

Richard Peirce BRENT

Research interests

Analysis of algorithms, combinatorics, computational complexity, number theory, numerical analysis, parallel computing, randomised algorithms, random number generators.

Education and degrees

1968 BSc Monash Honours 1 in Mathematics
1970 MSc Stanford in Computer Science
1971 PhD Stanford in Computer Science
1981 DSc Monash in Computer Science
1998 MA Oxon (by special resolution)

Awards and distinctions

1963 BHP Prize, Victoria
1982 Fellow, Australian Academy of Science
1984 Australian Mathematical Society Medal
1990 Forsythe Memorial Lecturer, Stanford University
1991 Fellow, Institute of Electrical and Electronics Engineers, USA (Life Fellow, 2011)
1993 Fellow, Institution of Engineers, Australia (resigned 1998)
1995 Fellow, Association for Computing Machinery, USA (resigned 2013)
1997 Fellow, Australian Mathematical Society
2000 IEEE Millennium Medal
2002 Fellow, British Computer Society (resigned 2008)
2003 Fellow, Institute for Mathematics and its Applications, UK
2005 Hannan Medal of the Australian Academy of Science
2009 Fellow, Society for Industrial and Applied Mathematics, USA
2009 Foreign Fellow, Bangladesh Academy of Science
2014 Moyal Lecturer and Medallist, Macquarie University
2015 Golub Memorial Lecturer, Hong Kong Baptist University
2019 Distinguished Fellow of the International Engineering and Technology Institute

Employment

1968 Teaching Fellow, Computer Centre, Monash University
1971 Research Employee, IBM Research Center, Yorktown Heights, USA
1972 Research Fellow, Computer Centre, ANU
1973 Fellow, Computer Centre, ANU
1976 Senior Fellow, Computer Centre/Computing Research Group, ANU
1978 Foundation Professor and Head of Computer Science, Faculty of Science, ANU
1983 Professor, Centre for Mathematical Analysis, ANU
1985 Professor and Head, Computer Sciences Laboratory, RSPHYS/RSPHYSSE/RSISE, ANU
1998 Statutory Professor of Computing Science and Fellow of St Hugh's College, Oxford, UK
2005 ARC Federation Fellow, MSI & RSISE, Australian National University
2010 Distinguished Professor, MSI & CECS, Australian National University
2011 Emeritus Professor, Australian National University

Visiting positions

1975 Visiting Assistant Professor, Computer Science, Stanford University (3 months)
1978 Visiting Professor, EECS, University of California, Berkeley (3 months)
1989 Visiting Professor, Computer Science, Carnegie-Mellon University (2 months)
1997 Visiting Professor, Mathematics, Harvard University (2 months)
2005–2011 Visiting Professor, University of Oxford, UK (short visits)
2011–2020 Conjoint Professor, Mathematics, University of Newcastle, NSW
2011– Member of CARMA (Executive Committee, 2021–)
2021– Affiliate, Monash University

Teaching

Taught many undergraduate and graduate courses in both Computer Science (Stanford, Oxford, ANU) and Mathematics (Harvard, ANU, Newcastle), 1975–2013; for example:

- *Advanced Algorithms* (comp4600, 2010 and 2011) with B. McKay *et al*, ANU;
- *Number Theory and Cryptography* (math3301, 2010) with S. Montarani, ANU;
- *Parallel Systems* (comp4300/6430, 2011) with A. Rendell, ANU;
- *Differential Equations* (math2800, 2013) with B. Lamichhane, Newcastle.

Professional activities

- Editor/associate editor of journals: *Journal of the ACM* (1976–79), *Numerische Mathematik* (1981–87), *Advances in Computer Science* (Prentice-Hall Book Series, 1987–95), *SIAM J. on Matrix Analysis and Applications* (1987–89), *Parallel Processing Letters* (1990–93), *Internat. J. of High Speed Computing* (1990–2005), *Asian J. of Mathematics* (1997–2006), *Mathematics of Computation* (1998–2007), *Internat. J. High Performance Computing and Networks* (2004–), *Contributions to Discrete Mathematics* (2005–).
- Reviewer for numerous granting bodies and journals, including *ACM Trans. Math. Software*, *Amer. Math. Monthly*, *Annals of Mathematics*, *BIT Numerical Math.*, *Electronic J. of Combinatorics*, *European J. of Combinatorics*, *Experimental Mathematics*, *Integers*, *J. ACM*, *J. Combinatorial Designs*, *J. Complexity*, *J. Integer Sequences*, *J. Symbolic Computing*, *Linear Algebra and Applications*, *Mathematics of Computation*, *Notes on Number Theory and Discrete Math.*, *Numerische Mathematik*, *Rocky Mountain J. Math.*
- Program/organising committee member for numerous national and international conferences, e.g. ACCMCC 2010, CATS 2008, PDCAT 2004–07, ICCSA 2004–05, ANTS 2004, FOCM 1999–2002, PDCS 2001, ISAAC 2001, ARITH15 2001.
- Member, IFIP Working Group 2.5 on Numerical Software, 1978–86.
- Member, National Committee for Mathematics, 1979–81, 1983–86, 1995–98.
- Foundation member and Secretary, Association of Australian Professors of Computer Science (now “CORE”), 1981–1985.
- Member, Council of the Australian Mathematical Society, 1983–1986.
- Member, ARC Engineering I Panel, 1994–96.
- Chair, Australian Academy of Science Sectional Committee 1, 2012–2014.
- Supervised 21 PhD students and numerous MSc and Honours students.
- Consultant and software architect for Quintessence Labs (2nd-generation quantum cryptography).

Research grants (since 2005)

- ARC Federation Fellowship *Exploring the Frontiers of Feasible Computation*, 2005–2010.
- CI in ARC Centre of Excellence *Mathematics and Statistics of Complex Systems* (MASCOS) with A. Guttman (Melbourne) *et al*, 2005–2010.
- Australian leader in INRIA Associate Team program *Algorithms, Numbers, Computation* with P. Zimmermann (INRIA, France), 2008–2010.
- CI in ARC Discovery grant *Integral Lattices and their Theta Series* with J. Cannon (Sydney), 2008–2010.
- CI in ARC Discovery grant *An Integrative and Interactive Approach for Co-estimation of Multiple Sequence Alignment and Phylogeny Reconstruction* with B. Zhou (Sydney), 2009–2011.
- CI in ARC Linkage grant *Robust Numerical Solution of Partial Differential Equations on Petascale Computer Systems with Applications to Tsunami Modelling and Plasma Physics* with M. Hegland, A. Rendell, S. Roberts, P. Strazdins (ANU), R. Nobes (Fujitsu Laboratories Europe), 2011–2014.
- CI/PI in ARC Discovery grant *Exploratory Experimentation and Computation in the Mathematical Sciences* with J. Borwein (Newcastle) and D. Bailey (USA), 2014–2017.

Research areas

Analysis of algorithms, analytic and computational number theory, area-time bounds, combinatorics, computational complexity, cryptography and cryptanalysis, experimental mathematics, high-precision computations, numerical analysis, optimisation, parallel algorithms, pseudo-random number generation, quantum computing, randomised algorithms, structured linear systems.

Students

Brent has supervised 21 PhD students at ANU, Oxford and the University of Newcastle. Details are available at <https://maths-people.anu.edu.au/~brent/students.html>.

Publications

Brent is the author of two books and over 270 papers. As at 2 September 2021 his publications have 19,459 citations with H-index 56 on Google Scholar. A complete list is available at <https://maths-people.anu.edu.au/~brent/pub/pubsall.html> or <https://maths-people.anu.edu.au/~brent/pd/rpbpubl.pdf>.

Last updated 2 September 2021.