Ren Potts Medal – the ASOR National Award

In the ASOR National council meeting held on June 5, 1994, it was agreed that ASOR will establish a national prize for outstanding contribution in OR.

On introduction in 1995, the award be called "The Australian Society for Operations Research Award". Later, it was named as Ren Potts medal of the Australian Society for Operations Research. The award may be presented for a major development in theory, application of OR in an industry or for any other reason considered worthy by the ASOR National Council. The award can be given to an individual or a group of persons, or to an organization. The award will be presented at the National conference. However, ASOR National Council members will not be considered for the award during their term as council members.

The applicant must have displayed over a period growth/development of OR in theory or applications. The criteria for an award will be considered satisfied if the applicant's claim is judged by the committee satisfying one or more of the following statements:

- the application of OR has resulted (or will result) in a substantial savings in the organization.
- the applicant has demonstrated successful and consistent promotion of OR in industry and/or the wider community.
- the theory developed by the applicant opens a possible field for research.
- the work of the applicant will have an international impact in the community of OR or its users. This can be in the form of a software, a text book, or a research monograph. Supervision of a substantial number of students for a higher degree by research in OR (Master or Doctorate) will also be a possible consideration to satisfy the requirements for the ASOR award**.**

In all cases evidence will be necessary which may be in the form of publications or a letter from the Head of the organization which has been benefited by the OR application. If the claim is for savings, it should be substantiated.

It is not possible to develop criteria common to all possible applications. However, each application will be reviewed by the evaluation committee and relevant additional information in terms of referees reports and management evaluations will be sought as appropriate. Theory or an application of OR which draws the national/international attention is considered worthy of the award. In all other cases, it is desirable to develop some quantitative measures which may be considered by the society as worthy of the ASOR award. For this purpose the following possible scenarios are suggested which may be reviewed by the council from time to time.

1. For claim based on an application measure of success can be:
   (a) by resulting savings
   (b) by impact on performance of organization.

2. For successful and consistent promotion of OR in Industry /Commerce
   (a) record of performance
   (b) support of relevant organization

3. For claim based on the theory it may be measured in the usual way such as

(a) publications (say 100 with at least 50% in OR or related journals and other may be in the form of reports and conference proceedings).
(b) successful supervision which resulted in a research degree award on an OR topic to at least 5 students.
(c) an OR text book or a major software used in at least 5 educational/ commercial institutions.
(d) research monographs which describes material from journals in a usable form by the wider community.
(e) some combination of the above deemed sufficient by the committee.

Ren Potts Medal 2005

Professor Jerzy Filar of University of South Australia was awarded ASOR Ren Potts Award 2005 at the national ASOR conference in Perth. A brief outline of Jerzy's many contributions is given below. It was written by Professor Charles Pearce, Elder Chair of Mathematics at Adelaide University.

Jerzy has made a sustained and outstanding contribution to research in Operations Research since taking up his chair in Mathematics and Statistics at the University of South Australia in 1992. I shall not attempt to cover all the facets of his work and contributions to the discipline of Operations Research -- his curriculum vitae and list of publications fill out what I have to say here.

Jerzy has since made a most substantial contribution that has materially promoted Operations Research both within Australia and overseas. He is well known internationally for his coauthored research level textbook *Competitive Markov Decision Processes*, published by Springer in 1996 and completely sold out. Reviewing the book in Zentralblatt, the German reviewer P. Neumann says 'taking the authors' conception of the book into account, under today's state-of-the-art, all essential aspects of stochastic games have been treated and this in a brilliant way.'

Apart from this book, he has authored or co-authored over 80 refereed research papers, many in top international journals. His research is both broad and deep and the results have gained him international recognition in a number of separate branches of Operations Research, including game theory, Markov decision processes and environmental modelling. I shall endeavour to give some idea of the flavour of his work.

He initiated the idea of embedding the Hamiltonian Cycle and Travelling Salesman problems in singularly perturbed controlled Markov chains. This has led to novel characterisations of the Hamiltonian cycle problem and to new algorithms based on the perturbed stationary distributions. He has pursued these ideas by considering the limiting behaviour of the corresponding fundamental matrices and has discovered a very interesting asymptotic result suggesting that the NP-completeness of the HCP can be described by the behaviour of certain characteristic functionals near the singularity. In collaboration with Ejov and Nguyen, Jerzy studied this behaviour via a complete spectral analysis of these functionals. An important spin-off from this research was work with Krieger and Syed which completes the analysis of the limiting behaviour of the Cesaro-limit matrix of perturbed Markov chains. Similarly, in papers with Bielecki and Abbad, he established the existence of uniformly optimal controls with no ergodic assumptions. Under conditions of near decomposability they constructed a staircase structured linear program that forms the true limit of the perturbed problem. These results are used in flexible manufacturing systems.

Jerzy pioneered the use of series expansions in perturbed mathematical programming. In work with Coulomb, Ejov and Szczechla he used the techniques of complex analytic varieties to prove that, often, solutions of real optimisation problems can be characterised as Puiseux series. For singularly perturbed linear programming problems, these series reduce to Laurent series. In further work, he, Altman and Avrachenkov developed an asymptotic simplex method for their solution.

Jerzy made substantial contributions to the early analysis of risk-sensitive Markov Decision Processes, a research line that is now continued internationally. In particular he analysed trade-offs between short and long run time horizons, a conceptual advance that captures the essence of the conflict between the industrialist and the environmentalist. In the environmental modelling area, he made a significant contribution to the greenhouse problem by demonstrating that uncertainties cascade in an unacceptably fast manner when a model is simulated over a long horizon. This was, perhaps, the first application of stochastic differential equations in the field of greenhouse modelling.

A number of Jerzy's other activities have served to raise our international profile. One of these is his role as Honorary Editor for the Mathematical Models theme for UNESCO's Encyclopaedia of Life Support Systems. Information about this project can be obtained from the web-site http://www.eolss.co.uk/.

In this capacity he has assembled an international team of over fifty distinguished scientists who are writing or have already completed contributions on most aspects of mathematical modelling. For more information see the web site http://www.unisa.edu.au/maths/EOLSS/MathematicalModels.html.

Jerzy is Editor-in-chief of *Environmental Modeling and Assessment* (published by Springer) and is Associate Editor of the *Journal of Mathematical Analysis and Applications*, *Mathematical Methods of Operations Research* (Zeitschrift fur OR) and *International Game Theory Reviews* and former Associate Editor of *Applicationes Mathematicae*.

Both nationally and internationally, the quality and applicability of his work is attested by a record of winning national competitive research grants with the National Science Foundation and Air Force Office of Scientific Research grants in the US, continued with ARC grants in Australia. He has a substantial record of research contracts and agreements with government agencies and research institutes such the US EPA, the World Resources Institute, DSTO and the Sir Keith and Sir Ross Smith Foundation. He is a Fellow of the Australian Mathematical Society, and from 2006 -2010 he will hold an ARC Professorial Fellowship, at the University of South Australia.

International recognition has also brought many invitations of short-term posts as Visiting Professor, as at the Universities of Maastricht, Toulouse, and Ulm, the Technical University of Vienna, Harvey Mudd College and the Chinese University of Hong Kong. He has visited Tsinghua University and Academia Sinica at the invitation of the Chinese Academy of Science. He has presented plenary or invited presentations at various international conferences including the prestigious Oberwolfach meetings and has accepted invitations to present seminars at many high profile institutions, including Yale University, Johns Hopkins and Carnegie-Mellon, the University of Geneva, the Weizmann Institute and the University of Leiden. I shall conclude with some observations about his contributions at local level. First, graduate students: Jerzy has supervised nine PhD theses and one Masters Degree thesis. His graduate students have contributed significantly to research in areas of Operations Research. Dr Paul Gaertner has gone on to work for DSTO in Adelaide, Professor Ke Liu has now a professorial position with Academica Sinica in the Peoples Republic of China, Dr Belinda Chiera is a postdoc at Adelaide University in the Teletraffic Research Centre and Dr Kostya Avrachenkov is a research scientist at INRIA in France.

Jerzy's greatest local contribution has been to establish the Centre for Industrial and Applied Mathematics (CIAM) at the University of South Australia and to help develop it in less than a decade to a leading national centre for industrial and modern applied mathematics. CIAM has an acknowledged international reputation and active research links to eminent researchers worldwide. CIAM can already claim many impressive achievements, testimony to Jerzy's outstanding leadership. The Scheduling and Control Group have established an international reputation through the development of optimal driving strategies for trains and solar-powered racing cars. Phil Howlett and Peter Pudney have published a definitive research monograph on energy-efficient train control, have designed and implemented the optimal driving strategy for Aurora 101, winner of the 1999 World Solar Challenge and were co-winners with Siemens Australia of the Australian Technology Award for the joint development of Metromiser. Their work has appeared in major international journals and CIAM is a major partner in the Rail CRC. CIAM hosted the annual Mathematics in Industry Study Group (MISG) meeting for 2000--2003.

Jerzy has played an instrumental role in recruiting new CIAM staff including Professor Vladimir Gaitsgory, and Dr Stephen Lucas. Vladimir is recognised as an outstanding scholar in the area of singularly perturbed control and Stephen was awarded the Mitchell medal in 2002 for the most outstanding young applied mathematician in Australia. Jerzy initiated the innovative Hypatia Scholarships for Mathematically Gifted Women. Two of the first three graduates from this programme have gone on to become PhD students. ASOR members may recall one of these, Kylie Bryant, who as an undergraduate was a runner-up for the best student paper prize at a recent National ASOR Conference against competition from postgraduate students.