

## Theme I Outputs

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### Publications:

1. A.F. Pun, X. Wang, S.M. Durbin and J.P. Zheng, Trilayer wafer passivation structure for (100) oriented silicon, *Electrochem. and Sol. State Lett.* **8** G258-G260 (2005).
2. C. T. Lu, S. Johnson, S. P. Lansley, R. J. Blaikie and A. Markwitz, Atmospheric pressure operation of a field emission diode based on self-assembled silicon nanostructures, *Journal of Vacuum Science & Technology B*, **23** (4), 1445-1449 (2005).
3. C.E. Kendrick, P.A. Anderson, R.J. Kinsey, V.J. Kennedy, A. Markwitz, A. Asadov, W. Gao, R.J. Reeves and S.M. Durbin, Polycrystalline InGaN grown by MBE on fused silica glass, *Physica Status Solidi (c)*, **2** 2236-2239 (2005).
4. D. O. S. Melville and R. J. Blaikie, Response to "Comment on 'Submicron imaging with a planar silver lens' " [Appl. Phys. Lett. 86, 126101 (2005)], *Applied Physics Letters*, **86** (12), 126102-1 to 126102-2 (2005).
5. D. O. S. Melville and R. J. Blaikie, Super-resolution imaging through a planar silver layer, *Optics Express*, **13** (6), 2127-2134 (2005).
6. E. D. Walsby, M. Arnold, Q. H. Wu, I. J. Hodgkinson and R. J. Blaikie, Growth and characterisation of birefringent films on textured silicon substrates, *Microelectronic Engineering*, **78-79**, 436 (2005).
7. G. Kumaravelu, M. M. Alkaisi, D. MacDonald, J. Zhao, B. Rong, A. Bittar, Minority carriers lifetime in plasma textured silicon wafers for solar cells, *Solar Energy Materials and Solar Cells*, **87**, 99-106, (2005).
8. I.J. Hodgkinson, Q. H. Wu, L. De Silva, M. Arnold, A. Lakhtakia and M. W. McCall, Structurally-perturbed chiral Bragg reflectors for elliptically polarized light, *Optics Letters*, **30**, 2629 (2005).
9. J. Downard, S. L. Jackson and E. S. Q. Tan, Fluorescence microscopy study of protein adsorption at modified glassy carbon surfaces, *Aust. J. Chem.*, **58**, 275, (2005).
10. J. E. Dalziel, S. C. Finch, J. Dunlop, The fungal neurotoxin lolitrem B inhibits the function of human large conductance calcium activated potassium channels, *Toxicology Letters*, **155**, 421-426, (2005).
11. J. Muys, M. M. Alkaisi, J.J. Evans, J. and Nagase, Analysis of dielectrophoretically trapped biological cells by atomic force microscopy using an integrated biochip platform, *Japanese Journal of Applied Physics*, **44**, No.7B, pp.5717-5723, (2005).
12. J. P. McIlroy, M. H. McCall, A. Lakhtakia and I. J. Hodgkinson. Strong coupling of a surface-relief dielectric grating and a structurally chiral volume grating, *Optik*, **116**, 311 (2005).
13. L. De Silva, I. J. Hodgkinson, P. Murray, Q. H. Wu, M. Arnold, J. Leader and A. McNaughton. Natural and nanoengineered chiral reflectors: Structural color of manuka beetles and titania coatings, *Electromagnetics*, **25**, 391-408 (2005).
14. L. Lin, R. J. Blaikie and R. J. Reeves, Surface-plasmon-enhanced optical transmission through planar metal films, *Journal of Electromagnetic Waves and Applications*, **19** (13), 1721-1728 (2005).

15. L.P. Schuler, M. M. Alkaisi, P. Miller, R.J. Reeves, A. Markwitz, Comparison of DC and RF Sputtered Zinc Oxide Films with Post-annealing and Dry Etching and Effect on Crystal Composition, *Japanese Journal of Applied Physics*, pt,1, **44**, pp7555-7560, (2005).
16. M. D. Arnold, I. J. Hodgkinson, Q. H. Wu and R. J. Blaikie. Multi-axis retarder arrays by masked oblique deposition, *Journal of Vacuum Science & Technology B* **23**, 1398 (2005).
17. M. Kaufmann, A Wurl, J. G. Partridge and S. A. Brown, Structure of Unsupported Antimony Nanoclusters, *Eur. Phys. J. D* **34**, 29 (2005).
18. M. Konijn, M.M. Alkaisi, M.M., R. J. Blaikie. Nanoimprint lithography of sub-100nm 3D structures, *Microelectronic Engineering*, **78-79**, 653-658, (2005).
19. P. A. Brooksby and A. J. Downard, Multilayer Nitroazobenzene Films Covalently Attached to Carbon. An AFM and Electrochemical Study, *J. Phys. Chem. B.*, **109**, 8791, (2005).
20. P. A. Brooksby and A. J. Downard, Nanoscale Patterning of Flat Carbon Surfaces by Scanning Probe Lithography and Electrochemistry, *Langmuir*, **21**, 1672, (2005).
21. P. A. Brooksby, A. J. Downard and S. S. C. Yu, Effect of Applied Potential on Arylmethyl Films Oxidatively Grafted to Carbon Surfaces, *Langmuir*, **21**, 11304, (2005).
22. P.A. Anderson, C.E. Kendrick, R.J. Kinsey, A. Asadov, W. Gao, R.J. Reeves and S.M. Durbin, (111) and (100) YSZ as substrates for indium nitride growth, *Physica Status Solidi (c)* **2** 2320-2323 (2005) .
23. P.A. Anderson, R.J. Kinsey, S.M. Durbin, M. Markwitz, J. Kennedy, A. Asadov, W. Gao and R.J. Reeves, Magnetic and optical characteristics of the InCrN system, *Journal of Applied Physics* **98** 043903-1 to 043903-5 (2005).
24. R. J. Blaikie and D. O. S. Melville, Imaging through planar silver lenses in the optical near field, *Journal of Optics A - Pure and Applied Optics*, **7** (2), S176-S183 (2005).
25. S. A. Scott, M. V. Kral and S. A. Brown, A crystallographic orientation transition and early stage growth characteristics of thin bismuth films on graphite, *Surf. Sci.* **587**, 175 (2005).
26. S. A. Scott, M. V. Kral and S. A. Brown, Self-assembly of oriented Bi nanorods at highly ordered pyrolytic graphite step-edges, *Phys. Rev. B* **72**, 205423 (2005).
27. S. Johnson, A. Markwitz, M. Rudolphi, H. Baumann, P. Y. Kuo, R. Blaikie and A. Mucklich, Effect of crystal orientation on self-assembled silicon nanostructures formed by electron-beam annealing, *Journal of Applied Physics*, **97** (9), 094301-1 to 094301-4 (2005).
28. S. S. C. Yu and A. J. Downard, Dynamic Behavior of Organic Thin Films Attached to Carbon Surfaces, *e- J. Surf. Sci. Nanotech.*, **3**, 294, (2005).

#### **Published conference papers:**

1. A.F. Pun, X. Wang, J.B. Meeks, S.M. Durbin, and J.P. Zheng, In-situ pretreatment approach for surface deterioration alleviation amidst thermal desorption of Si(100), *Proc. of the Materials Research Society Spring Meeting* (San Francisco, CA, USA), J2.3.1-J2.3.6, 28 March – 1 April 2005.

2. A.F. Thomson, D.O.S. Melville, M.D. Arnold and R.J. Blaikie, Fabrication and characterisation of quantised-conductance atomic switches, *Proceedings of the 12th Electronics New Zealand Conference (ENZCon'05)*, Manukau City, New Zealand, 13-18 (2005).
3. B. Kaiser, B. Stegemann, S. Scott, S. A. Brown, The Influence of Growth Kinetics on Island Morphology for Antimony and Bismuth Diffusion and Aggregation on Graphite, *Symposium on Size Selected Clusters*, Brand, Austria, (February 2005).
4. B. Wu, Lansley S.P., R.J. Blaikie, S. Johnson and A. Markwitz, Field-emission triode structure utilising a self-assembled silicon nanowhiskey cathode, *Proceedings of the 12th Electronics New Zealand Conference (ENZCon'05)*, Manukau City, New Zealand, 19-24 (2005).
5. D. O. Melville, R. J. Blaikie and M. M. Alkaisi, Improvement to silver superlens performance through narrowband exposure, *Proceedings of the Plasmonic Nano-imaging and Nanofabrication: SPIE Optics and Photonics Conference*, San Diego, CA, USA, Proc SPIE, **5928**, 18-26 (2005).
6. E. D. Walsby, M. Arnold, Q. H. Wu, I. J. Hodgkinson and R. J. Blaikie, Growth and characterisation of birefringent films on textured silicon substrates, *Microelectronic Engineering*, **78-79**, 436-441 (2005).
7. F. Chen, A.N. Cartwright, P.A. Anderson, S.M. Durbin, H. Lu and W.J. Schaff, Carrier Recombination, Relaxation and Transport Dynamics in InN, 2005 Fall Meeting of the Materials Research Society, Boston, USA, (28 November 2005 – 2 December 2005).
8. I.J. Hodgkinson and L. De Silva. Sculptured thin film handed mirrors. In Complex Mediums VI: Light and Complexity, M. W. McCall, G. Dewar and M. A. Noginov Editors, *Proceedings of the Society of Photo-Optical Instrumentation Engineers* **5924**, 147-158 (2005)
9. I.J. Hodgkinson, L. De Silva and M. D. Arnold, Inorganic polarizing materials grown by physical vapor deposition. In Advances in Thin-Film Coatings for Optical Applications II, M.L.Fulton and J.D.T.Kruschwitz, Editors, *Proceedings of the Society of Photo-Optical Instrumentation Engineers* **5870**, 1-15 (2005).
10. J. Dalziel, S. C. Finch, W. Imlach, N. Houssain, J. Dunlop, BK channel potassium currents are inhibited by lolitrems, *Biophysical Journal Abstracts*, **49**, 500-P, (2005).
11. M. Konijn, M. M. Alkaisi and R. J. Blaikie, Nanoimprint lithography of sub-100 nm 3D structures, *Microelectronic Engineering*, **78-79**, 653-658 (2005).
12. P.A. Anderson, D. Carder, R.J. Reeves and S.M. Durbin, Influence of nitrogen species on InN grown by PAMBE, 2005 Fall Meeting of the Materials Research Society, Boston, USA, (28 November 2005 – 2 December 2005).
13. S. A. Brown, J. Partridge, S. Scott, R. Reichel, A. Ayesh, K. C. Tee, Self-Assembled Cluster Nanostructures and Nanodevices, *Technical Proceedings of the 2005 NSTI conference and trade show*, Anaheim, (May 8-12, 2005). (Oral presentation by S. A. Brown).
14. S. Thongpang, R.J. Blaikie, S.P. Lansley, S. Johnson and A. Markwitz, Field emission diode based on self-assembled silicon nanowhiskers using SIMOX-SOI substrates, *Proceedings of the 12th Electronics New Zealand Conference (ENZCon'05)*, Manukau City, New Zealand, 1-5 (2005).

15. S.M. Durbin, W.C.T. Lee, P. Miller and R.J. Reeves, Role of active oxygen species on growth of ZnO using RF-PAMBE, *2005 Fall Meeting of the Materials Research Society*, Boston, USA, (28 November 2005 – 2 December 2005).
16. W.C.T. Lee, J. Kennedy, A. Markwitz, R.J. Kinsey and S.M. Durbin, Characterisation of PAMBE grown ZnO by ion beam analysis, *14<sup>th</sup> AINSE Conference on Nuclear and Complementary Techniques of Analysis & 9<sup>th</sup> Vacuum Society of Australia Congress*, Wellington, New Zealand, (20-22 November 2005).
17. W.C.T. Lee, P. Miller, T.H. Myers, R.J. Reeves and S.M. Durbin, The effect of annealing on the morphology and optoelectrical characteristics of ZnO thin films grown by plasma assisted molecular beam epitaxy, *2005 U.S. Workshop on the Physics and Chemistry of II-VI Materials*, Boston, USA, Extended abstract, (20-22 September 2005).

### **Conference poster presentations:**

1. A.J. Downard, Dynamic Behavior of Organic Thin Films Attached to Carbon Surfaces, *International Symposium on Surface Science and Nanotechnology (ISS-4)*, Omiya Sonic City, Saitama, Japan, 14-17 November, 2005.
2. A.J. Wright, R.J. Blaikie and G. Turner, Distortion in evanescent near field optical lithography conformable masks, *Proceedings of the Second International Conference on Advanced Materials and Nanotechnology (AMN-2)*, Queenstown, New Zealand, Programme and Abstract Book p. 287 (2005).
3. A.T. Chin and R.J. Blaikie, Light propagation through patterned nanoscale metallic polarisers, *Proceedings of the Second International Conference on Advanced Materials and Nanotechnology (AMN-2)*, Queenstown, New Zealand, Programme and Abstract Book p. 127 (2005).
4. Ayesh, R. Reichel, J. G. Partridge, S. A. Brown, Bi nanocluster wire fabrication using V-grooves as a template, *Australian Nanotechnology Network conference*, Perth, Australia, (July 2005).
5. D.O.S. Melville, M.M. Alkaisi and R.J. Blaikie, Super-resolution i-line proximity lithography with a silver lens (Invited poster presentation), *Proceedings of the 49th International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication (EIPBN05)*, Orlando, Florida, USA, Abstract book, pp. 221-222 (2005).
6. D.O.S. Melville, M.M. Alkaisi, and R.J. Blaikie, Super-resolution near-field lithography using planar silver lenses, *31<sup>st</sup> International Conference on Micro- and Nano-Engineering (MNE05)*, Vienna, Austria, (Invited poster presentation) Won Best Poster award, second prize 19–22 Sept 2005.
7. D.O.S. Melville, M.M. Alkaisi, and R.J. Blaikie, Super-resolution i-line proximity lithography with a silver lens, *49<sup>th</sup> International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication (EIPBN05)*, Orlando, Florida, USA, Abstract book, pp. 221-222. (Invited poster presentation) (31 May–3 June 2005).
8. E. Boyd and R.J. Blaikie, Development of Si/SiO<sub>2</sub> super-lattices deposited by RF reactive sputtering, *Proceedings of the Second International Conference on*

- Advanced Materials and Nanotechnology (AMN-2)*, Queenstown, New Zealand, Programme and Abstract Book p. 304 (2005).
9. E.S. Berthier, F. L'Hostis, M.M. Alkaisi, A.J. Downard and R.J. Blaikie, Microfluidic circuit integration using multilayer soft lithography methods and PDMS, *Proceedings of the Second International Conference on Advanced Materials and Nanotechnology (AMN-2)*, Queenstown, New Zealand, Programme and Abstract Book p. 293 (2005).
  10. E.S.Q Tan, and A.J. Downard, Electrochemical grafting of multilayer amine films onto thin-film carbon substrates, *AMN-2: Second International Conference on Advanced Materials and Nanotechnology*, Queenstown, New Zealand, (6-11 February, 2005).
  11. G. Kumaravelu, M.M. Alkaisi, D. Macdonald, The effect of surface area increase due to plasma texturing on the carrier lifetime of silicon solar cell substrates, *Second International conference on Advanced Materials and Nanotechnology*, 296, Queenstown, New Zealand (6-11 Feb 2005).
  12. H.H, Cheng, C.N. Andrew, J.K. Siaw, M.M. Alkaisi, The fabrication and Characterisation of Metallic Nanotransistors, *31<sup>st</sup> International Conference on Micro- and Nano-Engineering (MNE05)*, Vienna, Austria, (19–22 Sept 2005)
  13. H.H. Cheng, M.M. Alkaisi, J.K. Siaw, J. K, Metallic Nanotransistors, *Second International Conference on Advanced Materials and Nanotechnology*, p 297, Queenstown New Zealand, (Feb 6- 11 2005).
  14. JJ Muys, MM Alkais, J Nagase, JJ Evans Characterisation of endometrial cancer cells by atomic force microscopy, *BioMEMS and Nanotechnology II, SPIE Microelectronics, MEMS, and Nanotechnology*, Brisbane, Australia, (11-14 December 2005).
  15. JJ Muys, MM Alkaisi, JJ Evans, Atomic force microscopy of pituitary gonadotroph cells, *BioMEMS and Nanotechnology II, SPIE Microelectronics, MEMS, and Nanotechnology*, 11- Brisbane, Australia, (14 December 2005).
  16. K. Mohamed, M.M. Alkaisi, and J. Smail, Resist Deformation at Low Temperature in Nano-Imprint Lithography (NIL) *Second International Conference on Advanced Materials and Nanotechnology*, p 284, Queenstown New Zealand, (Feb 6-11, 2005).
  17. L. Lin, S.J. Drake, R.J. Reeves and R.J. Blaikie, Control of the optical transmission of metal films via excitation of surface plasmons, *Proceedings of the Second International Conference on Advanced Materials and Nanotechnology (AMN-2)*, Queenstown, New Zealand, Programme and Abstract Book p. 125 (2005).
  18. L. Williams, P.A. Anderson, R.J. Kinsey, S.M. Durbin and R.J. Reeves, Photoluminescence and photoconductivity exhibited by PAMBE grown InN, *AMN-2, 2<sup>nd</sup> International Conference on Advanced Materials and Nanotechnology*, Queenstown, New Zealand, (6-11 February 2005).
  19. Leo P. Schuler, M. M. Alkaisi, P. Miller, R. J. Reeves, S. Brown, A. Markwitz Comparison of dry etched DC and RF sputtered ZnO films and the effect on the crystal composition, *Second International Conference on Advanced Materials and Nanotechnology*, p308, Queenstown New Zealand, (Feb 6-11, 2005).
  20. M. Konijn, M.M. Alkaisi and R.J. Blaikie, Fabrication of 3D nanoimprint lithography molds, *Proceedings of the Second International Conference on*

- Advanced Materials and Nanotechnology (AMN-2), Queenstown, New Zealand, Programme and Abstract Book p. 282 (2005).
21. M.D. Arnold, I.J. Hodgkinson, Q.h. Wu and R.J. Blaikie, Lithographic patterning of obliquely deposited polarising elements, *Proceedings of the Second International Conference on Advanced Materials and Nanotechnology (AMN-2)*, Queenstown, New Zealand, Programme and Abstract Book p. 285 (2005).
  22. M.M. Alkaisi, J.J. Muys, J. J. Evans, J. J. Imaging of biological cells atomic force microscopy using an integrated biochip platform, won Outstanding Young Scientist award. *1<sup>st</sup> International Workshop of Nanosystems Institute*, Seoul National University, Korea, (May 30-31, 2005),
  23. P.A. Brooksby, and A.J. Downard, Nitrophenyl and nitrobenzene thin films on carbon surfaces, *AMN-2: Second International Conference on Advanced Materials and Nanotechnology*, Queenstown, New Zealand, (6-11 February, 2005).
  24. R. Reichel, J. G. Partridge, A. Ayesh, S. A. Brown, Self-assembly of Bi clusters in lithographically defined patterns, *Australian Nanotechnology Network conference*, Perth, Australia, (July 2005).
  25. S. J. Drake, N. Kohn, R.J. Blaikie, R.J. Reeves and M.M. Alkaisi, Photoresist as an Anti-Reflection Coating for Interference Lithography, *Second International Conference on Advanced Materials and Nanotechnology*, p292, Queenstown New Zealand, (Feb. 6-11, 2005).
  26. S.P. Lansley, P.-Y. Kuo, Lu, C.-T., S. Johnson, A. Markwitz and R.J. Blaikie, Nanostructuring of silicon by electron beam annealing, *Proceedings of the Second International Conference on Advanced Materials and Nanotechnology (AMN-2)*, Queenstown, New Zealand, Programme and Abstract Book p. 309 (2005).
  27. S.S.C. Yu, A.J. Downard, P.A. Brooksby, E.S.Q. Tan and R.J. Blaikie, Fabrication and surface modification of composite carbon and silicon hybrid materials, *Proceedings of the Second International Conference on Advanced Materials and Nanotechnology (AMN-2)*, Queenstown, New Zealand, Programme and Abstract Book p. 257 (2005).
  28. W.C.T. Lee, J. Kennedy, A. Markwitz, R.J. Kinsey and S.M. Durbin, Characterisation of PAMBE grown ZnO by ion beam analysis, *14<sup>th</sup> AINSE Conference on Nuclear and Complementary Techniques of Analysis & 9<sup>th</sup> Vacuum Society of Australia Congress*, Wellington, New Zealand, (20-22 November 2005).
  29. W.L. Chiu, M.M. Alkaisi, R.J. Blaikie, R. Reeves, S.J. Drake, Sub-wavelength texturing for solar cells using Interferometric Lithography, *Second International Conference on Advanced Materials and Nanotechnology*, p 286, Queenstown New Zealand, (Feb 6-11, 2005) .

### **Conference oral presentations:**

1. A.F. Pun, X. Wang, J.B. Meeks, S.M. Durbin, and J.P. Zheng, In-situ pretreatment approach for surface deterioration allevation amidst thermal

- desorption of Si(100), *Proc. of the Materials Research Society Spring Meeting*, San Francisco, CA, USA, (28 March – 1 April 2005).
2. D.O.S. Melville and R.J. Blaikie, A comparison of near-field lithography and planar lens lithography through simulation and experiment, *Proceedings of the Second International Conference on Advanced Materials and Nanotechnology (AMN-2)*, Queenstown, New Zealand, Programme and Abstract Book p. 185 (2005).
  3. H.M. Yusoff, R.K. Shastri and J. Abrahamson, Effect of arc parameters on CNT growth using a continuous reactor, paper PG4.3 in *AMN-2*, Queenstown, NZ (2005).
  4. I.J. Hodgkinson. Structural colour from natural and nanoengineered circular Bragg resonators. Invited paper presented at *AMN-2: Second International Conference on Advanced Materials and Nanotechnology*, Queenstown, (6-11 February, 2005).
  5. I.J. Hodgkinson, Vacuum-deposited form-birefringent materials for use as retarders and polarizers, Invited presentation at *American Vacuum Society International Symposium and Exhibition*, Boston, MA, (October 30 – November 4, 2005).
  6. J. Connolly, DJN Wall, JJ Evans The responses of luteinising hormone to interacting peptides: A mathematical model, *Canterbury Health Research Conference 2005* Christchurch, (26-27 August 2005).
  7. J. Downard and R. Du Plessis, Invited talk: Nanotechnologies in NZ: A cross-disciplinary dialogue, *Foundations for Success Symposium: Nanotechnologies in New Zealand: Opportunities and Challenges*, Queenstown, New Zealand, (10 February, 2005).
  8. J. Downard, Invited talk: Smartening-up carbon: towards chemically well-defined interfaces through attachment of molecular layers. *AMN-2: Second International Conference on Advanced Materials and Nanotechnology*, Queenstown, New Zealand, (6-11 February, 2005).
  9. J. Dunlop, H. T. Phung, Y. Zhang, J. E. Dalziel, Single channel and macroscopic currents for BK and voltage-gated sodium channels supported on and stored in a novel system, *New Zealand Society of Biochemistry and Molecular Biology Annual Conference*, Dunedin, (2005).
  10. J. G. Partridge, S. A. Brown, R. Reichel, M. Kaufmann, A. Ayeshe and K. C. Tee, Cluster-assembled wires with nano-scale widths, *2<sup>nd</sup> International conference on Advanced Materials and Nanotechnology (AMN-2)*, Queenstown, New Zealand, (February 2005).
  11. J. Kennedy, A. Markwitz, Z. Li, W. Gao, S. Durbin and R. Reeves, Realisation of p-type doping of ZnO thin films via nitrogen ion implantation, *International Conference on Advanced Materials Development and Performance*, Auckland, New Zealand, (11-13 July 2005).
  12. J. Kennedy, A. Markwitz, Z. Li, W. Gao, S.M. Durbin and R.J. Reeves, Modification of electrical conductivity in RF sputtered ZnO films and ZnO crystals by low-energy hydrogen implantation, *AMN-2, 2<sup>nd</sup> International Conference on Advanced Materials and Nanotechnology*, Queenstown, New Zealand, (6-11 February 2005).

13. J. van Lith, A. Lassesson, S. A. Brown, Nano Cluster Devices Hydrogen Sensors, *Connect Canterbury Sensor Showcase*, Christchurch, (November 2005).
14. J.E. Dalziel, W. Imlach, S. Finch, D. S.Kerr, J. Dunlop, Inhibitory effects of lolitremis on human BK channels expressed in the brain, *Australasian Winter Conference on Brain Research*, Queenstown, (2005).
15. J.J. Muys, M.M. Alkaisi, J.J. Evans, J. Nagase, Analysis of dielectrophoretically trapped biological cells by atomic force microscopy using a biochip platform, *Second International conference on Advanced Materials and Nanotechnology*, p 144, Queenstown New Zealand, (Feb 6-11, 2005).
16. L. De Silva, I. J. Hodgkinson and Q. H. Wu. Sculpturing thin films for DUV wavelengths, Presented at *AMN-2: Second International Conference on Advanced Materials and Nanotechnology*, Queenstown, (6-11 February, 2005).
17. L. Lin, R.J. Reeves and R.J. Blaikie, Plasmon-enhanced optical transmission through planar metal films, *Proceedings of the Progress in Electromagnetics Research Symposium (PIERS'05)*, Hangzhou, China, Book of Abstracts, p. 610 (2005).
18. Leo P. Schuler, Maan M. Alkaisi, Paul Miller, Roger J. Reeves, UV sensing using Surface Acoustic Wave device on DC sputtered ZnO monolayer, *31<sup>st</sup> International Conference on Micro- and Nano-Engineering (MNE05)*, Vienna, Austria, (19–22 Sept 2005).
19. M. D. Arnold, I. J. Hodgkinson, Q. H. Wu and R. J. Blaikie, Lithographic patterning of obliquely deposited polarizing elements. Presented at *AMN-2: Second International Conference on Advanced Materials and Nanotechnology*, Queenstown, (6-11 February, 2005).
20. M. D. Arnold, I.J. Hodgkinson and R. J. Ballagh. Simulations of growth and optical anisotropy of obliquely deposited thin films, Presented at *AMN-2: Second International Conference on Advanced Materials and Nanotechnology*, Queenstown, (6-11 February, 2005).
21. Markwitz, S. Johnson, J. Kennedy, M. Rudolphi, H. Baumann, P.-H. Kuo and R.J. Blaikie, Investigating the fabrication of SiC nanoboulders on Si(100) surface by  $^{12}\text{C}$  implantation and electron beam annealing, *Proceedings of the Second International Conference on Advanced Materials and Nanotechnology (AMN-2)*, Queenstown, New Zealand, Programme and Abstract Book p. 321 (2005).
22. Martin J. H. Henseler, William C. T. Lee, Paul Miller, Steven M. Durbin, Roger R. J. Reeves, Optical and photoelectrical properties of ZnO thin films and the effects of annealing, *3<sup>rd</sup> International Conference for Advanced Technologies – ICMAT 2005*, Singapore, (3-8 July 2005).
23. P.A. Anderson, D. Carder, R.J. Reeves and S.M. Durbin, Influence of nitrogen species on InN grown by PAMBE, *2005 Fall Meeting of the Materials Research Society*, Boston, USA, (28 November 2005 – 2 December 2005).
24. P.A. Anderson, R.J. Kinsey, C.E. Kendrick, L. Williams, R.J. Reeves, A. Asadov, W. Gao, J. Kennedy, A. Markwitz and S.M. Durbin, Room temperature ferromagnetism in the  $\text{In}_{1-x}\text{Cr}_x\text{N}$  system: A magnetic and optical study, *AMN-2, 2<sup>nd</sup> International Conference on Advanced Materials and Nanotechnology*, Queenstown, New Zealand, (6-11 February 2005).

25. P.A. Anderson, R.J. Kinsey, Z. Liu, S. Ringer, R.J. Reeves and S.M. Durbin, Multiple photoluminescence peaks from mixed-phase indium nitride thin films, *European Materials Research Society Meeting*, Warsaw, Poland, (6-10 September 2005).
26. P.A. Anderson, R.J. Reeves and S.M. Durbin, RF plasma sources for III-nitrides growth: influence of operating conditions and device geometry on active species production and InN film properties *European Materials Research Society Meeting*, Warsaw, Poland, [Invited] (6-10 September 2005).
27. R.J. Blaikie and D.O.S. Melville, Plasmon-enhanced near-field optical lithography (Invited oral presentation), *Proceedings of the Progress in Electromagnetics Research Symposium (PIERS'05)*, Hangzhou, China, Book of Abstracts, p. 612 (2005).
28. R.J. Blaikie and D.O.S. Melville, Projecting super-resolution near-field images through silver (Invited oral presentation), *Proceedings of the 14th International Laser Physics Workshop (LPHYS'05)*, Kyoto, Japan, Book of Abstracts, p. 34 (2005).
29. R.J. Blaikie, Nanolithography for the research and development environment (Invited Tutorial Lecture), *Proceedings of the International workshop on: Nanotechnology, the building block for tomorrow's advanced technology*, Perth, Australia, Programme book, p. 8 (2005).
30. R.J. Blaikie, Optical lithography using evanescent fields (Invited Plenary Talk), *Proceedings of the 14th Australian Conference on Nuclear and Complementary Techniques of Analysis & 8th Vacuum Society of Australia Congress*, Wellington, New Zealand, 1 (2005).
31. R.J. Kinsey, P.A. Anderson, C.E. Kendrick, L. Williams, R.J. Reeves, Z. Liu, S. Ringer and S.M. Durbin, Indium nitride: Towards and understanding of the bandgap, *AMN-2, 2<sup>nd</sup> International Conference on Advanced Materials and Nanotechnology*, Queenstown, New Zealand, (6-11 February 2005).
32. R.J. Kinsey, P.A. Anderson, R.J. Reeves, S.M. Durbin, Z. Liu, S.P. Ringer, A.V. Soldatov and M. Petracic, Nanostructural Analysis Of Indium Nitride, *6<sup>th</sup> International Conference on Nitride Semiconductors*, Bremen, Germany, (28 August – 2 September 2005).
33. R.J. Reeves, L. Williams, K. Beha, P. Anderson, S.M. Durbin, Photoluminescence and photoconductivity exhibited by PAMBE-grown InN, *3<sup>rd</sup> International Conference for Advanced Technologies – ICMAT 2005*, Singapore, [Invited] (3-8 July 2005).
34. S. A. Brown Self Assembly as an Alternative to Top Down Processing, *Nano Commerce/SEMI Nano Forum*, Chicago, (1-3 November, 2005).
35. S. A. Brown, Nano Cluster Devices Ltd, *SEMICON West Technology Innovation Showcase*, San Francisco, (July 12-14, 2005).
36. S. Scott, S. A. Brown and M. Kral, Self-Assembly of Nanoscale Bi and Sb Surface Islands, *2<sup>nd</sup> International conference on Advanced Materials and Nanotechnology (AMN-2)*, Queenstown, New Zealand, (February 2005).
37. S.M. Durbin, P.A. Anderson, R.J. Kinsey, and R.J. Reeves, Perspectives on the properties of indium nitride, *International Conference on Advanced Materials Development and Performance 2005*, Auckland, New Zealand, [Invited], (11-13 July 2005).

38. S.M. Durbin, W.C.T. Lee, P. Miller and R.J. Reeves, Role of active oxygen species on growth of ZnO using RF-PAMBE, *2005 Fall Meeting of the Materials Research Society*, Boston, USA, (28 November 2005 – 2 December 2005).
39. S.M. Durbin, W.C.T. Lee, R.P. Millane, Z. Liu, S.P. Ringer, F. Bertram and R.J. Reeves, Direct formation of nanoporous ZnO networks, *52<sup>nd</sup> International AVS Symposium and Exhibition*, Boston, USA, (30 October 2005 – 4 November 2005).
40. W. Imlach, J.E. Dalziel, S. Finch, D. S.Kerr, J. Dunlop, Structural determinants of BK channel inhibition by lolitrems, *Australasian Winter Conference on Brain Research*, Queenstown, (2005).
41. W.C.T. Lee, E.D. Walsby, M. Kral, P. Miller, R.J. Reeves and S.M. Durbin, Effects of growth templates on ZnO grown by RF-PAMBE, *AMN-2, 2<sup>nd</sup> International Conference on Advanced Materials and Nanotechnology*, Queenstown, New Zealand, (6-11 February 2005).
42. W.C.T. Lee, E.D. Walsby, R.J. Blaikie, S.M. Durbin, F. Bertram, S. Giemsch and J. Christen, Structural and optical micro-characterization of ZnO growth on patterned substrate, Strasbourg, France (31 May – 3 June 2005).
43. W.C.T. Lee, P. Miller, R.J. Reeves and S.M. Durbin, RF power dependency of ZnO films grown by plasma-assisted molecular beam epitaxy, *23<sup>rd</sup> North American Molecular Beam Epitaxy Conference*, Santa Barbara, California, USA, (11-14 September 2005).
44. W.C.T. Lee, P. Miller, T.H. Myers, R.J. Reeves and S.M. Durbin, The effect of annealing on the morphology and optoelectrical characteristics of ZnO thin films grown by plasma assisted molecular beam epitaxy, *2005 U.S. Workshop on the Physics and Chemistry of II-VI Materials*, Boston, USA, (20-22 September 2005).
45. Zongwen Liu, Robert J. Kinsey, Steven M. Durbin and Simon P. Ringer, HRTEM study of InN films grown on sapphire – evidence for a cubic InN structure, *Microscopy and Microanalysis 2005*, Honolulu, Hawai'i USA, (31 July – 5 August 2005).

#### **Invited talks:**

1. A.J. Downard, Invitee and Panelist at Global Nanotechnology Network meeting, Saarbrücken, Germany, May 26-27, 2005.
2. I.J. Hodgkinson. Inorganic birefringent materials, retarders and polarizing filters for ultraviolet, visible and near infrared wavelengths. Invited talk presented at JDSUniphase, Santa Rosa, California, 27 October 2005.
3. I.W.M. Brown, Structural and Thermal Characterisation of Nanostructured Alumina Templates, Landcare Research Energy Materials Seminar, 24 Feb 2005.
4. M. M. Alkaisi, Development of the biochip, *Seoul National University, Seoul, Korea* June 1<sup>st</sup>, 2005.
5. M. M. Alkaisi, Imaging of biological cells by atomic force microscopy using an integrated biochip platform, *Medical Physics and Bioengineering Dept*, Christchurch Hospital, April 19, 2005.

6. M. M. Alkaisi, Nanoengineering: Emerging technologies and potential applications *IPENZ convention 2005*, Auckland, New Zealand, 18 March, 2005.
7. R.J. Blaikie, Imaging pellicle for proximity optical lithography, Presentation to Canterprise Investor Advisory Group, University of Canterbury, Christchurch 14 October 2005.
8. R.J. Blaikie, Imaging pellicle for proximity optical lithography, Presentation to iGlobe Treasury Investors, University of Canterbury, Christchurch 17 November 2005.
9. R.J. Blaikie, MacDiarmid Institute: University of Canterbury Node, Presentation to TEC Partnerships for Excellence Selection Panel, University of Canterbury, Christchurch 7 April 2005.
10. R.J. Blaikie, MacDiarmid Institute: University of Canterbury Node, Presentation to the Prime Minister of New Zealand, University of Canterbury, Christchurch 6 May 2005.
11. R.J. Blaikie, MacDiarmid Institute: University of Canterbury Node, Presentation to the Japanese Ambassador to New Zealand, University of Canterbury, Christchurch 12 May 2005.
12. R.J. Blaikie, Nanoengineered Structures: optics, electronics and beyond, Presentation at MoRST Nanotechnology Workshop, Wellington 23 November 2005.
13. R.J. Blaikie, Research collections for interdisciplinary research: real, virtual and ever-growing (Invited oral presentation), Proceedings of the Research ... Libraries ... Collections ... Creating Knowledge: A Conference at the National Library of New Zealand, Wellington, New Zealand, 2005.
14. S. Brown, Chemical Week electronic chemicals Outlook, San Francisco, September 13, 2005.
15. S. Brown, Nano Cluster Devices' Hydrogen Sensors', Sensor Showcase, Connect Canterbury, Christchurch, NZ. (Presentation by J. van Lith). 2005.
16. S. Brown, Nano Commerce/SEMI Nano Forum, Chicago 1-3 November, 2005.
17. S. Brown, Nanotechnology, invited presentation at SemiCon West, San Francisco, July 2005.
18. S. Brown, SEMICON West Technology Innovation Showcase, San Francisco, July 12-14, 2005.
19. S. Durbin, Department of Electrical and Computer Engineering, Florida A&M University and The Florida State University, Tallahassee, FL, USA 17 November 2005.
20. S. Durbin, Department of Electrical Engineering, University at Buffalo, The State University of New York, Buffalo, NY, USA 3 November 2005.
21. S. Durbin, Department of Physics Seminar, West Virginia University, Morgantown, West Virginia USA 11 January 2005.

### **Industry reports:**

1. I.J. Hodgkinson and Q. H. Wu. Thin Film Research Study, Confidential Project Report prepared for the MicroDisplay Corporation, USA, 37pages, 23 figures, 1 table, 1 February, 2005.

**Books:**

1. M. M. Alkaisi, R.J. Blaikie, .Chapter title: Nanolithography in the Evanescent Near Field, in *Micromanufacturing and Nanotechnology* Springer-Verlag, Germany, Chapter 17, Page 395-422, ISBN:3-540-25377-7 Sept. 2005.

**Patents:**

1. J. E. Dalziel, S. C. Finch, J. Dunlop, Channel blocking compounds, New Zealand Patent No. 42247, 2005.
2. J. G. Partridge, D. M. Mackenzie, and S. A. Brown, Nanoscale Patterning And Fabrication Methods, New Zealand Patent Application No. 540798. Provisional Patent Application Lodged 15 June 2005.
3. M.M. Alkaisi, J.J. Muys, BioImprint™, New Zealand patent application No. 540713. 13 June 2005.
4. R. Reichel, J. G. Partridge, and S. A. Brown, Nanoscale And Microscale Lithography Methods And Resultant Devices, New Zealand Patent Application No. 541209. Provisional Patent Application Lodged 8 July 2005.
5. R.J. Blaikie, M.M. Alkaisi, and D.O.S. Melville, Improvements in or related to lithography, New Zealand provisional patent, application number 540333 filing date 26 May 2005.
6. R.J. Blaikie, M.M. Alkaisi, D.O.S. Melville, Lithography Pellicle, New Zealand patent application number 540333, 26 May 2005.
7. S. A. Brown, A. Lassesson and J. van Lith, Fluid Sensors And Fabrication Methods, New Zealand Patent Application No. 529931. Provisional Patent Application Lodged 9 May 2005. Further Provisional Patent Application Lodged 5 August 2005
8. S. A. Brown, K. P. Grundy, J. Fjelstad, and A. Rae, Electrostatic Discharge Protection & Fabrication Methods, US Provisional Patent Application Lodged 30 August 2005.
9. T. Phung, J. Dunlop, Y. Zhang, J. E. Dalziel, A method of forming biomimetic membranes, New Zealand Patent Application No. 542286, 2005.

**Awards, medals, fellowships:**

1. R.J. Blaikie, Appointed to Marsden Fund Council (Chair of Physical Sciences and Engineering Panel), 2005.
2. Shelley Scott, MacDiarmid Young Scientist of the Year for Materials and Manufacturing, 2005. (Supervisor S. Brown)
3. Shelley Scott, one of only 3 NZ representatives at Lindau Nobel Prize winners meeting 2005. (Supervisor S. Brown)
4. Shelley Scott, runner-up, MacDiarmid Young Scientist of the Year, 2005. (Supervisor S. Brown)

5. W. Bowen, Bragg Gold Medal for Excellence in Physics. The Bragg Medal is awarded annually by the Australian Institute of Physics for the best PhD thesis by a student at an Australian University
6. W. Bowen, The J. G. Crawford Prize is awarded annually by the Australian National University for the most outstanding science PhD thesis.

**Talks or interactions with community groups or schools:**

1. J.J. Evans, Interview with Mary Stevens about the Animal Ethics Committee of the Christchurch School of Medicine and Health Sciences, 11 October 2005.
2. R.J. Blaikie, Going forward with the Marsden Fund – the view of a panel member , Presentation at Lincoln University, Christchurch, 21 September 2005.
3. R.J. Blaikie, Going forward with the Marsden Fund – the view of a panel member , Presentation at University of Canterbury, Christchurch, 18 October 2005.
4. R.J. Blaikie, Nanotechnology research at the University of Canterbury, Presentation to final-year undergraduate students, University of Canterbury, Christchurch, 22 May 2005.
5. S. Brown, Nanotechnology – building things on a scale of a billionth of a metre, Christchurch West Rotary Club, Christchurch, 22 July 2005.
6. S. Brown, Nanotechnology – building things on a scale of a billionth of a metre, Garden City Rotary Club, Christchurch, 14 July 2005.

**Visitors:**

1. Dr Keisuke Shinagawa, Canon Corp., Japan (September 2005). (hosted by R. Blaikie, UoC)
2. Dr M. A. Quilliam, Institute for Marine Biosciences, National Research Council, Canada. November, 2005 (hosted by J. Dunlop, AgResearch).
3. Dr Ralph Rosenbaum, Tel Aviv University (Jan 2005).(hosted by R. Blaikie, UoC)
4. Dr Tim Drysdale, Glasgow University (March 2005). (hosted by R. Blaikie, UoC)
5. Dr Warwick Bowen, University of Otago (October 2005). (hosted by R. Blaikie, UoC)
6. Dr. Masashi Kuwahara Centre for Applied Near-field Optics Research (CAN-FOR) National Institute of Advanced Industrial Science and Technology (AIST) Tsukuba, Japan, Feb 2005. (hosted by M. Alkaisi, UoC)
7. Martin McCall and Kenny Weir, Imperial College, visit to Dept of Physics, University of Otago, March 2005 (hosted by I. Hodgkinson, UoO).
8. Prof Alex Efros, Utah State University (November 2005). (hosted by R. Blaikie, UoC)
9. Prof. Tom Myers, West Virginia University, Erskine Fellow August – October 2005. (hosted by S. Durbin, UoC)

### **International linkages:**

1. Dr Bill Tumas & Dr Tony Burrell, Los Alamos National Laboratory (LANL), USA. (I. Brown, IRL)
2. Dr J Schwartz, University of Adelaide, Australia, (J. Evans, UoC).
3. Dr S Fox, University of Cambridge, England, (J. Evans, UoC).
4. Dr. Mladen Petracic, Australian National University, (S. Durbin, UoC).
5. Mark Warner, University of Cambridge. (S. Brown, UoC).
6. Prof Hank Smith, MIT (USA) – hosted visit from PhD student in August 2005. (R. Blaikie, UoC)
7. Prof Robin Grimes, Dept of Materials, Imperial College, London. (I. Brown, IRL)
8. Prof. Alex Cartwright, University of Buffalo, State University of New York, (S. Durbin, UoC).
9. Prof. H. J. Kimble, The California Institute of Technology, U.S.A, (W. Bowen, UoO).
10. Prof. J. Christensen, Magdeburg University, (S. Durbin, UoC).
11. Prof. K. J. Vahala, The California Institute of Technology, U.S.A, (W. Bowen, UoO).
12. Prof. Tom Myers, West Virginia University (S. Durbin, UoC)
13. Professor J Wimalasena, University of Tennessee, USA, (J. Evans, UoC).
14. Professor M G Nicholls, United Arab Emirates University, United Arab Emirates, (J. Evans, UoC).
15. W. Bowen, Dr. T. C. Ralph, Department of Physics, University of Queensland, Australia, (W. Bowen, UoO).
16. W. Bowen, Dr. T. J. Kippenberg, [Max-Planck-Institut für Quantenoptik](#), Garching, Germany, (W. Bowen, UoO).
17. W. Bowen, Prof. C. Fabre and Dr. N. Treps, Laboratoire Kastler Brossel, Ecole Normale Supérieure and Université Pierre et Marie Curie, Paris, (W. Bowen, UoO).
18. W. Bowen, Prof. H.-A. Bachor and Dr. P. K. Lam, Department of Physics, The Australian National University, (W. Bowen, UoO).