

WELCOME 2011 CSS PRESIDENT RICHARD MIDDLETON

Q. Congratulations on your election as the 2011 IEEE Control Systems Society (CSS) president.

Rick: Thank you. As well as involving plenty of work, it is an honor to serve the CSS as president. I joined CSS as a graduate student more than 25 years ago and have found the Society's journals and conferences to be extremely valuable in my research. I have many excellent research contacts and friends through my involvement with CSS, and I am happy to have the opportunity and privilege to help lead the Society.

Q. Please share some details about your educational background and present position.

Rick: I graduated with bachelor's degrees in science (1983) and electrical engineering (1984) from the University of Newcastle in Australia. My final-year electrical engineering project was a mixture of power electronics and control design as I examined and built a prototype power electronic drive for stepper motors that provided electromagnetic damping of the rotor position. During my undergraduate years, I also took a course on digital control given by Graham Goodwin. I found this course inspiring and interesting and subsequently went on to study for my Ph.D. with Graham.

My Ph.D. work combined interests in digital, adaptive, and robot control. It included numerical studies using difference (δ) operators, adaptive control in a unified setting, and adaptive control of robot arms. My thesis work also involved experiments of adaptive control on a servo system that taught me some important lessons on robustness. For example, naïve implementations of adaptive control were indeed nonrobust in the absence of excitation (small offset errors causing large chaotic errors in the experiments we conducted), and it was not hard to redesign the adaptive algorithm (including

filtering and estimation deadzones) to fix this robustness problem.

Starting in 1986, I have been a faculty member of the University of Newcastle, Australia, becoming full professor in 2000. For several years in the mid 2000s, I was the director of the Australian Research Council Centre for Complex Dynamic Systems and Control. In mid-2007, I took up a full-time position as a research professor in the Hamilton Institute at the National University of Ireland, Maynooth.

Q. What are your recent and current research interests?

Rick: One of my long-term interests is the study of performance limitations in feedback control, and I've had a long and fruitful collaboration with Jim Freudenberg in this area. In more recent times, this work has extended to look at control over communications systems, in particular looking at signal-to-noise-ratio-constrained systems. I also have interests in formation or platoon problems, in



Rick Middleton of the University of Newcastle and 2011 CSS president.

particular, how an analysis of performance limitations can illuminate the causes and potential remedies for string instability.

In 2002, some colleagues from information science and computer science at the University of Newcastle started a team to enter the RoboCup Soccer, Four-Legged League

competition using Sony Aibos, and I became part of the team. This was a great opportunity to work with students on a range of projects, with tight deadlines, in a challenging real-time environment. The team, NUbots, did very well and placed in the top three teams from 2002 to 2008, including winning the competition in 2006. In 2008, the joint Newcastle/Maynooth team, NUManoids, won the Standard Platform League where we used Aldebaran's Nao robots.

After moving to Maynooth a few years ago, I started looking at some areas of systems biology. Together with Peter Wellstead and other colleagues, we are working on modeling and analysis of neurodegeneration in

Profile of Richard Middleton

Current position: Research professor, The Hamilton Institute, The National University of Ireland, Maynooth (also part-time senior research associate of the University of Newcastle, Australia).

Visiting and research positions: Imperial College of Science and Technology, the University of Illinois at Urbana-Champaign, the University of Michigan, Nanyang University, NUI Maynooth.

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IEEE CSS experience highlights: Appointed program chair of the 2006 CDC, San Diego; VP for Member Activities, 2004–2005; VP for Conference Activities, 2006–2007; associate editor at large, then senior editor of *TAC*, 2007–2009.

Notable Awards: Fellow of the IEEE 1999; CSS Distinguished Lecturer, 2008–2009; Distinguished Member Award, IEEE CSS 2008.

My involvement with CSS began in the mid 1980s with my first CDC attendance at Athens in 1986.

Parkinson's disease. This debilitating disease has a high human cost for both the elderly, who are most susceptible to the disease, and their caregivers. Although much biomedical work has been done, it is hampered by difficulties in experimentation.

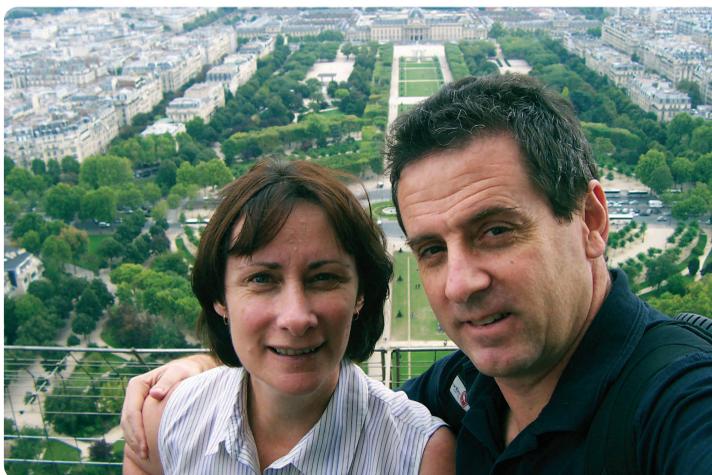
In addition, there are no known natural animal models of the disease. At present, there are symptomatic treatments for the disease, but no known cure, nor is there a reliable way to prevent progression of the disease.

I also have done work in modeling and treatment scheduling design for treatment of HIV infection. Under certain simplifying assumptions, the underlying problem of treatment scheduling can be posed as a state-based switched system synthesis problem. Using a combination of theory (for switched linear systems, for which I am indebted to collaborations with Patrizio Colaneri and others), and simulation studies, we have been able to develop strategies with the potential to slow the emergence of drug-resistant viral strains.

Q. Please tell us about your involvement with CSS, and other Societies, over the years.

Rick: My involvement with CSS began in the mid 1980s with my first CDC attendance at Athens in 1986. I remember well the excitement of meeting renowned researchers whose papers I had read, stimulating talks, and discussions afterwards. I have attended almost all CDCs since then. During the early 1990s, I

was an associate editor for *TAC*, and later for *TCST* and *Automatica*. More recently, I have been an associate editor at large and now senior editor of the *TAC* prior to taking up the role of president elect.



Ruth and Rick Middleton on the Eiffel Tower.

In terms of committee work within CSS, I was involved in the Sydney CDC 2000 as copublications chair. More recently I have served on the CSS Executive Committee for several years as VP member activities and also VP conference activities. One of my major conference organization roles was as program chair of CDC 2006 in San Diego.

Q. How do you see your role as president of the Society, and what are your priorities for the next year?

Rick: There are several indicators that CSS is in good shape. Our conferences are well attended, we continue to see high submission rates, and the cutoff point remains at the B-level. All of our publications are well regarded, with high citation rates and impact factors as well as increasing submission rates. Thanks to the work of my predecessors, including Tariq and

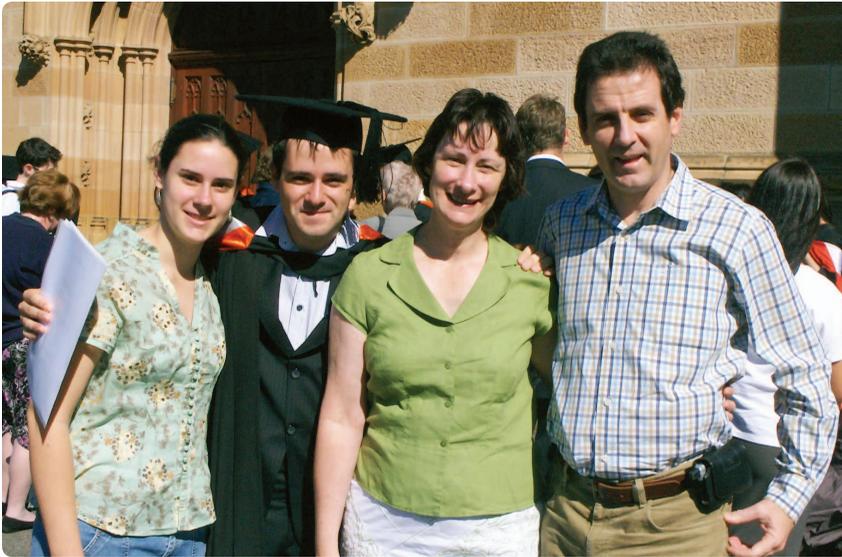
Roberto, we have several new initiatives in outreach, internationalization, revamping of technical committees, and the creation of new technical committees. Our societal membership numbers show some limited growth, despite a widespread trend for people to opt out of similar organizations or societies. I think these are all good signs of a healthy society.

The Society's financial position is very sound, despite the recent turmoil in the financial system. Our financial

position is by no means an end in itself. However, my simplified analysis suggests that there are three main factors that contribute to our strong Societal reserves. One is that our sponsored conferences, the American Control Conference (cosponsored), the Multiconference on Systems and Control, and the Conference on Decision and Control are well attended, and almost invariably contribute a surplus, even beyond

the budgeted surplus demanded by IEEE. In addition, for some time now, our presidents, the VP of finance, and others have managed our budgets well. Third, our journals continue to show high impact factor and high download rates from IEEE *Xplore*, which contributes further to our Society's healthy surplus. These healthy reserves allow us to do things like create an outreach fund (<http://www.ieeecss.org/main/outreach-fund>) that I hope many of you will make proposals to.

Notwithstanding these many healthy signs, I think there are some issues that we need to keep an eye on. For example, particularly since I am a resident in Ireland at present, I am acutely aware of how quickly a healthy financial position can revert to one that urgently needs correction. We need to ensure that we don't become "addicted" to a healthy cash flow but use this opportunity



Rick and Ruth Middleton and their children Penny and Tim on the occasion of Tim's graduation with a B.S. in architecture from the University of Sydney in 2007.

in ways that benefit the Society and its future.

Another issue that people have commented on is the level of industry and applications work in our Society. While there is some excellent applications work going on in our Society, there is also some evidence of a gap between industry and academic perspectives. For example, in the recent survey of control curricula, there were several points where academia and industry perspectives were aligned. However, there were also areas where

we are emphasizing things in our teaching that are regarded by industry as of little importance. Conversely, there are some topics regarded by industry as of high importance, which we pay little attention to in our teaching. In addition, my perception of industry participation in our conferences is that it is quite limited, particularly for CDC.

My ideal would be a situation where our theory is as rigorous and solid as it is now, but where industry and academia see great value in

interacting with one another. I think we need more academics (but I certainly wouldn't want to imply that this has to be all academic) who will both learn from our industry colleagues and also help communicate theoretical results in a form more accessible to industry. I don't imagine that this ideal will be simple or quick to achieve, but there are already several initiatives under way, and I would like to see if we can push this direction further.

Perhaps at a more personal level, an issue that concerns me, but for which I don't see any simple resolution relates to the Society's effective "carbon footprint." In relation to this, my own thinking was influenced greatly by Mackay's *Sustainable Energy—Without the Hot Air*. While in some regards, I think I am reasonably modest in my use of energy (my wife Ruth and I share one smallish car, and I almost always walk to the office), between various meetings and conferences travel, my air travel creates a very large carbon footprint. Most of this is work and CSS related; I don't know if there are any simple and effective ways of eliminating or reducing the effect of this travel, but I think we need to pay some attention to this.

Q. Please tell us about your family life and personal interests.

Rick: My wife Ruth works part time as an administrative assistant in the Hamilton Institute and also volunteers at the Dublin Zoo. We have two children, Tim, who is currently working as an architect in Tokyo, and Penny, who works as a nurse in Gosford, Australia. In my spare time I enjoy playing soccer, particularly lunchtime friendlies at NUI Maynooth. Ruth and I are also active in a small local church, Maynooth Community Church.

Q. Thank you for your comments. We wish you success as 2010 CSS president, and we look forward to reading your editorials in the magazine. 

The 2011 CSS Executive Committee

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