

Isaac Tamblyn

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Faculty	University of Ontario Institute of Technology Assistant Professor Department of Physics
Joint Appointment	National Research Council of Canada Security and Disruptive Technologies Portfolio
Postdoctoral	Lawrence Livermore National Laboratory Chemical Sciences Division Advisor: Dr. N. Goldman, 2012 Lawrence Berkeley National Laboratory NSERC Postdoctoral Fellow The Molecular Foundry Theory of Nanostructured Materials Facility Advisor: Prof. J.B. Neaton, 2010 – 2011
PhD	Dalhousie University Physics, 2009 <i>On the Nature of Light Elements at High Pressure</i> Advisor: Prof. S.A. Bonev University of California, Berkeley Visiting Student, Department of Physics, 2008 – 2009 Carnegie Institution of Washington Graduate Internship, Geophysical Laboratory, 2005
BSc	Dalhousie University 1 st Class Honours, Physics, 2005

DISTINCTIONS

- Cover article, *Physical Review Letters* (2015)
- Cover article, *J. Phys. Chem. C* (2015)
- Ranked in top 10% of UOIT Faculty of Science Teaching Reviews (2012-2015)
- Cover article, *J. Phys. Chem. A* (highlighted in *The New Yorker*) (2013)
- Article spotlighted in *Physics* (2010)
- Editor's suggestion in *Physical Review Letters* (2010)
- Cover article, *Physical Review Letters* (2008)

AWARDS

- National Research Council Security & Disruptive Technology Best Poster (2014)
- Lawrence Livermore National Laboratory PLS Directorate Best Paper (2012)
- Lawrence Livermore National Laboratory Postdoctoral Poster Prize (2012)
- NSERC Postdoctoral Fellowship (2010 – 2012)
- NSERC Michael Smith Foreign Studies Supplement (2009)
- Killam Graduate Scholarship (2007 – 2009)
- NSERC Alexander Graham Bell Canadian Graduate Scholarship (2007 – 2009)
- Dalhousie President's Award (2007 – 2009)
- 1st place, Graduate student talks at CAP Congress (2007)
- Dr. W. Leiper Graduate Award (2006 – 2007)
- NSERC Postgraduate Scholarship (2005 – 2007)
- 2nd place, oral presentation – Canadian Undergraduate Physics Conference (2004)
- Dr. E.W. Guptill Memorial Prize (2004)
- NSERC Undergraduate Summer Research Award (2004)
- J.D. Stewart Scholarship (2003 – 2004)
- D.J. Vair Scholarship (2001 – 2002)
- Dalhousie Renewable Entrance Scholarship (2000 – 2005)
- Nova Scotia Naval Officers Association Scholarship (2000 – 2001)
- Governor General and Lieutenant Governor's Medal (1999/2000)

RESEARCH FUNDING

NSERC Discovery Grant	\$115,000	(2013 – 2018)
SHARCNET Programming Award	\$17,500	(2015)
Molecular Foundry User Project	\$15,000	(2015)
UOIT-Teaching Innovation Fund	\$7,500	(2015)
National Research Council	\$23,500	(2014)
NSERC Engage Grant	\$25,000	(2013)
SOSCIP Graduate Funding	\$15,000	(2013)
LLNL Directors Discretionary Project Fund	\$8,000	(2012)
LBL Directors Beam-time Award (ALS)	3 days	(2013)

COMPUTE ALLOCATION AWARDS

SOSCIP	10 million hours	(\$1,000,000)	(2013 – 2014)
ComputeCanada	11 million hours	(\$418,000)	(2013 – 2015)

BOARD MEMBERSHIP

- Editorial Board for Materials Research Society News (2011 – present)
- SHARCNET UOIT Site Leader (2014 – present)
- Scientific Advising Committee for Southern Ontario Smart Computing Innovation Platform (2012 – present)

EXTERNAL FUNDING REVIEWS

- Israel Science Foundation, U.S. Department of Energy User Program (Molecular Foundry)

JOURNAL REFEREE

- *ACS Nano, Journal of Chemical Physics, Computational Materials Science*

ADDITIONAL EXPERIENCE

- Volunteer tutoring and mentoring with an educational non-profit based in Oakland, California. CollegeTrack.org is an after-school, college preparatory program that works to increase high school graduation, college eligibility and enrolment, and college graduation rates in under-resourced communities (2010 – 2012)
- Volunteer with “Newton BBS: Ask a Scientist” Program. This service is funded by the Office of DOE Science Education, and is aimed at connecting upper year secondary school students and teachers with scientific researchers. Users submit questions and volunteers provide an explanation or suggestions at the level of high school students (2010 – present)
- Selected from an international pool of student and postdoctoral applicants to attend the World Materials Summit, Washington, D.C. (October 2011)
- Tutoring in Math and Physics from Grade 7 to 1st year University (1999 – 2009)
- Director, Atmospheric & Material Physics Summer School, Dalhousie (2007 - 2008)
 - proposed and initiated the project, created website, brochures, advertising material, and an online discussion group, designed and organized application process and ranking, successfully applied for external funding used for a seminar series and poster session
- Vice President of Dalhousie Physics Graduate Society (2006 - 2007)
- Dalhousie Science Society Physics representative (2002 - 2003)
- Member of Canadian Undergraduate Physics Conference organizing committee (2002)
- Officer in Canadian Naval Reserves (2000 – 2006)
- Graduate student intern at Lawrence Livermore National Laboratory, Computational Chemistry and Material Science Institute – supervisor Dr. E. Schwegler (Summer 2006)

TEXTBOOKS

- H.J. Kreuzer & **I. Tamblyn**, *Thermodynamics*, World Scientific Publishing (2010)
- B. Boates & **I. Tamblyn**, *Understanding Math (Series)*, Solid State Press (2011)

TEACHING

- Nominated for 2014 & 2015 Faculty Teaching Award
- Ranked in top 10% of Faculty for 2012/2013 & 2013/2014 teaching reviews
- Thermodynamics (2nd year undergraduate Physics), 2013 – present
- Classical Mechanics (2nd year undergraduate Physics), 2013

- Condensed Matter Physics (4th year undergraduate Physics), 2013 – 2014
- Materials Science (3rd year undergraduate Physics & Chemistry), Winter 2015
- Guest lecturer in Materials Methodology Course (graduate level), 2012 – present

COURSE & PROGRAM DEVELOPMENT

- Materials Science (3rd year Physics/Chemistry), created new course
- Proposed and instituted undergraduate curriculum enhancements through:
 - introduction of simulation in Classical Mechanics & Condensed Matter Physics
 - built consensus across Faculty for new program map to enhance enrolment and build ties within the Faculty of Science (Chemistry and Math)
 - wrote successful proposal for \$9000 to build undergraduate curriculum around new computing platform (RaspberryPi)
- Developed and delivered Grant Writing Workshop for Senior Undergraduates and Graduate student body, resulted in x7 increase in the number of applicants across Faculty of Science
- Promoted and successfully recruited students to write CAP Certification Exam (2013)
- UOIT Faculty Site Leader Global Balloon Launch Challenge (2015)

UNIVERSITY COMMITTEE WORK

- UOIT Faculty of Science Academic Appeals Committee (2012 – present)
- UOIT Faculty of Science Ad-hoc TELE Transformation Committee (2014)
- UOIT University Sustainability Committee (2014 – present)

STUDENTS SUPERVISED

(names have been replaced with initials)

NB - Work term (Summer 2015)
 KK - USRA (Summer 2015)
 GC - MSc Student (2013 – present)
 KR - MSc Student (2013 – present)
 ES - UOIT STAR Award (Summer 2014)
 KM - USRA (Summer 2014 – present)
 AM - Work term (Summer 2014 – present)
 AD - Work Term (Fall 2013- Winter 2014)
 SC - UOIT STAR Award (Summer 2013)
 TH - Work Term (2010)

STUDENTS CO-SUPERVISED

DN - MSc Student (2014 – present)

AB - PhD student (2010-2011)

GL - PhD student (2010-2011)

PUBLICATIONS (supervised students underlined)

h-index = 12, i10-index = 15, citations = 611

25. S. Choing, A. J. Francis, G. Clendenning, M. Schuurman, Roger D. Sommer, **I. Tamblyn**, W.W. Weare, and T. Cuk, "Vibrational trapping of excited 3d electrons leads to long lived LMCT in a d0 V Complex", accepted *J. Phys. Chem. C*, (2015)
24. S. Whitelam, **I. Tamblyn**, J.P. Garrahan, and P. H. Beton "Emergent rhombus tilings from molecular interactions with M-fold rotational symmetry", *Phys. Rev. Lett.*, 114, 115702, **Cover article**, (2015)
23. **I. Tamblyn**, S. Refaely-Abramson, J.B. Neaton, and L. Kronik, "Performance of an *ab initio* self-optimizing functional", *J. Phys. Chem. Lett.*, 5, 2734 (2014)
22. S.G. Srinivasan, N. Goldman, **I. Tamblyn**, S. Hamel, and M. Gaus, "A Density Functional Tight Binding Model with an Extended Basis Set and Three-Body Repulsion for Hydrogen under Extreme Thermodynamic Conditions", *J. Phys. Chem. A*, 118, 5520 (2014)
21. S. Whitelam, **I. Tamblyn**, T.K. Haxton, M.B. Wieland, N.R. Champness, J.P. Garrahan, and P.H. Beton, "Common physical framework explains phase behavior and dynamics of atomic, molecular and polymeric network-formers", *Phys. Rev. X* 4, 011044 (2014)
20. N. Goldman & **I. Tamblyn**, "Prebiotic chemistry within a simple impacting icy mixture", *Journal of Physical Chemistry A*, 117 (24), 5124–5131, **Cover article**, (2013)
19. T. Haxton, H. Zhou, **I. Tamblyn**, T. Heinz, J.B. Neaton, S. Whitelam "Competing thermodynamic and dynamic factors select molecular assemblies on a gold surface", *Phys. Rev. Lett.* 111, 265701, (2013)
18. M. Yu, P. Doak, **I. Tamblyn**, and J.B. Neaton, "Theoretical design of redox levels of thiophene on functionalized light-absorbing semiconductor surfaces", *J. Phys. Chem. Lett.*, 4, 1701, (2013)
17. S. Sharifzadeh, **I. Tamblyn**, P. Doak, P. T. Darancet, and J.B. Neaton, "Quantitative Molecular Orbital Energies within a G_0W_0 Approximation", *Euro J. of Phys. B*, 85, 9, (2012)
16. G. Li, **I. Tamblyn**, V. Cooper, H.-J. Gao, and J.B. Neaton, "Molecular Adsorption on Metal Surfaces with a van der Waals Density Functional", *Phys. Rev. B*, 85, 121409 (R) (2012)
15. S. Whitelam, **I. Tamblyn**, P.H. Beton, and J.P. Garrahan, "Random and ordered phases of off-lattice rhombus tiles", *Phys. Rev. Lett.*, 108, 035702 (2012)
14. **I. Tamblyn**, P. Darancet, S.Y. Quek, S.A. Bonev, and J.B. Neaton, "Level alignment at metal-molecule interfaces with a GW approach", *Phys. Rev B*, 84, 201402(R), (2011)
13. A. Biller, **I. Tamblyn**, J.B. Neaton, L. Kronik, "Level alignment at a metal-molecule interface from a short-range hybrid functional", *J. Chem. Phys.*, 135, 164706, (2011)
12. M.A. Morales, L.X. Benedict, D.S. Clark, E. Schwegler, **I. Tamblyn**, S.A. Bonev, A.A.

- Correa, S.W. Haan, “*Ab initio* calculations of the equation of state of hydrogen in a regime relevant for inertial fusion applications”, *High Energy Density Physics*, 8, 5-12, (2011)
11. **I. Tamblyn** & S.A. Bonev “Structure and phase boundaries of compressed liquid hydrogen”, *Phys. Rev. Lett.*, 104, 065702, **PRL Editor’s Suggestion; featured in Physics** (2010)
 10. **I. Tamblyn** & S.A. Bonev “A note on the metallization of compressed liquid hydrogen”, *Journal of Chemical Physics*, 132, 134503, (2010)
 9. M. Dell’Angela, G. Kladnik, A. Cossaro, A. Verdini, M. Kamenetska, **I. Tamblyn**, S.Y. Quek, J.B. Neaton, D. Cvetko, A. Morgante, L. Venkataraman “Level Alignment and Amine-Linked Molecular Junction Conductance”, *Nano Letters*, 10, 2470 (2010)
 8. **I. Tamblyn**, J.-Y. Raty, S.A. Bonev “Tetrahedral clustering in molten lithium under pressure”, *Physical Review Letters*, 101, 075703 (2008), **Cover article**
 7. B. Militzer, W.B. Hubbard, J. Vorberger, **I. Tamblyn**, and S.A. Bonev “Massive core in Jupiter predicted from first-principles simulations”, *Astrophysical J. Letters*, 688: L45 (2008)
 6. **I. Tamblyn** and S.A. Bonev “Exploring the high pressure phase diagrams of light elements using large scale *ab-initio* molecular dynamics simulations”, *HPCS*, pp. 154-160, 22nd International Symposium on HPC Systems and Applications (2008)
 5. J. Vorberger, **I. Tamblyn**, B. Militzer, S.A. Bonev “Hydrogen-Helium Mixtures in the Interiors of Giant Planets”, *Physical Review B*, 75, 024206 (2007)
 4. **I. Tamblyn**, J. Vorberger, B. Militzer, S.A. Bonev, “Inside the Jovian atmosphere: Hydrogen and Helium at extreme conditions”, *Physics in Canada*, 63, 3, 133, (2007), **Cover article**
 3. J. Vorberger, **I. Tamblyn**, S.A. Bonev, B. Militzer “Properties of Dense Fluid Hydrogen and Helium in Giant Gas Planets” *Contrib. Plasma Phys.* 47, 4-5, 375 (2007)
 2. J. Garcia Sucerquia, W. Xu, S.K. Jericho, M.H. Jericho, **I. Tamblyn**, H.J. Kreuzer “Digital in line holography: 4-D imaging and tracking of organisms in microfluidics and biology” ICO20: Biomed. Opt., Proc. SPIE 6026, 267-275, (2006, USRA work)
 1. **I. Tamblyn** and B. Paton “Sands of Time”, *Canadian Undergraduate Physics Journal*, 4:13-16 (2005, 3rd year undergraduate work)

INTERNAL REPORTS

1. Y. Martinez-Eubi, M.B. Jakubinek, B. Ashrafi, Y. Zhang, S. Derdouri, M. Rahmat, **I. Tamblyn**, D. Bouchard, B. Simard, “Development of Nanotube-based nanocomposites”, A1-005463, 2015

INVITED PRESENTATIONS & SESSION CHAIRS

15. G. Clendenning, S. Choing, A. Francis, M. Schuurman, R. D. Sommer, W. W. Weare, T. Cuk, **I. Tamblyn**, "Extended LMCT lifetime in a d0 vanadium complex via vibrational trapping of 3d electrons", Conference of Metallurgists, (2015)
14. **I. Tamblyn**, "Large scale simulation of agent based networks", Facebook Canada, (2015)
13. **I. Tamblyn**, "How (and why) a Physicist Simulates Twitter", colloquium, Department of Physics & Computer Science, University of Wilfred Laurier, (2015)
12. **I. Tamblyn**, "Leaving money in the ground", Royal Canadian Institute for the Advancement of Science, invited table host (2015)
11. **I. Tamblyn**, "Level alignment between liquid water and Pt(111) within many-body perturbation theory", International Conference on Computational Physics, Singapore (2015)
10. S. Choing, G. Clendenning, A. Francis, **I. Tamblyn**, W. Weare, T. Cuk, "Differentiating ligand to metal charge transfer decay pathways through transient optical d-d excitations", 41st International Conference on Coordination Chemistry, (2014)
9. **I. Tamblyn**, "Nanostructured materials and devices for renewable energy: theory and computation", invited talk, Department of Physics, University of Trent (2013)
8. **I. Tamblyn** & N. Goldman, "Non-equilibrium shock chemistry and the Origins of Life", Lawrence Livermore National Laboratory Science and Tech Day, invited poster (2012)
7. **I. Tamblyn**, "Electronic structure of metal-organic interfaces within many-body perturbation theory", invited talk, Stacie Institute for Molecular Sciences, National Research Council of Canada (2012)
6. **I. Tamblyn**, "Structural and electronic properties of metal-molecule interfaces", invited talk, Department of Physics, University of Ottawa (2012)
5. "Classical & quantum molecular dynamics", session chair, APS March Meeting (2011)
4. **I. Tamblyn** and S.A. Bonev "Theoretical studies of the high-pressure phase diagram of hydrogen", invited talk, Study of Matter at Extreme Conditions (2009)
3. **I. Tamblyn** and S.A. Bonev "The high pressure phase diagram of liquid hydrogen", invited talk, QSG, Lawrence Livermore National Laboratory (2009)
2. **I. Tamblyn**, J.-Y. Raty, S.A. Bonev "Tetrahedral clustering in dense molten lithium", invited poster, Gordon Research Conference on High Pressure (2008)
1. J.-Y. Raty, E. Schwegler, **I. Tamblyn**, S.A. Bonev "Distortions and low symmetry environments in liquids: alkalis at high pressure", invited talk, E-MRS Fall Meeting (2008)

EDITORIALS

2. **I. Tamblyn**, "It's time to start ignoring the climate deniers", The Globe and Mail (Globe Debate), Dec 8 2014
1. **I. Tamblyn**, I. Aguiar, R. K. Annabattula, G. Justin, K. Rafiee, A. Rios-Flores, A. Vicente,

J.G. Vitillo, and D. Wong, "Energy Outlook", MRS Bulletin, 36, Dec 2011

CONTRIBUTED PRESENTATIONS AND POSTERS (students underlined)

40. K. Mills, M. B. Jakubinek, **I. Tamblyn**, "Designing lightweight aluminum composites", Conference of Metallurgists, (2015)
39. K. Ryczko & **I. Tamblyn**, "Liquid water next to platinum and graphite, a comparison of bonding and level alignment", Conference of Metallurgists (2015)
38. A. Maharaj & **I. Tamblyn**, "Electronic structure and growth of self-assembled nano-rings", Conference of Metallurgists, (2015)
37. K. Ryczko & **I. Tamblyn**, "Liquid water next to platinum and graphite, a comparison of bonding and level alignment", Conference of Metallurgists, (2015)
36. G. Clendenning, S. Choing, A. Francis, M. Schuurman, R. D. Sommer, W. W. Weare, T. Cuk, **I. Tamblyn**, "Detection of trap states using pump-probe measurements and TD-DFT", The 27th Annual Workshop on Recent Developments in Electronic Structure Theory, (2015)
35. A. Maharaj, S. Whitelam, **I. Tamblyn**, "Tight Binding Model of Self-Assembled Nano-rings", Next Generation Solar - Photovoltaics Canada, (2015)
34. A. Domurad, K. Ryczko, **I. Tamblyn**, "Monte Carlo Simulation of Massive Social Networks", Compute Ontario Research Day, (2015)
33. **I. Tamblyn**, K. Ryczko, A. Domurad, and K. White "#k@ - An online social network simulator", High Performance Computing Symposium Canada, (2015)
32. **I. Tamblyn**, "Liquid water and Pt(111) within the GW approximation", Canadian Chemistry Conference, (2015)
31. K. Mills, M. B. Jakubinek, **I. Tamblyn**, "Aluminum wetting of hexagonal boron nitride", NRC SDTech Day, (2014)
30. **I. Tamblyn**, "Computers and Lightbulbs for Grade One", EdCamp Ottawa (2014)
29. G. Clendenning, S. Choing, A. Francis, M. Schuurman, R. D. Sommer, W. W. Weare, T. Cuk, **I. Tamblyn**, "Long lived LMCT due to trapping of excited 3d electrons", Bio-Inspired Ideas for Sustainable Energy, (2014)
28. A. Maharaj & **I. Tamblyn**, "Self-assembly of porphine derivatives", CUPC (2014)
27. E. Selinger & **I. Tamblyn**, "Charge transfer units for artificial photosynthesis, CUPC (2014)
26. K. Mills & **I. Tamblyn**, "Lightweight boron-nitride aluminum composites", CUPC (2014)
25. G. Clendenning, S. Choing, A. Francis, W. Weare, T. Cuk, and **I. Tamblyn**, "Electronic structure of an optically excited coordination complex", MRS Spring Meeting (2014)
24. **I. Tamblyn**, S. Refaely-Abramson, J.B. Neaton, and L. Kronik, "Performance of an *ab initio* self-optimizing functional", MRS Spring Meeting (2014)
23. K. Ryczko & **I. Tamblyn**, "Quantum Molecular Dynamics of liquid water", CUPC, (2013)
22. **I. Tamblyn** & N. Goldman, "Non-equilibrium shock chemistry and the Origins of Life",

Gordon Research Conference on High Pressure (2012)

21. A. Biller, **I. Tamblyn**, J.B. Neaton, and L. Kronik, “Electronic level alignment at a metal-molecule interface from a short-range hybrid functional”, APS March Meeting (2012)
20. S. Whitelam, **I. Tamblyn**, P. Benton, and J. Garrahan, “Random and ordered phases of off-lattice rhombus tiles”, APS March Meeting (2012)
19. G. Li, V. Cooper, J.-H. Cho, **I. Tamblyn**, S. Du, J.B. Neaton, H.-J. Gao, and Zhenyu Zhang, “Van der Waals Interactions of Organic Molecules on Semiconductor and Metal Surfaces: a Comparative Study”, APS March Meeting (2012)
18. **I. Tamblyn**, P. Darancet, S.Y. Quek, S.A. Bonev, and J.B. Neaton, “Electronic energy level alignment of a physisorbate on gold within GW approximations”, 23rd Annual Electronic Structure Workshop (2011)
17. **I. Tamblyn**, R. Baer, L. Kronik, and J.B. Neaton, “Self-optimizing Kohn-Sham hybrid functional”, APS March Meeting (2011)
16. J.B. Neaton, **I. Tamblyn**⁺, S.Y. Quek, S.A. Bonev, P. Darancet, “Level alignment at covalently bonded metal-organic interfaces within the GW”, APS March Meeting (2011)
15. **I. Tamblyn** & S.A. Bonev⁺, “Structure of compressed liquid hydrogen”, Gordon Research Conference, poster (2010)
14. **I. Tamblyn** & S.A. Bonev, “Structure of compressed liquid hydrogen”, APS (2010)
13. **I. Tamblyn**, S.Y. Quek, S.A. Bonev, and J.B. Neaton, “Electronic structure of metal-organic interfaces from first principles”, APS March Meeting (2010)
12. **I. Tamblyn**, S.Y. Quek, S.A. Bonev, and J.B. Neaton, “Studies of Covalently-Bonded Aromatic Molecules on Au using a GW Approach”, MRS Spring Meeting (2009)
11. **I. Tamblyn**, S.Y. Quek, S.A. Bonev, J.B. Neaton, “Covalently Bonded Aromatic Molecules on Gold using a GW Approach”, APS March Meeting (2009)
10. **I. Tamblyn** and S.A. Bonev, “High pressure bonding in hydrogen”, CAPC (2008)
9. **I. Tamblyn**, J.Y. Raty, S.A. Bonev, “Clustering in dense molten lithium”, APS March Meeting (2008)
8. **I. Tamblyn**, J. Vorberger, B. Militzer, S.A. Bonev, “Inside the Jovian atmosphere: Hydrogen and Helium at extreme conditions”, CAP Congress (2007)
7. **I. Tamblyn** and S.A. Bonev “Hydrogen under extreme conditions” & with A. Chaffey “Potassium under extreme conditions”, AIMMS Workshop on Materials Modeling (2007)
6. **I. Tamblyn**, E. Schwegler, S.A. Bonev “High pressure bonding properties of hydrogen”, APS March Meeting (2007)
5. S.A. Bonev, **I. Tamblyn**, A. Chaffey, J.-Y. Raty “Liquid-liquid transitions in low-Z materials: parallel with high-pressure solid phase transitions”, APS March Meeting (2007)
4. J. Vorberger, **I. Tamblyn**, S.A. Bonev, B. Militzer “EOS Calculations for Hydrogen and Helium under Giant Gas Planet Conditions”, Geophysical Union Joint Assembly (2006)

3. **I. Tamblyn**, J. Vorberger, B. Militzer, S.A. Bonev, “Simulations of dense hydrogen and hydrogen-helium mixtures at conditions relevant to gas planet interiors”, APS March Meeting (2006)
2. J. Vorberger, **I. Tamblyn**, S.A. Bonev, and B. Militzer “Hydrogen-Helium Mixtures under Giant Gas Planet Conditions”, APS March Meeting (2006)
1. **I. Tamblyn** and B. Militzer “Simulations of Hydrogen-Helium mixtures at high pressure”, CIW Geophysical Laboratory High Pressure Group colloquium (2005)