

## Theme 4 Outputs:

### 1. Publications:

1. A. Lutti, and P.T. Callaghan, Effect of shear on an onion texture, *Eur. Phys. J. E*, **24**, 129-137, (2007)
2. A. Lutti, and P.T. Callaghan, Measurement of multilamellar onion dimensions under shear using frequency domain pulsed gradient NMR, *J. Magn. Reson.*, **187**, 251-257, (2007)
3. A. Noisuwan, Y. Hemar, J.E. Bronlund, B. Wilkinson, and M.A.K. Williams, Viscosity, swelling and starch leaching during the early stages of pasting of normal and waxy rice starch suspensions containing different milk protein ingredients, *Starch / Stärke*, **59**, 379–387, (2007)
4. A. Strom, P. Ribelles, L. Lundin, I.T. Norton, E.R. Morris, and M.A.K. Williams, Influence of pectin fine structure on the mechanical properties of calcium-pectin and acid-pectin gels, *Biomacromolecules*, **8**, 2668-2674, (2007)
5. B. Douglass, R.J. Cormier, and P.T. Callaghan, Shear deformation of polymer melt observed via proton NMR: theory and experiment, *Phys. Rev. E*, **75**, 041802-1 to 041802-9, (2007)
6. E. Tønning, D. Polders, S.B. Engelsen, and P.T. Callaghan, A novel improved method for analysis of 2D diffusion-relaxation data, *J. Magn. Reson.*, **188**, 10-23, (2007)
7. E.C. Le Ru, P.G. Etchegoin, J. Grand, N. Felidj, J. Aubard, and G. Levi, Mechanisms of Spectral Profile Modification in Surface-Enhanced Fluorescence, *J. Phys. Chem. C*, **111**, 16076, (2007)
8. E.C. Le Ru, E. Blackie, M. Meyer, and P.G. Etchegoin, Surface Enhanced Raman Scattering Enhancement Factors: A Comprehensive Study, *J. Phys. Chem. C*, **111**, 13794, (2007)
9. J. Lekner, Acoustic beam invariants, *Phys. Rev. E*, **75**, 36610: 1-6, (2007)
10. J. Lekner, Reflectionless eigenstates of the  $\text{sech}^2$  potential, *Am. J. Phys.*, **75**, 1151-1157, (2007)
11. J. Lekner, Viscous flow through pipes of various cross-sections, *Eur. J. Phys.*, **28**, 521-527, (2007)
12. J. Lekner, Young Einstein and the beginnings of quantum mechanics, *NZ Sci. Rev.*, **64**, 011-019, (2007)
13. K.E. Washburn, and P.T. Callaghan, Propagator Resolved Transverse Relaxation Exchange Spectroscopy, *J. Magn. Reson.*, **186**, 337-340, (2007)
14. M. Campoy-Quiles, J. Nelson, D.D.C. Bradley, and P.G. Etchegoin, Dimensionality of electronic excitations in organic semiconductors: A dielectric function approach, *Phys. Rev. B*, **76**, 235206, (2007)
15. M. Sims, S.M. Tuladhar, J. Nelson, R.C. Maher, M. Campoy-Quiles, S.A. Choulis, M. Mairy, D.D.C. Bradley, P.G. Etchegoin, C. Tregidgo, K. Suhling, D.R. Richards, P. Massiot, C.B. Nielsen, and J.H.G. Steinke, Correlation between microstructure and charge transport in poly(2,5-dimethoxy-p-phenylenevinylene) thin films, *Phys. Rev. B*, **76**, 195206, (2007)
16. M.A.K. Williams, A.T. Marshall, P. Anjukandi, and R.G. Haverkamp, Investigation of the effects of fine structure on the nanomechanical properties of pectin, *Phys. Rev. E*, **76**, 21927, (2007)
17. M.E. Halse, and P.T. Callaghan, Imaged deconvolution: a method for extracting high-resolution NMR spectra from inhomogeneous fields, *Journal of Magnetic Resonance*, **185**, 130-137, (2007)

18. M.W. Hunter, and P.T. Callaghan, NMR measurement of non-local dispersion tensor, *Phys. Rev. Lett.*, **99**, 210602, (2007)
19. P. Savigny, J.J. Evans, and K.M. McGrath, Cell membrane structures during exocytosis, *Endocrinology*, **148**, 3863-3874, (2007)
20. P.G. Etchegoin, E.C. Le Ru, R.C. Maher, and L.F. Cohen, Enhancement factor averaging and the photostability of probes in SERS vibrational pumping, *Phys. Chem. Chem. Phys.*, **9**, 4923, (2007)
21. P.G. Etchegoin, M. Meyer, and E.C. Le Ru, Statistics of single molecule SERS signals: is there a Poisson distribution of intensities?, *Phys. Chem. Chem. Phys.*, **9**, 3006, (2007)
22. P.G. Etchegoin, M. Meyer, E. Blackie, and E.C. Le Ru, Statistics of Single-Molecule Surface Enhanced Raman Scattering Signals: Fluctuation Analysis with Multiple Analyte Techniques, *Anal. Chem.*, **79**, 8411, (2007)
23. P.T. Callaghan, A. Coy, R. Dykstra, C.D. Eccles, M.E. Halse, M.W. Hunter, O.R. Mercier, and J.N. Robinson, New Zealand developments in Earth Field NMR, *Applied Magnetic Resonance*, **32**, 63-75, (2007)
24. R.G. Haverkamp, A.T. Marshall, and M.A.K. Williams, Entropic and Enthalpic Contributions to the Chair-Boat Conformational Transformation in Dextran under Single Molecule Stretching, *J. Phys. Chem. B*, **111**, 13653-13657, (2007)
25. R.G. Haverkamp, A.T. Marshall, and M.A.K. Williams, Model for stretching elastic biopolymers which exhibit conformational transitions, *Phys. Rev. E*, **75**, 21907, (2007)
26. R.R. Vincent, D.N. Pinder, Y. Hemar, and M.A.K. Williams, Microrheological studies reveal semiflexible networks in gels of a ubiquitous cell wall polysaccharide, *Phys. Rev. E*, **76**, 31909, (2007)

**2. Published conference papers:**

**3. Conference presentations:**

1. A. Cucheval, R.R. Vincent, Y. Hemar, D.N. Pinder, D. Otter, and M.A.K. Williams, Investigations of milk acid gelation using difusing wave spectroscopy and multiple particle tracking, *Structure & Dynamics in Soft Condensed Matter*, Lysekil, Sweden, (Aug-2007)
2. K.M. McGrath, Dynamic processes in emulsions, *International Soft Matter Conference 2007 (ISMC2007)*, Aachen, Germany, (Oct-2007)
3. K.M. McGrath, Manipulating crystal nucleation through soft substrate interactions, *International Soft Matter Conference 2007 (ISMC2007)*, Aachen, Germany, (Oct-2007)
4. M.A.K. Williams, R.R. Vincent, D.N. Pinder, and Y. Hemar, Micro-rheological studies of biopolymer networks with Multiple Particle Tracking, *The Third International Conference on Advanced Materials and Nanotechnology (AMN-3)*, Wellington, (Feb-2007)
5. M.A.K. Williams, R.R. Vincent, D.N. Pinder, and Y. Hemar, Micro-rheological studies reveal semi-flexible networks in gels of a ubiquitous cell wall polysaccharides, *Second International Conference on Mechanics of Biomaterials & Tissues*, Lihue, Kaua'i, Hawaii, (Dec-2007)
6. R.R. Vincent, D.N. Pinder, Y. Hemar, and M.A.K. Williams, Microrheological studies of the structure and dynamics of gels of a major plant cell wall polysaccharide, *Structure & Dynamics in Soft Condensed Matter*, Lysekil, Sweden, (Aug-2007)

#### **4. Invited talks:**

##### ***Conference invitations***

1. P.G. Etchegoin, Accurate determinations of enhancement factors in SERS, *Colloquium Spectroscopicum Internationale XXXV*, Xiamen, China, (2007)
2. P.G. Etchegoin, Single molecule Raman spectroscopy, *The Third International Conference on Advanced Materials and Nanotechnology (AMN-3)*, Wellington, (Feb-2007)
3. P.T. Callaghan, New variants of multidimensional NMR: the Fourier and Laplace domains at low field and at high, *Gordon Conference on Magnetic Resonance*, Biddeford, Maine, *Biddeford, Maine*, (2007)
4. P.T. Callaghan, NMR and MRI measurement of flow and diffusion, *9th International Conference on Magnetic Resonance Microscopy*, Aachen, Germany, (2007)
5. P.T. Callaghan, Rheo-NMR of shearbanded flow in soft matter, *International Soft Matter Conference 2007*, Aachen, Germany, (2007)

##### ***Other invitations***

1. P.G. Etchegoin, Single molecule SERS with isotopically edited dyes, *International Conference on Raman Spectroscopy (ICORS)*, (2007)

#### **5. Industry Reports**

#### **6. Books**

1. P.T. Callaghan, and K. Hill, *As Far as We Know: conversations about science, life and the universe*, Penguin, Auckland, (2007)

#### **7. Book Chapters**

1. P.T. Callaghan, *Journeys in space and time, Transit of Venus*, Awa Press, Wellington, (2007)

#### **8. Patents:**

#### **9. Awards, medals, fellowships:**

1. K.M. McGrath, 2007 New Zealand Association of Scientists' Research Medal, (2007)
2. P.T. Callaghan, KEA World Class New Zealander Award, Category Research, Science and Academia, (2007)
3. P.T. Callaghan, Sir Peter Blake Medal, (2007)

#### **10. Talks or interactions with community groups or schools:**

1. M.A.K. Williams, Organised two hour session of physics demonstrations for the "Energy", TeManawa Science Centre, Palmerston North, (Jul-2007)

2. M.A.K. Williams, Organizer for Science Café programme at TeManawa Science Centre, Palmerston North, (2007)
3. M.A.K. Williams, Radio Interview: ‘Why is Chewing Gum Chewy?’ This Way Up, National Radio New Zealand, (Apr-2007)
4. P.T. Callaghan, BECA holdings executive conference, (2007)
5. P.T. Callaghan, Hospital Physicists conference, (2007)
6. P.T. Callaghan, Millbrook CEO Retreat, New Zealand, (2007)
7. P.T. Callaghan, National Party Caucus, New Zealand, (2007)
8. P.T. Callaghan, NZ Association of Radio Transmitters, New Zealand, (2007)
9. P.T. Callaghan, NZ Labour Party conference, New Zealand, (2007)
10. P.T. Callaghan, Parliament Speakers Science Forum, Wellington, (2007)
11. P.T. Callaghan, Pencarrow Rotary, New Zealand, (2007)
12. P.T. Callaghan, Royal Australasian College of Surgeons Convocation, Australia, (2007)
13. P.T. Callaghan, School Librarians Association Conference, (2007)
14. P.T. Callaghan, Science Communicators conference, (2007)
15. P.T. Callaghan, Several speaking engagements and media interviews have concerned As far as we know, Various, (2007)
16. P.T. Callaghan, Talks to school children at Massey High School and Kings College Auckland, New Zealand, (2007)
17. P.T. Callaghan, University of the 3rd Age, (2007)
18. P.T. Callaghan, Wilton Probus club, Wellington, (2007)

#### **11. New grant funds:**

1. K.M. McGrath, AI in Riddet Institute – a Centre of Research Excellence: TEC, Food Materials and Structures Platform – project 1 – Interfacial engineering and properties of food emulsions, 6 yrs
2. K.M. McGrath, VUW Science Faculty, Probing Nature's complexity using synthetic liquid crystals, \$6000, 3 months
3. K.M. McGrath, VUW URF, Bioglass formation: biomolecule control vs phase separation, \$49000, 1 year
4. M.A.K. Williams, AI in Riddet Institute – a Centre of Research Excellence: TEC, Food Materials and Structures Platform, 6 yrs
5. P.T. Callaghan, New RFI grant VICX0703, Magnetic Resonance Technologies, \$1875000, 4 years

#### **12. Visitors:**

1. Carlito Labrilla, University of California, Davis, USA, Jan-2007, (K.M. McGrath)
2. Clive Evans, University of Auckland, Auckland, Jan-2007, (K.M. McGrath)
3. David Williams, University of Auckland, Auckland, Jan-2007, (K.M. McGrath)
4. Dr. J. Grand, Laboratoire ITODYD, Université Paris 7, France, Dec-2007, (P.G. Etchegoin)
5. Dr. Mariano-Campoy Quiles, Imperial College, London, Jan/Feb-2007, (P.G. Etchegoin)
6. Dr. N. Felidj, Laboratoire ITODYD, Université Paris 7, France, Dec-2007, (P.G. Etchegoin)
7. Dr. Arden Bement (Jr), Director of the National Science Foundation, Virginia, USA, Jan-2007, (P.T. Callaghan)
8. Dr. Don Eigler, IAB member, IMB Almaden, Jun-2007, (P.T. Callaghan)

9. Dr. Galina Pavlovskaya, University of Colorado, USA, Aug/Dec-2007, (P.T. Callaghan)
10. Dr. Jung-uck Seo, Korea-New Zealand S&T Ambassador, Korea, Jun-2007, (P.T. Callaghan)
11. Dr. Suzanne Fielding, University of Manchester, UK, Jan-2007, (P.T. Callaghan)
12. M Michel Le Gras, French Ambassador, France, Nov-2007, (P.T. Callaghan)
13. Prof. Zhu Zuoyan, Head of delegation, Vice President National Natural Science Foundation of China, China, Apr-2007, (P.T. Callaghan)
14. Prof. Elliott Burnell, University of British Columbia, Canada, Oct-2007, (P.T. Callaghan)
15. Prof. Fernando Lund, Director of CIMAT, University of Chile, Chile, Mar-2007, (P.T. Callaghan)
16. Prof. Mark Warner, IAB member, Cambridge University, UK, Aug-2007, (P.T. Callaghan)
17. Prof. Ole Mouritsen, Center for Biomembrane Physics, University of Southern Denmark, Denmark, Feb-2007, (P.T. Callaghan)
18. Prof. Thomas Meersman, University of Colorado, USA, Aug/Dec-2007, (P.T. Callaghan)

**13. International linkages:**

1. Dr. Randall Cameron, USDA, Florida, USA, (M.A.K. Williams)
2. Dr. Marie-Christine Ralet, INRA, Nantes, France, (M.A.K. Williams)
3. Assoc. Prof. Dave Dunstan, Chemical & Biomolecular Engineering, Melbourne University, Australia, (M.A.K. Williams)
4. Assoc. Prof. Edith Seveck, Research School of Chemistry, ANU, Canberra, Australia, (M.A.K. Williams)
5. Dr. Kurt Draget, Norwegian Biopolymer Institute, Trondheim, Norway, (M.A.K. Williams)
6. Dr. Leif Lundin, FSA, Melbourne, Australia, (M.A.K. Williams)
7. Prof. Carole Perry, Nottingham Trent University, UK, (K.M. McGrath)
8. Prof. Mark Hildebrand, Scripps Institution of Oceanography, USA, (K.M. McGrath)
9. Prof. L.F. Cohen, Imperial College, London, (P.G. Etchegoin)
10. Prof. D.D.C. Bradley, Imperial College, London, (P.G. Etchegoin)

**14. Committee/board/panel memberships, editorships:**

1. J. Lekner, Member, Institutional Repository Committee: VUW Library
2. K.M. McGrath, President, New Zealand Association of Scientists
3. K.M. McGrath, Secretary, Wellington Branch New Zealand Institute of Chemistry
4. K.M. McGrath, Vice-President, New Zealand Association of Scientists
5. P.T. Callaghan, Member of Editorial Board, Journal of Magnetic Resonance
6. P.T. Callaghan, Member of Editorial Board, Applied Magnetic Resonance
7. P.T. Callaghan, Member of Editorial Board, Concepts in Magnetic Resonance
8. P.T. Callaghan, Member of Editorial Board, Soft Matter
9. P.T. Callaghan, President, International Society of Magnetic Resonance