

A C I newsletter

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SPECIAL ISSUE DEDICATED TO BRIAN ANDERSON AND GRAHAM GOODWIN

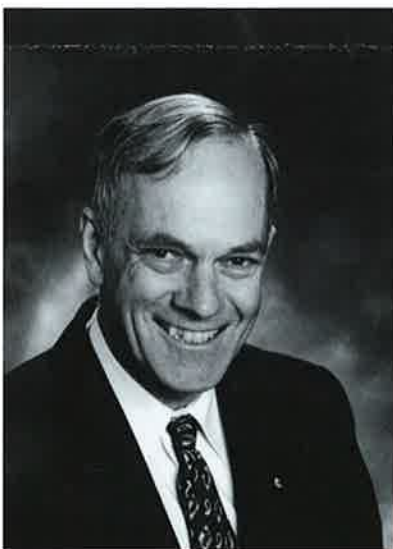
It is with a great pride that we announce that

- Professor Brian Anderson has succeeded in his efforts to establish the Information and Communications Technology (ICT) Centre of Excellence – National ICT Australia (NICTA); and
- Professor Graham Goodwin has been granted the ARC Federation Fellowship to work on "Ill-conditional and Constrained Inverse Problems in Signal Processing, Telecommunications and Control".

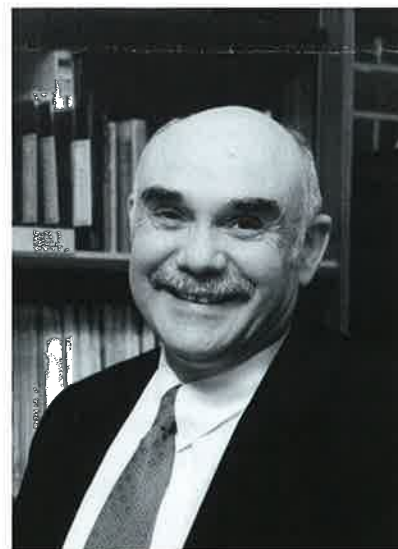
These astonishing achievements by two of the most prominent Australian control engineers, scientists, educators and leaders needs to be marked and celebrated. This special issue, dedicated to Brian and Graham, *the Australian control gurus*, is our contribution to that end.

Brian and Graham, we salute you!

Editor



*Professor Brian Anderson
Chief Scientist, NICTA*



*Professor Graham Goodwin
ARC Federation Fellow*



NICTA¹ will become a national landmark institution that takes Australia's ability to create and commercialise information and communications technologies to a new level.

It will be a world-class and world-scale ICT research institute that will raise the standard of ICT research and postgraduate training in Australia. In the process, it will become a magnet to attract world-class researchers to Australia including many of Australia's best and brightest researchers who are currently working overseas.

NICTA will help transform Australia's ICT sector and strengthen the competitiveness of our traditionally strong sectors such as financial services, primary industries, resources, education, entertainment and health.

Structure

National ICT Australia has been created by a consortium chosen by the Commonwealth Government to establish the ICT Centre of Excellence.

National ICT Australia Ltd is a limited liability not-for-profit company whose members are the four founding partners of the NICTA bid:

- The Australian National University
- The University of NSW
- The NSW Government
- The ACT Government

Website: <http://nicta.com.au>

Open and Collaborative

NICTA is establishing processes to enable collaborative projects with industry and other research organizations that allow shared wealth creation.

Organizations or individuals who have an interest in collaborating with NICTA should contact a member of the management team: Arun.Sharma@nicta.com.au (02 9385 4619), Brian.Anderson@nicta.com.au (02 6125 8667) or Bob.Williamson@nicta.com.au (02 6125 0079).

NICTA is establishing a Fellowship program that is aimed at attracting high calibre researchers to become NICTA Fellows, tenable from existing Australian institutions, thereby securing the ongoing engagement of top researchers while enabling those institutions to retain their valuable research staff.

Research

The focus of research to be undertaken by the Centre will fall within five broad themes:

- Infrastructure Technologies;
- Intelligent Systems;
- Software Engineering;
- Human-Machine Interaction; *and*
- Foundations, the basic theories and algorithms on which ICT technologies are built.

Initial Programs

- Wireless Signal Processing
- Autonomous Systems and Sensing Technologies
- Logic and Computation
- Statistical Machine Learning and Sensor Signal Processing
- Systems Engineering and Complex Systems
- Empirical Software Engineering
- Knowledge Representation and Reasoning
- Real-time and embedded systems
- Networks and Pervasive Computing
- Formal Methods
- Symbolic Machine Learning

¹ Reprinted by courtesy of NICTA

Graham Goodwin, ARC Federation Fellow

Graham² began his term as a Federation Fellow in January 2002 and will receive \$1.125 million over five years.

The Federation Fellowship is the most prestigious and richest publicly funded research fellowship ever offered in Australia.

The title of his associated project is “*Ill-Conditioned and Constrained Inverse Problems in Signal Processing, Telecommunications and Control*”.

The Federation Fellowship Award will allow Graham to focus full time on his research work. Speaking about the Award he said, “The scheme represents a major development in Australia regarding the recognition given to research and researchers. Australia has always had high regard for top level sports men and women. However, there has been little public recognition given to researchers. The Federation Fellowship grants are an important symbol of the Australian community’s support for research. The Fellowships also send an important message to young people that involvement in scholarly activities will also be recognized and valued by the Australian community”.

The specific work that Graham plans to do revolve around gaining a better understanding of inverse problems. These problems are at the heart of many design questions in control and signal processing. For example, in control, we are typically given a desired output behaviour and want to know which input, when applied to the plant, achieves that behaviour. In principle this involves an inversion (of the plant dynamics in this case). As another example, consider a telecommunications problem in which data is sent through a channel and is received at another location. The inverse question is: given the received data, reconstruct the transmitted signal (by inverting the channel characteristics in this case).

These types of inverse problems become challenging (and interesting) when the inverse system must satisfy constraints and/or the inversion process is ill-conditioned. For example, it is very common in control that the input signal be required to satisfy various constraints (on input (or state) amplitude or slew rates). One class of very challenging problems is when the input can only be drawn from a finite alphabet. This latter problem arises in many areas of application including on-off control, quantization of audio signals, digital communications, networked control systems and filter design when the coefficients are required to be quantized.

The flavour of his work is captured in four Plenary Addresses that he has recently given, namely:

- “Inverse Problems with Constraints”, Plenary Address, *IFAC World Congress*, Barcelona, Spain, July 2002.
- “Loop Performance Assessment and Remediation”, Plenary Address, *International Symposium on Advanced Control of Industrial Problems*, Kumamoto, Japan, June 2002.
- “When, Why and How to Constrain Control: With Application to Cross Directional Control”, Plenary Address, *Control Systems 2002*, June 2002, Sweden.
- “State and Parameter Estimation for Linear and Nonlinear Systems”, Keynote Address, *ICARCV*, Singapore, December 2002.

His current work focuses on novel approaches to Model Predictive Control, Control over Communication Channels and Duality Issues Between Nonlinear Estimation and Control.

²Reprinted by courtesy of the Special Research Centre for Integrated Dynamics and Control, University of Newcastle

The 5th Asian Control Conference

20-23 July 2004, Melbourne

Call for Papers

The Asian Control Conference (ASCC) is a biennial event and the major control conference held in Asia. The 5th ASCC is being held at the Grand Hyatt in Melbourne Australia, 20-23 July 2004 and will provide professionals, researchers and engineers worldwide with excellent information exchange opportunities. The conference consists of a four-day program, beginning with a workshop day followed by a three-day conference program, which includes international plenary speakers, poster sessions, workshops, and industry exhibits.

The Grand Hyatt Melbourne, located in the heart of Melbourne's CBD, provides a first class meeting and exhibition venue with delegate accommodation provided. The 5th ASCC will build on the success of conferences organized in Tokyo, Seoul, Shanghai, and Singapore.

Topics of interest are in the broad area of control and automation ranging from industry applications to theoretical advances and include but are not limited to:

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|-------------------------------|-------------------------------------|
| - System Theory | - PID Control |
| - Nonlinear Control | - Adaptive Control and Tuning |
| - Multivariable Control | - Predictive Control |
| - Fuzzy, Neural Systems | - Hybrid, Supervisory Systems |
| - GA, Evolutionary Computing | - Information Technology |
| - Mechatronics | - Guidance and Navigation |
| - Process Control Systems | - Measurement and Sensing |
| - Aerospace | - Automotive Control |
| - Linear Control | - Robust Control |
| - Optimal Control | - Intelligent/Learning Control |
| - Fault Detection | - Discrete Event Systems |
| - Simulation and Control CAD | - Signal Processing |
| - Robotics and Motion Control | - Manufacturing Systems |
| - Power Systems | - Environmental and Bio-engineering |
| - Human Machine Systems | - Control Education |

Prospective authors are invited to submit papers electronically via <http://ascc2004.ee.mu.oz.au>.

For more information regarding the ASCC2004 please contact the organizer at ascc@ee.mu.oz.au or visit the conference website at <http://ascc2004.ee.mu.oz.au> for detailed paper submission instructions.

EDITORS' POSTSCRIPT

- **Discussion Forum:** Discussion letters to the editors in response to any article in the newsletter will have the responses published in subsequent editions.
- **Submissions of News** of interest to the Australian community of control engineers are most welcome.
- **A Special issue** of the newsletter may also be worthwhile. Please discuss your initiatives with the editors.
- **Your calls** are always welcome.

All contributions will be reviewed against the Mission Statement of the Committee when editing received material. The editors reserve the right to make changes.

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