Australia.

Sloan was also keen to collaborate internationally and in 1998 and 2002, when his children were very young, he spent two sabbaticals as a visiting professor at the Department of Geotechnical Engineering and Geosciences at the Universitat Politecnica de Catalunya (UPC) in Barcelona, where he is fondly remembered. During his second stay, he considered himself fortunate to live in the same condominium and share the swimming pool, coffee and many hours of discussion with one of the pioneers of finite element analysis, Professor Oleg Zienkiewicz.

In 2008, he was awarded one of only six Laureate Professorships at the University of Newcastle, in recognition of his research standing and achievements to that date. From 2004 to 2009 he was awarded a highly competitive Federation Fellowship by the Australian Research Council (ARC) and from 2009 to 2014 he held a prestigious Laureate Fellowship of the ARC. He had a stellar academic career and built an enviable international reputation based on, in equal measure, his research performance and findings, and his amiable personality. He was a great advocate for civil engineering and professed his discipline of geotechnical engineering very convincingly and very effectively over the course of his career. His tenacity and skill in both research and grantsmanship combined most effectively to convince successive referees and assessors that they should support his research and that of the group he had built up at Newcastle.

Major research contributions

Objective statistical information on research performance reveals that Sloan was simply one of the world's most prolific and most highly cited geotechnical researchers. He was the author of almost five hundred technical articles published in journals and conference proceedings,[2] with most being peer reviewed. He worked on a variety of problems, but the common theme pervading all his work was a search for rigorous computational methods that could readily be adopted in engineering practice to solve problems of practical significance. He made many lasting advances in a variety of areas, as described in more detail below. He strove for excellence in everything he did, and research was no exception.

Finite element limit analysis

Sloan pioneered new computational methods that now enable engineers to predict the ultimate limit states of general types of geostructures, such as roads, railways, tunnels, building foundations, dams, port facilities, pipelines, mining operations, and offshore oil and gas facilities. These methods evolved collaboratively with colleagues over almost the entire span of his academic career, but it was clear that Sloan was a driving force and inspiration for these developments. It is this body of work for which he was probably best known.[3]

In lay terms, these ultimate limit states refer to the sets of conditions under which structures would collapse or otherwise fail to perform their design function, usually due to the application of excessive load. Predicting such circumstances forms a critical part of all good engineering design. Knowing how much load a structure, including geostructures, may carry before it collapses is a fundamental consideration in design. The methods Sloan and his research team developed over the years have revolutionised this particular aspect of engineering and paved the way for the solution of problems that had previously been intractable.[4]

These methods are based on a combination of the limit theorems of classical plasticity, finite element analysis, and large-scale mathematical optimisation techniques, and are now known simply as finite element limit analysis.[5] They give the limit load directly, without the need to trace the complete load-deformation path, and they have the invaluable advantage of an inbuilt error indicator.

Being able to estimate the limit load accurately is crucial in most fields of engineering, but especially so in geotechnical engineering design. It is particularly complicated in geotechnics by the fact that the behaviour of geomaterials—earth materials: soil, rock and groundwater—is often dilatant, nonlinear, heterogeneous, anisotropic and often highly dependent on the pore water pressures and ground water conditions. Sloan's methods delivered new tools for engineers to tackle these complex problems,[6] and have led to cheaper and safer designs for energy and transport infrastructure throughout Australia and across the globe. The theoretical solutions he devised supplanted many previous solutions of varying reliability that were often based on more approximate techniques. They formed the basis of his Rankine Lecture to the British Geotechnical Association in 2011, a most prestigious recognition of his standing in his chosen discipline.[7]

[2] Full details are contained in the Bibliography appearing in the Supplementary Material.
[3] Sloan (2013).
[4] For example, Indraratna and others (2016), Nazem and others (2008), Sheng and others (2003*a*), Sheng and others (2003*b*), Sloan and Randolph (1982).
[5] For example, Sloan (1988), Sloan (1989), Sloan (2013).
[6] For example, Augarde and others (2003), Ukritchon and others (2003), Wilson and others (2017).
[7] Sloan (2013).

High order elements for accurate finite element analysis

Sloan's early research involved conventional displacement finite elements. During his PhD research, Sloan proved that under conditions of plane strain and axial symmetry, high-order displacement finite elements yield accurate estimates of the limit load for incompressible elastoplastic material models (such as those that are used to represent the mechanical behaviour of clays) when tracking the full load path to failure.[8] In particular, he proposed the use of the 15-noded quartic triangle for accurate collapse load predictions under conditions of plane strain and axial symmetry. This element is now the benchmark for accurate displacement finite element simulations in geomechanics. Indeed, it is the recommended element in PLAXIS,[9] probably the world's largest selling commercial geotechnical finite element computer program, and is also implemented in other bespoke geotechnical codes including CRISP (developed at Cambridge), AFENA (developed at Sydney), OXFEM (developed at Oxford), and SNAC (developed at Newcastle).

Finite element algorithms for nonlinear problems

In the field of conventional displacement finite elements, Sloan made several other important contributions. Most notably he was the first to formulate explicit schemes for integrating elastoplastic stress-strain relations with adaptive error control.[10] These algorithms are highly effective for complex constitutive laws that are widely used to describe geomaterials and have been implemented in several leading finite element programs including ICFEP (developed at Imperial College), FEAP (developed at UC Berkeley), CODE_BRIGHT (developed at UPC Barcelona), ABAQUS, AFENA, and SNAC. His stress/load/time integration procedures remove the need for a trial-and-error approach and permit practising engineers to model accurately the response of geomaterials with very complex non-linear constitutive models.

Sparse matrix solvers

In non-linear finite element computations, a significant fraction of the overall computing time is spent solving sparse systems of linear equations. A system of linear equations is called 'sparse' if only a relatively small number of the coefficients of the equations' variables are non-zero. To minimise the computational time solving these sparse equations, Sloan formulated a new algorithm,[11] which became the benchmark for this task, with the relevant computer code now being used in the finite element programs ANSYS, PAFEC, LUSAS, FEAP, CRISP, ICFEP and IDEAS, as well as the (Harwell) HSL Library. This code has also been exported to several hundred universities, software companies, and research institutes worldwide.

Advanced analysis of rockfalls

Towards the latter part of his academic career, Sloan turned his attention to various other practical problems in geotechnical engineering. One of these was the analysis of rockfalls. Rockfalls pose a serious threat to Australia's and the world's road and rail infrastructure, as well as in open-cut mining operations. Due to their nature, rockfall events are notoriously difficult to predict reliably and even more challenging to model mathematically. For the last decade of his career, Sloan and his colleagues studied this problem using advanced laboratory and field testing, coupled with sophisticated discrete element modelling, that accounts for the effects of block shape, block composition and block size on rockfall barriers and wire drapery.[12] This has led to cheaper and safer drapery designs in mining operations in the Hunter Valley, NSW, and more cost-effective low-energy rockfall barrier designs for the NSW Roads and Maritime Services.

Unsaturated soil mechanics

During the latter part of his research career, Sloan also played a key role in field and laboratory studies of unsaturated expansive soils. This work, which was supported by the ARC and industry, had an immediate impact on the profession and its recommendations on the active depth of unsaturated soil were included in a revision of the relevant Australian Standard.[13] These changes directly affect the type and class of foundation that must be adopted for lightly loaded foundations on expansive clays in Australia and elsewhere. To complement this field and laboratory study, Sloan and his colleagues proposed efficient finite element algorithms for modelling unsaturated soil behavior.[14] New and conceptually rigorous constitutive models for unsaturated soils were also developed.[15]

Stochastic analysis

Geomaterials are generally stochastic in nature, although most current methods to predict their behaviour are based on deterministic analysis. Put simply, a deterministic approach assumes that there is a unique connection between the cause and the effect of an action, whereas a stochastic approach assumes that the cause and effect of an event may be related by chance. Or in other words, a stochastic approach includes the possibility of random factors influencing the relationship between cause and effect. To address this deficiency in the available predictive methods, Sloan and his colleagues initiated a program of research at the University of Newcastle to develop new stochastic methods based on random field theory, finite element limit analysis and Monte-Carlo simulation in order to predict the behaviour of slopes and foundations.[16] Concurrently, he and his research group formulated new stochastic procedures for assessing the reliability and performance of road and

[8] Sloan (1982).
[9] PLAXIS (2018).
[10] Sloan (1987), Sloan and Abbo (1999*a*), Sloan and Abbo (1999b).
[11] Sloan (1986).
[12] Giacomini and others (2012), Thoeni and others (2014).
[13] Anonymous (2011).
[14] Sheng and others (2003*a*), Sheng and others (2003*b*), Sheng and others (2004).
[15] Sheng and others (2004).
[16] Ali and others (2014*a*), Ali and others (2014*b*), Ali and others (2017), Tang and others (2018), Sun and others (2019).

rail embankments and foundations on soft soil.[17] These methods now permit engineers to quantify the likelihood of failure and have led to cheaper and safer designs of infrastructure built on problematic ground in Australia and elsewhere.

National soft soil testing facility

One of Sloan's important professional legacies is the establishment of a National Soft Soil Field Testing Facility (NFTF) near the town of Ballina in northern NSW.[18] The NFTF was established with major support from the ARC's Centre of Excellence for Geotechnical Science and Engineering (CGSE). Development of the facility was driven by challenges with soft soil engineering at the nearby Ballina Bypass motorway project, that were confronting the Ballina Bypass Alliance (consisting of NSW Roads and Maritime Services, Leighton Contractors, and the engineering consultancies AECOM, SMEC and Coffey). The idea to establish and fund the facility was taken up with enthusiasm by the CGSE under Sloan's leadership. Since its establishment it has been used very successfully to perform high-quality research with the aim of providing solutions to problems associated with energy and transport infrastructure founded on soft soils in Australia and elsewhere. This includes a comprehensive program of site investigation to characterise the distribution and mechanical behaviour of the soft soils at the site,[19] a comprehensive program of laboratory tests on those soils,[20] and the construction and monitoring of trial embankments and shallow footings at the site.[21]

Under Sloan's leadership a prediction symposium was held in Newcastle in September 2016, at which predictors from around the world, forearmed with the results of the site investigation and laboratory testing of the Ballina soils, were invited to make predictions of various aspects of the behaviour of the constructed embankments. The outcomes of this symposium were presented in a special edition of the journal *Computers and Geotechnics* edited by Sloan.[22]

Distinctions and honours

Evidence of the outstanding nature of Sloan's research contributions and academic leadership is both manifest and abundant. It includes accolades and awards from his profession, from learned bodies and from peer groups. Some of them are listed in chronological order in Table S1 of the Supplementary Material. In particular, it is notable that he was elected to four learned academies: the Australian Academy of Technology and Engineering, the Australian Academy of Science (AAS), the British Royal Academy of Engineering, and the Royal Society of London.

Further information on some of the more significant items of this multi-faceted recognition is also provided below. It is evident that he received some of the highest awards available to engineers worldwide for his professional work.

In 2015, the stars seemed to align for Sloan as his contributions to the field of geotechnical engineering were recognised in multiple ways by his election to prestigious fellowships of the Royal Society (London) and the Royal Academy of Engineering (UK) and his nomination as the New South Wales Scientist of the Year. Very few engineers attain such distinctions. And in the same year, he was also named by Engineers Australia as one of the nation's top 100 most influential engineers.

Other prestigious international accolades include a Fellows Award from the International Association for Computational Mechanics in 2010, and an invitation to deliver the 51st Rankine Lecture at Imperial College London in 2011,[23] issued by the British Geotechnical Association as its highest honour available to a geotechnical engineer. He was also invited to present the 11th C. W. Lovell Distinguished Lecture at Purdue University in 2012. He also received various distinguished awards including the Telford Medal from the Institution of Civil Engineers London in 2000,[24] an invitation to deliver the E. H. Davis Memorial Lecture from the Australian Geomechanics Society in 2003,[25] a Centenary Medal from the Prime Minister of Australia in 2003, a Federation Fellowship from the ARC in 2004, the Desai and Booker Medals from the International Association for Computer Methods and Advances in Geomechanics (IACMAG) in 2005 and 2008 (respectively), the Thomas A. Middlebrooks Award from the American Society of Civil Engineers in 2005,[26] the Telford Premium from the Institution of Civil Engineers London in 2007,[27] and an Australian Laureate Fellowship from the ARC in 2009.

Until his untimely death, Sloan was a co-editor of the international journal *Computers and Geotechnics*, one of the premier journals in computational geomechanics. Building on the excellent work of earlier editors of the journal, *Computers and Geotechnics* flourished under Sloan's leadership. In addition, he served on the editorial boards of five other international journals, providing clear and unequivocal testament to his high standing in academia.

In January 2018, Sloan was made an Officer of the Order of Australia and his citation reads for 'distinguished service to education, particularly in the field of geotechnical engineering, as an

[17] Zheng and others (2018).
[18] Pineda and others (2019).
[19] Pineda and others (2016*a*).
[20] Pineda and others (2016*b*).
[21] Kelly and others (2017), Doherty and others (2018).
[22] Sloan and Kelly (2018). Kelly and others (2018).
[23] Sloan (2013).
[24] The Telford Medal is the highest award for any paper published by the Institution of Civil Engineers London. Sloan received this award for his paper with Merifield and others (1999).
[25] The E. H. Davis Memorial Lecturer is a person who has made a distinguished recent advancement to geomechanics knowledge in Australia. Sloan's lecture was published as Sloan (2005).
[26] The Thomas A Middlebrooks Award is presented by the American Society of Civil Engineers for a paper of special merit in geotechnical engineering. Sloan received this award for his paper with Ukritchon and others (2003).
[27] The Telford Premium is awarded by the Institution of Civil Engineers London for best paper on applied mechanics. Sloan received this award for his paper with Merifield and others (2006).

academic and researcher, to professional associations, and as a mentor of young engineers'. The latter was a very important part of his work—helping others to pursue excellence.

Leadership

Throughout his career, Sloan demonstrated outstanding leadership in his academic discipline. He established a world-class research team at the University of Newcastle, which culminated in the award of a Centre of Excellence funded by the Australian Research Council. Sloan was its founding director.

Prior to Sloan's arrival from Oxford in 1984, the University of Newcastle was virtually unknown for its geotechnical research, with only one other staff member in the field, no postgraduate students, and little research income. Over the decades following his arrival in Newcastle he took the lead in completely transforming the geotechnical research group into one of the most productive and successful groups of its type in the world. He built a very strong group over time and ultimately he became the head of the seventy-strong Priority Research Centre for Geotechnical and Materials Modelling at Newcastle (CGMM). This Centre was the lead node in the ARC's Centre of Excellence for Geotechnical Science and Engineering (CGSE), and at its peak CGMM had seventeen geotechnical academic staff (including five full professors and four associate professors), nine geotechnical postdoctoral researchers, over thirty geotechnical postgraduates, and an annual research income of more than five million Australian dollars.

In driving this growth in geotechnical research at the University of Newcastle, Sloan personally attracted forty-five million dollars in research funding from the ARC, industry and other sources. Under his leadership as the founding director of the multi-noded CGSE, its annual budget grew to over twelve million per annum, with only 18% of this income being provided by the primary ARC grant and the remainder being made up from other competitive grant sources and from industry. With a total of 180 staff and students, managed by Sloan and ten other chief investigators, the CGSE provided a national focus for geotechnical research from 2011 to 2018, which included advanced laboratory testing, field and *in situ* testing, physical modelling, including state-of-the-art centrifuge testing, and cutting-edge computational modelling. There can be no disputing that this achievement was due in large part to the energy, enthusiasm, drive, technical and management skills and outstanding leadership of Sloan.

During his career, Sloan supervised and mentored a significant number of high achievers in research, including numerous individuals who went on to become full professors in Australia and abroad.

Service

Not only was he a world-class researcher and academic leader, Sloan also served his profession locally with distinction in several other important ways. In addition to the editorial functions described previously,[28] Sloan also served on numerous university committees and he provided sterling service to the AAS, the ARC and the Royal Society of London. Examples of these types of activity are listed in Table S3 of the Supplementary Material. Of note are the committees for the selection of fellows of the AAS and the rating of research in Engineering in Australia (ERA) for the ARC and the federal government. Both represent significant responsibility. He was elected to the governing council of the AAS and served the academy well from 2016 until his untimely death in 2019. He was also an assessor for the election of engineering fellows for the Royal Society of London from 2010.

Sloan also served his chosen profession and the nation as an expert consultant. In 2010, he was appointed a 'Technical Master' in numerical analysis by the consulting firm of Coffey Geotechnics Pty Ltd (Coffey). In this role, he assisted in the technical development of several the professional staff within Coffey, and in enhancing their capabilities in advanced geotechnical analysis. He also became involved with Coffey in engineering projects involving complex geotechnical behaviour. An example was his work on the fissured clays of Botany Bay, NSW in which he assisted in formulating and analysing proposed excavations for extensions to an existing port terminal. Coffey has also made extensive use of some of his published work, especially in relation to the bearing capacity of foundations and the stability of tunnel openings.

Family life, hobbies and interests

While geotechnical research was his professional passion, Sloan had other passions and other strings to his bow. His family was foremost in his life, and he devoted considerable time to them. He encouraged and supported his wife, Denise, in her professional career in information technology. He provided a role model for his children, who now as adults are engaged in furthering their own professional careers, daughter Erica in the law and twin sons Rory and Oscar in civil engineering. He was a caring father who fostered in his children a love of reading, learning, music and the arts. He encouraged them to play musical instruments, providing a musical role model by maintaining his own interest in guitar-playing throughout his life. He also fostered their curiosity. Sloan enjoyed travelling and skiing. There were many overseas trips that often included a family skiing holiday. And of course, he taught the whole family to fish, passing on his great passion and vast knowledge of this recreational activity.

Sloan was the proud owner of a sports fishing boat, which he used regularly, taking family and colleagues on fishing expeditions on the local bays and inlets that are in abundant supply in his hometown region of Newcastle. He owned a vast array of fishing equipment—rods, reels and tackle, all top quality and impeccably maintained. Sloan spent many weekend afternoons servicing his reels with many tiny parts laid out in order on his desk. Numerous local sports fishermen would seek his advice on maintaining their gear and what equipment was most suitable for all sorts of pursuits.

Of all his fishing exploits, he most loved to fish for barramundi in the warm northern coastal and estuarine waters of Australia. He enjoyed the challenge of the outdoors and he loved nothing more than to share the experience with family and friends.

He had an active interest in many sports, particularly Australian Rules Football, but also cricket, football (soccer) and the various codes of rugby. He gained much pleasure in watching elite sports men and women stretch out and run through a gap or take a high

[28] Further details are contained in Table S2 of the Supplementary Material.

mark or kick a long-range goal. He had a good knowledge of several major sports.

Sloan was also a great socialiser and an excellent host. Many visiting colleagues will attest to that. He loved good company and good food and wine. He instituted the annual geotechnical Christmas party at the University of Newcastle, which he and his wife Denise hosted without fail, for many years until his death.

Summary

Professor Scott Sloan was a rare and outstanding individual who was a true leader of engineering in Australia and beyond. This leadership is evidenced by his numerous important research achievements, which have had significant impact on his chosen profession of geotechnical engineering. He also selflessly provided important mentoring to individual staff members and students and provided distinguished leadership through his editorial work. The numerous prestigious professional awards and recognition he received provide strong evidence that he was a person of significance.

Sloan's pursuit of excellence extended to all facets of his life. He wanted only the best, for himself and his friends and family. For example, he would work and rework drafts of a technical paper or a research grant application until he got the words just right. He implored others to do the same. He had only the best fishing gear. He insisted that his friends and fishing pals should have the same.

Sloan was a warm, friendly, intelligent, humorous, generous, focused person, who throughout his life developed many friendships, both at home and abroad. Any meeting he attended, large or small, scientific or otherwise, was enlivened by his witty conversation, his sense of humour and his wisdom. He will be sadly missed by his family and by his numerous friends and colleagues all round the world.

Conflicts of interest

The authors were professional colleagues of Scott Sloan. All three authors have collaborated and published scientific papers with him. They declare no other conflicts of interest.

Declaration of funding

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Data availability statement

Data sharing is not applicable as no new data were generated or analysed during this study.

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