

Dr Adam P. Micolich

Employment History

2007-present	Senior Lecturer	School of Physics, University of NSW
2005-2007	Lecturer	School of Physics, University of NSW
2003-2006	ARC Australian Postdoctoral Fellow	School of Physics, University of NSW
2002-2003	Senior Research Associate	School of Physics, University of NSW
2000-2002	Research Associate	Physics Dept., University of Oregon, USA
1995-1996	Summer Vacation Scholar	Accelerator Mass Spectrometry, ANSTO

Educational Qualifications

1997-2000	Ph.D. in Physics	School of Physics, University of NSW
1993-1996	B.Sc. (Hons. I and University Medal)	School of Physics, University of NSW

Awards and Honours

2007	Keynote Speaker at the 17 th Australian Institute of Physics National Congress
2006	NSW/ACT Young Tall Poppy Science Award (Aust. Inst. for Policy & Science)
2003-2006	ARC Australian Postdoctoral Fellowship
1999	Australian Institute of Physics Award for Postgraduate Excellence
1999	Best Student Poster Prize, Australian and New Zealand Institutes of Physics Annual Condensed Matter Meeting, Wagga Wagga.
1997	UNSW University Medal (outstanding undergraduate performance)
1995	Physics Staff Prize for Physics Honours (overall top mark in honours course)
1996	Head of School's Prize in Physics (best honours thesis)
1995	Australian Institute of Physics Prize (overall top mark physics III courses)
1995	Spectra Physics Prize in Experimental Physics (top mark experimental physics III)
1995	The B.L. Turtle Memorial Astrophysics Prize (top mark astrophysics III)

Research Summary

I have published 98 publications in the last 11 years, 26 of which are in high impact journals, including 2 in *Nature*, 1 in *Nature Physics*, 1 in *Physics World*, 5 in *Physical Review Letters*, 6 in *Applied Physics Letters* and 12 in *Physical Review*. I have given 18 talks and 13 posters at international/national conferences including 9 invited talks at conferences in the U.S., Japan, N.Z and Australia. My research has been presented in a 30 minute *Quantum* episode aired on ABC-TV in 1998, scientific magazines including *Nature*, *Nature Physics*, *Physics World* and *Scientific American* and numerous major newspapers including the *New York Times*, *The Guardian* and *The Sydney Morning Herald*. I was listed among the top 50 nanotechnology researchers in Australia (based on publication rate) in the recent "Nanotechnology Benchmarking Project" report published by the Australian Academy of Science (See <http://www.science.org.au/policy/nanotech.htm>).

Most Significant Publications (2003-2008) [31 peer reviewed papers 03-08 h-index = 10]

1. R. Danneau, O. Klochan, W.R. Clarke, L.H. Ho, A.P. Micolich, M.Y. Simmons, A.R. Hamilton, M. Pepper and D.A. Ritchie, *0.7 Structure and zero bias anomaly in ballistic hole quantum wires*, **Phys. Rev. Lett.** **100**, 016403 (2008).
2. W.R. Clarke, C.E. Yasin, A.R. Hamilton, A.P. Micolich, M.Y. Simmons, K. Muraki, Y. Hirayama, M. Pepper and D.A. Ritchie, *Impact of long- and short-range disorder on the metallic behaviour of two-dimensional systems*, **Nature Phys.** **4**, 55-59 (2007).
3. A.P. Micolich, E. Tavenner, B.J. Powell, A.R. Hamilton, M.T. Curry, R.E. Giedd and P. Meredith, *Superconductivity in Metal-mixed Ion-implanted Polymer Films*, **Appl. Phys. Lett.** **89**, 155203 (2006).
4. R.P. Taylor, A.P. Micolich and D. Jonas, *Reply to Jones-Smith and Mathur*, **Nature** **444**, E10-11 (2006).

5. O. Klochan, W.R. Clarke, R. Danneau, A.P. Micolich, L.-H. Ho, A.R. Hamilton, K. Muraki and Y. Hirayama, *Ballistic transport in induced one-dimensional hole systems*, **Appl. Phys. Lett.** **89**, 092105 (2006).
6. R. Danneau, O. Klochan, W.R. Clarke, L.-H. Ho, A.P. Micolich, A.R. Hamilton, M.Y. Simmons, M. Pepper, D.A. Ritchie and U. Zülicke, *Zeeman spin-splitting anisotropy in ballistic hole quantum wires*, **Phys. Rev. Lett.** **97**, 026403 (2006).
7. R. Danneau, W.R. Clarke, O. Klochan, A.P. Micolich, A.R. Hamilton, M.Y. Simmons, M. Pepper and D.A. Ritchie, *Conductance quantization and the $0.7 \times 2e^2/h$ conductance anomaly in one-dimensional hole systems*, **Appl. Phys. Lett.** **88**, 012107 (2006).
8. W.R. Clarke, A.P. Micolich, A.R. Hamilton, M.Y. Simmons, C.B. Hanna, J.R. Rodriguez, M. Pepper and D.A. Ritchie, *Evolution of the bilayer $\nu=1$ quantum Hall state under charge imbalance*, **Phys. Rev. B (Rapid Comm.)** **71**, 081304 (2005).
9. C.E. Yasin, T.L. Sobey, A.P. Micolich, W.R. Clarke, A.R. Hamilton, M.Y. Simmons, L.N. Pfeiffer, K.W. West, E.H. Linfield, M. Pepper and D.A. Ritchie, *Interaction correction to the longitudinal conductivity and Hall resistivity in high quality two-dimensional GaAs electron and hole systems*, **Phys. Rev. B (Rapid Comm.)** **72**, 241310 (2005).
10. A.P. Micolich, R.P. Taylor, T.P. Martin, R. Newbury, T.M. Fromhold, A.G. Davies, H. Linke, W.R. Tribe, L.D. Macks, C.G. Smith, E.H. Linfield and D.A. Ritchie, *Three key questions on fractal conductance fluctuations: Dynamics, quantization and coherence*, **Phys. Rev. B** **70**, 085302 (2004).

Invited Talks

1. “*New Routes to Organic Electronic Devices*”, Invited talk at the SPIE Conference on Device and Process Technologies for Microelectronics, MEMS, Photonics, and Nanotechnology (AU03), Canberra, Dec 2007.
2. “*Wave-Particle Duality*”, Invited lecture at the VCE Physics Focus Day, Melbourne, Nov. 2007.
3. “*New Routes to Organic Electronic Devices*”, Keynote Talk at the 17th Australian Institute of Physics National Congress, Brisbane, Dec. 2006.
4. “*Superconductivity in Metal-mixed Ion-Implanted Polymer Films*”, Invited talk at the 6th International Symposium on Crystalline Organic Metals, Superconductors and Ferromagnets, Florida Keys, U.S.A, Sept. 2006.
5. “*Ballistic Transport and Spin-Orbit Coupling in Hole Quantum Wires*”, Invited talk at the 2007 International Conference on Nano- & Bionanotechnology, Quantum Transport and Quantum Functional Semiconductors, Wellington, N.Z., Feb. 2007.
6. “*Superconductivity in Ion-implanted Plastic Films*”, Invited talk at the Sir Mark Oliphant Conference on Quantum Nanoscience, Noosa, Jan. 2006.
7. “*Superconductivity in Ion-implanted Plastic Films*”, Invited talk at the Workshop on Quantum Materials, Heron Island, Jul. 2005.
8. “*Universal Scaling Behaviour of Electrical Currents in Nanostructure Devices*”, Invited talk at the International Workshop on Breakthroughs in New Quantum Transport Devices, Chiba, Japan, Jun. 2001.
9. “*Quantum Chaos in Nanostructured Semiconductor Devices*”, Invited talk at the International Workshop on Applications of Quantum Chaos, Advanced Telecommunications Research Institute, Nara, Japan, Nov. 2000.

External Research Funding Obtained (2003-2008) – Total = \$6.85M (\$2.4M from ARC-DP)

- 2008-2010 ARC Discovery: *Nanospintronics – Spin Transport in Semiconductor Nanostructures*, A.P. Micolich (UNSW), U. Zülicke (Massey U.) & A.D. Wieck (Bochum), **\$380k**
- 2007-2012 ARC Discovery: *Engineering ultra-low disorder semiconductor quantum nanostructures*, A.P. Micolich (UNSW), A.R. Hamilton (UNSW), U. Zülicke (Massey U.), R.P. Taylor (U. Oregon) & Y. Hirayama (NTT Basic Research Labs, Japan), **\$1.31M**
- 2005-2007 ARC Discovery: *Ion implanted polymers as plastic electronic & superconducting materials*, P. Meredith (U. Queensland), B.J. Powell (UQ), A.P. Micolich (UNSW), R.E. Giedd (Missouri State University), **\$345k**
- 2003-2006 ARC Discovery: *Nanofabrication of Organic Semiconductor and Superconductor Devices* and ARC Australian Postdoctoral Fellowship, A.P. Micolich (UNSW), **\$370k**
- 2004-2009 ARC Research Networks: *Australian Research Council Nanotechnology Network*, C. Jagadish (ANU), L. Faraone (UWA), P. Mulvaney (U. Melb), A.P. Micolich (UNSW) + 46 other authors, **\$1.9M**
- 2003 ARC Special Research Initiatives: *Young Investigators Network for Next-generation Electronic Devices*, A.P. Micolich (UNSW), M.Y. Simmons (UNSW), A.R. Hamilton (UNSW), P. Meredith (UQ), P.C. Dastoor (U. Newcastle) + 17 other authors, **\$10k**
- 2008-2010 ARC Linkage International: *Nanoscale Electronic Devices: Bringing sample design, fabrication, test and theory together*, A.R. Hamilton (UNSW), A.P. Micolich (UNSW), R. Newbury (UNSW), T.P. Martin (UNSW), M. Pepper (U. Cambridge), A.D. Wieck (Bochum), M. Governale (Bochum), R.P. Taylor (U. Oregon) and U. Zülicke (Massey U.), **\$81k**
- 2008 ARC LIEF: *Vector Magnetic Field Facility for Nanoscale Spintronic Materials and Device Research*, A.R. Hamilton (UNSW), A.P. Micolich (UNSW), R. Newbury (UNSW), A. Fuhrer (UNSW), T. P. Martin (UNSW), P.C. Dastoor (U. Newc.), U.K. Divakar (UQ) and B.J. Powell (UQ), **\$440k**
- 2008 ARC LIEF: *Integrated Surface Fabrication and Characterisation Laboratory* P.C. Dastoor (U. Newc.), J. O'Connor (U. Newc.), B.V. King (U. Newc.), A. McCluskey (U. Newc.), W.J. Belcher (U. Newc.), C.M. Stampfl (U. Syd.), J.R. Reimers (U. Syd.), A.R. Hamilton (UNSW), A.P. Micolich (UNSW), C.J. Fell (CSIRO), S.E. Watkins (CSIRO), M. Bown (CSIRO), A.P. Stampfl (ANSTO) and P.J. Evans (ANSTO), **\$750k**
- 2004 ARC LIEF: *Scanning probe facility for atomic-scale device fabrication in silicon and its integration with molecular electronics*, M.Y. Simmons (UNSW), L. Oberbeck (UNSW), N.S. Hush (U. Sydney), J.R. Reimers (U. Syd.), M.J. Crossley (U. Syd.), C.M. Stampfl (U. Syd.), B.V. King (U. Newc.), P.V. Smith (U. Newc.), M.W. Radny (U. Newc.), A.R. Hamilton (UNSW), A.P. Micolich (UNSW) and F. Rosei (U. Quebec), **\$1.235M**
- 2003 AATSE/DEST IAP Programme: *Australian workshop on soft condensed matter and nanoscale physics*, A.R. Hamilton (UNSW) & A.P. Micolich (UNSW), **\$26k**
- 2003-2008 **\$454k** of internal UNSW funding (MREII, UCG, FRGP, etc.)

10 Most Significant Publications – Career

I have a total of 98 publications with **1 book chapter and 73 papers in Refereed Journals and 323 citations** (spanning 1997-2008). My career publication record includes papers in **Nature** (2), **Nature Physics** (1), **Physics World** (1), **Physical Review Letters** (5), **Applied Physics Letters** (6), and **Physical Review** (12). The ten papers below include my three most highly-cited papers (#7,9 and 10).

1. W.R. Clarke, C.E. Yasin, A.R. Hamilton, A.P. Micolich, M.Y. Simmons, K. Muraki, Y. Hirayama, M. Pepper and D.A. Ritchie, *Impact of long- and short-range disorder on the metallic behaviour of two-dimensional systems*, **Nature Phys.** **4**, 55-59 (2007).
2. A.P. Micolich, E. Tavenner, B.J. Powell, A.R. Hamilton, M.T. Curry, R.E. Giedd and P. Meredith, *Superconductivity in Metal-mixed Ion-implanted Polymer Films*, **Appl. Phys. Lett.** **89**, 155203 (2006).
3. R. Danneau, O. Klochan, W.R. Clarke, L.-H. Ho, A.P. Micolich, A.R. Hamilton, M.Y. Simmons, M. Pepper, D.A. Ritchie and U. Zülicke, *Zeeman spin-splitting anisotropy in ballistic hole quantum wires*, **Phys. Rev. Lett.** **97**, 026403 (2006). – **Cited 16 times**
4. O. Klochan, R. Danneau, W.R. Clarke, A.P. Micolich, L.-H. Ho, A.R. Hamilton, K. Muraki and Y. Hirayama, *Ballistic transport in induced one-dimensional hole systems*, **Appl. Phys. Lett.** **89**, 092105 (2006).

This paper was discussed in a News & Views article by K. Ensslin in **Nature Physics** **2**, 587 (2006).

5. R. Danneau, W.R. Clarke, O. Klochan, A.P. Micolich, A.R. Hamilton, M.Y. Simmons, M. Pepper and D.A. Ritchie, *Conductance quantization and the $0.7 \times 2e^2/h$ conductance anomaly in one-dimensional hole systems*, **Appl. Phys. Lett.** **88**, 012107 (2006). – **Cited 16 times**
6. A.P. Micolich, R.P. Taylor, T.P. Martin, R. Newbury, T.M. Fromhold, A.G. Davies, H. Linke, W.R. Tribe, L.D. Macks, C.G. Smith, E.H. Linfield and D.A. Ritchie, *Three key questions on fractal conductance fluctuations: Dynamics, quantization and coherence*, **Phys. Rev. B** **70**, 085302 (2004).
7. A.P. Micolich, R.P. Taylor, A.G. Davies, J.P. Bird, R. Newbury, T.M. Fromhold, A. Ehlert, H. Linke, L.D. Macks, W.R. Tribe, E.H. Linfield, D.A. Ritchie, J. Cooper, Y. Aoyagi and P.B. Wilkinson, *The Evolution of Fractal Patterns during a Classical-Quantum Transition*, **Phys. Rev. Lett.** **87**, 036802 (2001). – **Cited 40 times**
8. P.B. Wilkinson, T.M. Fromhold, R.P. Taylor and A.P. Micolich, *Electromagnetic Wave Chaos in Gradient Refractive Index Optical Cavities*, **Phys. Rev. Lett.** **86**, 5466 (2001). – **Cited 17 times**
9. R.P. Taylor, A.P. Micolich and D. Jonas, *Fractal Analysis of Pollock's Drip Paintings*, **Nature** **399**, 422 (1999). – **Cited 35 times**
10. A.P. Micolich, R.P. Taylor, R. Newbury, J.P. Bird, R. Wirtz, C.P. Dettmann, Y. Aoyagi and T. Sugano, *Geometry-induced Fractal Behaviour in a Semiconductor Billiard*, **J. Phys.: Condens. Matter** **10**, 1339 (1998). – **Cited 28 times**