

Curriculum vitae for Jason R. Dwyer

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Jason R. Dwyer

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Research Experience and Education

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- 7/15-
current **Associate Professor Chemistry**
 Assistant Professor (8/2009-6/15)
 Department of Chemistry, University of Rhode Island
 -Design, fabrication and use of single-molecule nanopore sensors for bioanalytical applications and biophysical investigations. Thin film surface chemical modification strategies to control interfacial properties in confined environments. Development and application of techniques for surface-enhanced Raman spectroscopy (SERS).
- 2009-2014 **Vice President of Research and Development**
 Co-founder and consulting VP R&D for Insight Nanofluidics, Inc.
 -Led the grant-funding and technical development for commercialization of a nanofluidic sample cell for high-performance spectroscopy and transmission electron microscopy on liquid samples, including design and interpretation of proof-of-principle experiments.
- 02/2008-
08/2009 **Postdoctoral Research**
 Professor Andre Marziali, Director of Engineering Physics
 Dept. of Physics & Astronomy, University of British Columbia, Vancouver, Canada
 -Built on expertise in chemistry, nanofabrication and project management to work towards design and deployment of a clinic-ready lab-on-a-chip genotyping device.
- 5/2005-
12/2007 **Postdoctoral Research – NSERC PDF**
 Professor Dr. Thomas Elsaesser, Director
 Dr. Erik T.J. Nibbering, Project Leader
 Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Berlin, Germany
 -Used femtosecond infrared spectroscopy and materials science to study DNA base pair hydrogen bonding and DNA hydration.
- 1998-2005 **Ph.D., Physical Chemistry – NSERC PGS A&B**
 Professor R.J. Dwayne Miller, Canada Research Chair in Femtosience
 Departments of Chemistry & Physics, University of Toronto, Toronto, Canada
 Thesis: /
 -Designed, built and used a femtosecond electron diffractometer to probe ultrafast laser-driven structural dynamics. First observation of real-space structure with femtosecond temporal resolution. Designed nanofabricated tools to enhance instrument performance.
- 1994-1998 **B.Sc., Honours Chemistry and Full-Time Chemistry Research – Canada Scholar**
 5/1998-
8/1998 Professor Stuart M. Rothstein
 Departments of Chemistry & Physics, Brock University, St. Catharines, Canada
 Thesis: *Variational Monte-Carlo study of a core-valence partitioned wavefunction: Electron affinities for selected first-row atoms using a modest basis set.*
 -Wrote custom variational Monte Carlo computer code to compute atomic properties and explore core-valence electron partitioning using explicitly correlated wavefunctions.
- summers
1995-1997 **Full-Time Chemistry Research**
 Professor Kathleen M. Gough
 Department of Chemistry, University of Manitoba, Winnipeg, Canada
 -Used commercial *ab initio* molecular modelling packages and wrote custom analysis software to investigate the effect of molecular conformation on the electronic structure of hydrocarbons, as manifested in their Raman spectra.

Significant Awards

Year	Award	Scope of Competition
2017	Best Presentation, SESSION: Colloidal Metal & Semiconductor Nanostructures: Theory, Synthesis & Application. (<i>Thin-film nanofluidics for single-particle analysis</i> , paper # COLL 121; Session Chair Jing Zhao, University of Connecticut)	254th ACS National Meeting
2017	Canada 150 Research Chair Invited Applicant (Department of Chemistry, Brock University)	International
2017	URI Intellectual Property Recognition Award (patent submission)	University of Rhode Island
2015	URI Intellectual Property Recognition Award	University of Rhode Island
2014	URI Intellectual Property Recognition Award (patent submission+ invention disclosure)	University of Rhode Island
2013	Early Career Faculty Research Excellence Award: Life Sciences, Physical Sciences and Engineering, URI Division of Research and Economic Development	University of Rhode Island
2006	Top 5 finish in the Mathematics, Physical Sciences and Engineering division of the 2006 CGS/UMI Distinguished Dissertation Award competition.	North America
2006	Nomination finalist for the Governor General's Gold Medal Award	U. of Toronto
2005-2007	NSERC Postdoctoral Fellowship (\$80,000 total)	Canada
2005	Larry Calvert Travel Award to IUCr2005 (International Union for Crystallography Annual Meeting, \$1,500)	Canada
2005	IUCr2005 Travel Bursary (August 2005; Florence, Italy)	International
2004-2005	Donald J. Le Roy Prize in Physical Chemistry (\$500 + award lecture)	U. of Toronto
2003	Michael J. Dignam Graduate Travel Award (CLEO Pacific Rim, December 2003; Taipei, Taiwan, \$1,000)	U. of Toronto
2003-2004	Robert and Jean Hadgraft Graduate Fellowship in Chemistry (\$4,000)	U. of Toronto
2000-2002	NSERC PGSB (\$38,200 total)	Canada
2001-2002	Edwin Walter Warren Graduate Student Award (\$4,000)	U. of Toronto
1998-2000	NSERC PGSA (\$34,200 total; foreign tenure granted but declined)	Canada
1998-1999	Eminent Scholar Award (\$3,500)	U. of Toronto
1998-2000	Alberta Heritage Foundation for Medical Research (\$35,000; declined)	Alberta
1998-1999	Ontario Graduate Scholarship (OGS, \$11,959; declined)	Ontario
1997-1998	Governor General's Silver Medal	Brock University
1994-1998	Sears Canada Scholarship (\$10,000 total)	Canada
1994-1998	Donohue (QUNO) Scholarship (\$3,000 total)	Brock University
1994-1998	Canada Scholarship (\$10,000 total)	Canada
1994-1998	Dean's Honours List	Brock University
1997-1998	Scholler Foundation Scholarship (\$1,700)	Brock University
1997-1998	John W. Bean and Kathryn Bean Becker Scholarship (\$1,350)	Brock University
1997-1998	The Chemical Institute of Canada Prize (silver medal)	Brock University
1997-1998	SCI Student Merit Award Winner (silver medal)	Brock University
1997-1998	Martin S. Gibson Scholarship (\$150)	Brock University
1996-1997	M.J. (Mel) Farquharson Scholarship (\$1,025)	Brock University
1994-1995	C. Boyd Slemon Scholarship (\$1,650)	Brock University
1994-1995	3M Scholarship in Chemistry (\$500)	Brock University

Named Fellowships

1999-2000	James C. Cumming Fellow, Trinity College, Canada (\$6,800)	U. of Toronto
2000-2002	Walter C. Sumner Memorial Fellowship (\$9,000 total)	Canada

Refereed Publications

1. **Nature Communications (2018) 9, 3278.** *Surveying silicon nitride nanopores for glycomics and heparin quality assurance.* Buddini Iroshika Karawdeniya, Y.M. Nuwan D.Y. Bandara, Jonathan W. Nichols, Robert B. Chevalier, and Jason R. Dwyer. <https://doi.org/10.1038/s41467-018-05751-y>
2. **ACS Appl. Nano. Mater. (2018) 1, 960-968.** A General Strategy to Make an On-Demand Library of Structurally and Functionally Diverse SERS Substrates. Buddini Iroshika Karawdeniya, Y.M. Nuwan D.Y. Bandara, Julie C. Whelan, and Jason R. Dwyer. DOI: 10.1021/acsnm.7b00385
3. **(INVITED) ELECTROPHORESIS (2018) 39, 626-634.** *Conductance-Based Profiling of Nanopores: Accommodating Fabrication Irregularities.* Y.M. Nuwan D.Y. Bandara, Jonathan W. Nichols, Buddini Iroshika Karawdeniya, and Jason R. Dwyer. DOI 10.1002/elps.201700299.
4. **Physical Chemistry Chemical Physics (2017) 19, 27074-27080.** *A Comparison of SERS and MEF of Rhodamine 6G on A Gold Substrate.* Elizabeth Kohr, Buddini I. Karawdeniya, Jason R. Dwyer, Anju Gupta, and William B Euler. DOI: 10.1039/C7CP05569B.
5. **(INVITED, Focal Point Review) Applied Spectroscopy (2017) 71, 2051-2075.** Jason R. Dwyer and Maher Harb. *Through a window, brightly: A review of selected nanofabricated thin film platforms for spectroscopy, imaging, and detection.* DOI: <https://doi.org/10.1177/0003702817715496>
6. **ACS Applied Materials & Interfaces (2016) 8, 34964-34969.** Y.M. Nuwan D.Y. Bandara, Buddini Iroshika Karawdeniya, Julie C. Whelan, Lucas D.S. Ginsberg, and Jason R. Dwyer. *Solution-Based Photo-Patterned Gold Film Formation on Silicon Nitride.* DOI 10.1021/acsnm.6b12720
7. **(INVITED) Nanofluidics 2nd edition: Nanoscience and Nanotechnology Series (2016) 196-236.** Jason R. Dwyer*, Y.M. Nuwan D.Y. Bandara, Julie C. Whelan, Buddini Iroshika Karawdeniya, and Jonathon W. Nichols. *Silicon nitride membranes for nanofluidic device fabrication.* (Eds. Joshua Edel & Min Jun Kim, Royal Society for Chemistry). <http://dx.doi.org/10.1039/9781849735230>.
8. **ACS Applied Materials & Interfaces (2016), 8, 30583–30589.** *Real-time Profiling of Solid-State Nanopores During Solution-Phase Nanofabrication,* Y.M. Nuwan D.Y. Bandara, Buddini Iroshika Karawdeniya, and Jason R. Dwyer. DOI 10.1021/acsnm.6b10045
9. **ACS Applied Materials & Interfaces (2014) 6, 10952-10957.** Julie C. Whelan, Buddini Iroshika Karawdeniya†, Y.M. Nuwan D.Y. Bandara‡, Brian D. Velleco, Caitlin M. Masterson and Jason R. Dwyer. *Electroless Plating of Thin Gold Films Directly onto Silicon Nitride Thin Films and into Micropores.* †equal contributions. DOI 10.1021/am501971n.
10. **(INVITED, cover) ACS Applied Materials & Interfaces Forum: New Frontiers and Challenges in Biomaterials (2013) 5, 9330-9337.** C.M. Frament, N. Bandara and J.R. Dwyer, *Nanopore surface coating delivers nanopore size and shape through conductance-based sizing.* (DOI: 10.1021/am4026455).
11. **(INVITED FOR ACS LIVESLIDES) J. Phys. Chem. Lett. (2013) 4, 2339.** C. Mueller, M. Harb, J.R. Dwyer* and R.J.D. Miller. *Nanofluidic cells with controlled path length and liquid flow for rapid, high-resolution in situ Imaging with Electrons.* DOI: 10.1021/jz401067k *URI Affiliation. <http://pubs.acs.org/iapps/liveslides/pages/index.htm?mscNo=jz401067k>
12. **Review of Scientific Instruments (2013) 84, 036101-036101-2.** Jason R. Dwyer*, Łukasz Szyc, Erik T.J. Nibbering and Thomas Elsaesser. *Note: An environmental cell for transient spectroscopy on solid samples in controlled atmospheres.* *Corresponding author. (DOI: 10.1063/1.4794092)
13. **MRS Online Proceedings Library (2013) 1544.** C. Mueller, M. Harb, J.R. Dwyer and R.J.D. Miller. *Nanofluidic Cells with Controlled Path Length and Liquid Flow For Rapid, High-Resolution In Situ Electron Microscopy.* *URI Affiliation. (DOI: <http://dx.doi.org/10.1557/opl.2013.780>)
14. **Journal of Physical Chemistry C (2012) 116, 23315-23321.** C.M. Frament and J.R. Dwyer. *Conductance-Based Determination of Solid-State Nanopore Size and Shape: An Exploration of Performance Limits.* (DOI: 10.1021/jp305381j).
15. **Journal of Physical Chemistry A (2011) 115, 13149-13157.** R. Dawes*, J.R. Dwyer*, W. Qu and K.M. Gough (*equal contributions). *QTAI Investigation of the Electronic Structure and Large Raman Scattering Intensity of Bicyclo-[1.1.1]-pentane.*
16. **ACS Nano (2009) 3, 3009-3014.** V. Tabard-Cossa, M. Wiggin, D. Trivedi, N.N. Jetha, J.R. Dwyer and A. Marziali. *Single-Molecule Bonds Characterized by Solid-State Nanopore Force Spectroscopy.* (DOI: 10.1021/nn900713a)

17. **(SPECIAL ISSUE) Chemical Physics (2009) 357, 36-44.** Ł. Szyc, J.R. Dwyer, E.T.J. Nibbering and T. Elsaesser. *Ultrafast dynamics of N-H and O-H stretching excitations in hydrated DNA oligomers.* (DOI: 10.1016/j.chemphys.2008.08.013)
18. **Journal of Physical Chemistry B, (2008) 112, 11194-11197.** J.R. Dwyer, Ł. Szyc, E.T.J. Nibbering and T. Elsaesser. *Ultrafast vibrational dynamics of adenine-thymine base pairs in DNA oligomers.* (DOI: 10.1021/jp8054119)
19. **Springer Series in Chemical Physics, Ultrafast Phenomena XVI (2008) 92, 535-537.** J.R. Dwyer, Ł. Szyc, E.T.J. Nibbering and T. Elsaesser. *Ultrafast vibrational dynamics of adenine-thymine base pairs in hydrated DNA.*
20. **(INVITED) Chemical Physics (2007) 341, 175-188.** T. Elsaesser, N. Huse, J. Dreyer, J.R. Dwyer, K. Heyne and E.T.J. Nibbering. *Ultrafast vibrational dynamics and anharmonic couplings of hydrogen-bonded dimers in solution.*
21. **(INVITED) Journal of Modern Optics (2007) 54, 923-952.** J.R. Dwyer, R.E. Jordan, C.T. Hebeisen, M. Harb, R. Ernstorfer, T. Dartigalongue and R.J.D. Miller. *Experimental basics for femtosecond electron diffraction studies.* (DOI: 10.1080/09500340601125020)
22. **Journal of Modern Optics (2007) 54, 905-922.** J.R. Dwyer, R.E. Jordan, C.T. Hebeisen, M. Harb, R. Ernstorfer, T. Dartigalongue and R.J.D. Miller. *Femtosecond electron diffraction: An atomic perspective of condensed phase dynamics.* (DOI: 10.1080/09500340601095348)
23. **Springer Series in Chemical Physics, Ultrafast Phenomena XV (2007) 88, 335-337.** A. Paarmann, D. Kraemer, M.L. Cowan, N. Huse, M. Harb, B.D. Bruner, J.R. Dwyer, E.T.J. Nibbering, T. Elsaesser and R.J.D. Miller. *2D-IR photon echo spectroscopy of liquid H₂O—Combination of novel nanofluidics and diffractive optics deciphers ultrafast structural dynamics.*
24. **Chemical Physics Letters (2006) 432, 146-151.** J.R. Dwyer, J. Dreyer, E.T.J. Nibbering and T. Elsaesser. *Ultrafast dynamics of vibrational N-H stretching excitations in the 7-azaindole dimer.*
25. **Philosophical Transactions of the Royal Society A (2006) 364, 741-778.** J.R. Dwyer, C.T. Hebeisen, R. Ernstorfer, M. Harb, V.B. Deyirmenjian, R.E. Jordan and R.J.D. Miller. *Femtosecond electron diffraction: "Making the molecular movie"*. (DOI: 10.1098/rsta.2005.1735)
26. **Nature (2005) 434, 199-202.** M.L. Cowan, B.D. Bruner, N. Huse, J.R. Dwyer, B. Chugh, E.T.J. Nibbering, T. Elsaesser and R.J.D. Miller. *Ultrafast memory loss and energy redistribution in the hydrogen bond network of liquid H₂O.* (DOI: 10.1038/nature03383)
27. **Springer Series in Chemical Physics, Ultrafast Phenomena XIV (2005) 79, 144-148.** J.R. Dwyer, R.E. Jordan, B.J. Siwick, C.T. Hebeisen and R.J.D. Miller. *Femtosecond electron diffraction: Towards making the "molecular movie"*.
28. **Chemical Physics (2004) 299, 285-305.** B.J. Siwick, J.R. Dwyer, R.E. Jordan and R.J.D. Miller. *Femtosecond electron diffraction studies of strongly driven structural phase transitions.*
29. **(JOURNAL COVER) Science (2003) 302, 1382-1385.** B.J. Siwick, J.R. Dwyer, R.E. Jordan and R.J.D. Miller. *An atomic level view of melting using femtosecond electron diffraction.* (DOI: 10.1126/science.1090052)
30. **Springer Series in Chemical Physics, Ultrafast Phenomena XIII (2003), 71, 322-324.** B.J. Siwick, J.R. Dwyer, R.E. Jordan and R.J.D. Miller. *Ultrafast electron optics: Propagation dynamics and measurement of femtosecond electron packets.*
31. **Journal of Applied Physics (2003) 94, 807-808.** B.J. Siwick, J.R. Dwyer, R.E. Jordan and R.J.D. Miller. *Response to "Comment on 'Ultrafast electron optics: Propagation dynamics of femtosecond electron packets'"*.
32. **Journal of Applied Physics (2002) 92, 1643-1648.** B.J. Siwick, J.R. Dwyer, R.E. Jordan, and R.J.D. Miller. *Ultrafast electron optics: Propagation dynamics of femtosecond electron packets.*
33. **Canadian Journal of Chemistry (2000) 78, 1035-1043.** K.M. Gough, J.R. Dwyer and R. Dawes. *Ab initio analysis of C-H and C-C stretching intensities in Raman spectra of hydrocarbons.*
34. **Journal of Chemical Physics (1999) 111, 9971-9981.** M. Snajdr, J.R. Dwyer and S.M. Rothstein. *Histogram filtering: A technique to optimize wavefunctions for use in Monte Carlo simulations.*
35. **Journal of Physical Chemistry A (1998) 102, 2723-2731.** K.M. Gough and J.R. Dwyer. *Effect of structure and conformation on Raman trace scattering intensities in hydrocarbons.*
36. **Canadian Journal of Chemistry (1996) 74, 1139-1144.** K.M. Gough, M. Yacowar, R.H. Cleve and J.R. Dwyer. *Analysis of polarizability derivatives in H₂, HF, F₂, N₂ and CO with the theory of atoms in molecules.*

Refereed Book Chapter

1. **(INVITED)** K.M. Gough, R. Dawes, J.R. Dwyer and T.R. Welshman, *QTAIM analysis of Raman scattering intensities: Insights into the relationship between molecular structure and electronic charge flow*. In *Recent Advances in the Quantum Theory of Atoms in Molecules* (Eds. R.J. Boyd and C. Matta., Wiley-VCH). March 2007, ISBN 978-3-527-30748-7.

Intellectual Property

United States Provisional Patent Application 62462583 (2017, University of Rhode Island): Covalent Chemical Surface Modification of Surfaces With Available Silicon.
 Invention Disclosure (2016, University of Rhode Island): Covalent Chemical Surface Modification of Nascent Silicon-Rich Surfaces
 United States Provisional Patent Application 61788984 (2013, University of Rhode Island): Novel Process for Electroless Plating of Gold on a Surface
 United States Provisional Patent Application 62014966 (2014, University of Rhode Island): Novel Process for Electroless Plating of Gold on a Surface
 Invention Disclosure (2013, University of Rhode Island): Patterned Electroless Gold Plating on Silicon Nitride via Photochemical Masking
 Invention Disclosure (2014, University of Rhode Island): Patterned Electroless Gold Plating on Silicon Nitride via Photochemical Masking
 Co-founder (2009): **Insight Nanofluidics**

Lectures and Presentations

(KEYNOTE LECTURE): 2, **(PLENARY LECTURE):** 1, **(INVITED LECTURE – PRINCIPAL SPEAKER):** 1
(INVITED PRESENTATION): at conferences, symposia; **(invited presentation):** at universities, institutes

1. *Chemically Tuned Nanopore Sensor Platforms for Single-Molecule Sensing*. FACSS SciX 2018, Atlanta, GA, USA, October 26-26, 2018.
2. *Nanopore Single-Molecule Sensors for Oligo- and Polysaccharide Analysis*. FACSS SciX 2018, Atlanta, GA, USA, October 26-26, 2018.
3. **(invited presentation)** Nanopore Single Molecule Sensing and Platform Development. Department of Chemistry and Biochemistry, University of Notre Dame
4. **(invited presentation)** *Thin-Film Nanofluidic Devices for Single-Molecule Science: Electronic, Optical, and Force Sensor Platforms*. Department of Chemistry, University of Kansas, Lawrence, KS, USA, Sept. 28, 2018.
5. **(invited presentation)** *Detecting Single Molecules and Their Interactions Using Nanopores*. Department of Chemistry and Biochemistry, Providence College, Providence, USA.
6. **(INVITED PRESENTATION)** *Single-molecule and interaction-based biosensing using nanopores: Oligo and polysaccharide analysis*, American Chemical Society, 256th National Meeting, Boston, USA, August 19-23, 2018.
7. *Single Molecule Glycomics Using Interface-Tailored Nanopore Sensing*, Gordon Conference on Bioanalytical Sensors, Newport, RI, June 24-29, 2018. (poster)
 - a. [+3 graduate student presentations]. *Characterization and Application of Surface Modified Solid-State Nanopores*, Robert B. Chevalier, Buddini I. Karawdeniya, Y. M. Nuwan D. Y. Bandara, James Hagan, Jonathan W. Nichols, and Jason R. Dwyer
 - b. *Sweets to Nutrients, We Keep Track of All: Single Molecule Sensing and Molecular Fingerprinting*. Buddini Iroshika Karawdeniya, Y.M. Nuwan D.Y. Bandara, Jonathan W. Nichols, Robert B. Chevalier, Julie C. Whelan and Jason R. Dwyer
 - c. *Customization of Solid State Nanopores for Single Molecule Detection*. James Hagan, Y.M. Nuwan D.Y. Bandara, Jason R. Dwyer.
8. **(KEYNOTE LECTURE)** *Shining a Light on Bay Chemistry and Technology Commercialization*, RI NSF EPSCoR Annual Research Symposium, University of Rhode Island, April 9, 2018.
9. **(INVITED PRESENTATION)** *Chemically tuned thin-film and nanofluidic sensors for single-molecule and particle sensing*, American Chemical Society 255th National Meeting, New Orleans, USA, March 18-22, 2018.

10. (invited presentation) *Single Molecule Biopolymer Analysis Using Interface-Tailored Nanopore Sensing*, The U.S. Army Natick Soldier Research, Development & Engineering Center, Natick, MA, Dec. 7, 2017.
11. (**INVITED PRESENTATION**) *Thin-film nanofluidics for single-particle analysis*, American Chemical Society 254th National Meeting, Washington, D.C., August 20-24, 2017.
12. (invited presentation) *Thin-Film Nanofluidic Devices for Single-Molecule Science: Electronic, Optical, and Force Sensor Platforms*. Department of Chemistry, Brock University, St. Catharines, ON, Canada. June 5, 2017.
13. (**PLENARY LECTURE**) *Tailored Thin-Film Nanofluidics for Optical and Charged-Particle Single-Molecule Science*. Canadian Society for Chemistry Satellite Meeting on Ultrafast Spectroscopy and Imaging of Molecular Processes. University of Toronto, Toronto, ON, Canada. June 2, 2017.
14. (**INVITED PRESENTATION**) *Thin-Film Nanofluidic Devices for Single-Molecule Science: Electronic, Optical, and Force Sensor Platforms*. 231st ECS Meeting (The Electrochemical Society), New Orleans, LA. May 28-June 1, 2017.
15. *Low-Overhead Thin-Film Approaches and Platforms for Spectroscopic Fingerprinting and Electronic Single-Molecule Sensing*. 231st ECS Meeting (The Electrochemical Society), New Orleans, LA. May 28-June 1, 2017.
16. (invited presentation) *Thin-Film Nanofluidic Devices for Single-Molecule Science: Electronic, Optical, and Force Sensor Platforms*. Department of Chemistry, University of Montreal, Montreal, QC, Canada. April 7, 2017.
17. (invited presentation) *Thin-Film Nanofluidic Devices for Single-Molecule Science: Electronic, Optical, and Force Sensor Platforms*. Department of Chemistry, McGill University, Montreal, QC, Canada. April 6, 2017.
18. (invited presentation) *Pores, Particles, Fibres, and Films: Tailored Nanostructures for Charged-Particle Single-Molecule Sensing and Spectroscopy*. Department of Physics, Drexel University, Philadelphia, PA. January 26, 2017.
19. (invited presentation) *Pores, Particles, Fibres, and Films: Tailored Nanostructures for Charged-Particle Single-Molecule Sensing and Spectroscopy*. Department of Chemistry, University of Manitoba. July 28, 2016.
20. *Pores, Particles, Fibres, and Films: Tailored Nanostructures for Charged-Particle Single-Molecule Sensing and Spectroscopy*. Gordon Research Conference on Bioanalytical Sensors (From Atoms to Organisms: Bioanalytical Sensors Elucidating Physicochemical Properties of Multiscale Systems). Newport, RI, June 26-July 1, 2016. [poster presentation]
 - a. [+3 graduate student presentations at Gordon Research Symposium June 25-26 & GRC] *Surface tuning of silicon nitride for optical and conductance based nanopore sensing*, Y. M. Nuwan D. Y. Bandara, Buddini I. Karawdeniya, Julie C. Whelan and Jason R. Dwyer.
 - b. *Biopolymer profiling by nanopore sensors*, Buddini I. Karawdeniya, Y.M. Nuwan D.Y. Bandara, Julie C. Whelan and Jason R. Dwyer.
 - c. *Electroless plating to tune the physiochemical properties of nanostructured silicon nitride for use in device fabrication*, Julie C. Whelan, Y.M. Nuwan D.Y. Bandara, Buddini I. Karawdeniya, Jason R. Dwyer.
21. (invited presentation) *Pores, Particles, Fibres, and Films: Tailored Nanostructures for Charged-Particle Single-Molecule Sensing and Spectroscopy*. Department of Chemistry, University of Waterloo, Waterloo, Canada, June 15, 2016.
22. (invited presentation) *Pores, Particles, Fibres, and Films: Chemically tailoring nanostructures for Exploring the Molecular World*. Department of Chemistry, Guelph University, Guelph, Canada, June 13, 2016.
23. (**INVITED PRESENTATION**) *Nanochannel sensing devices enhanced with tailored thin films: applications to single-molecule bioanalysis and materials characterization*. Third Arab American Frontiers, of Science, Engineering, and King Abdullah University of Science and Technology (KAUST) Medicine Symposium, Thuwal, Saudi Arabia (declined attendance).
24. (invited student lecture) *Molecular-Level Design of Nanoscale Tools for Enhanced Single-Molecule Sensing*. FACSS SciX 2015, Providence, RI, [Julie C. Whelan](#), Y.M. Nuwan D.Y. Bandara, Buddini Iroshika Karawdeniya, and Jason R. Dwyer.

- a. [+2 additional graduate student presentations] *Photopatterned Electroless Gold Deposition: Optimizing Film Patterning and Nanoscale Structure for Applications*. Y.M. Nuwan D.Y. Bandara, Buddini I. Karawdeniya, Julie C. Whelan, and Jason R. Dwyer.
 - b. [poster award winner] *Electroless gold plating as an adaptable tool to fabricate custom surface enhanced Raman spectroscopic (SERS) substrates*. Buddini Iroshika Karawdeniya, Y.M. Nuwan D.Y. Bandara, Caitlin M. Masterson, Julie C. Whelan, Brian D. Velleco, and Jason R. Dwyer.
25. **(INVITED LECTURE)** *Tailored silicon nitride thin-films for optical and all-electronic chemical sensing*. 250th ACS National Meeting, August 16-20, 2015, Boston, MA, USA.
- a. [+3 additional graduate student presentations] *Electroless plating as a flexible tool for the creation of custom surface enhanced Raman spectroscopic (SERS) substrates*. Buddini I. Karawdeniya, Y. M. Nuwan D. Y. Bandara, Caitlin M. Masterson, Julie C. Whelan, and Jason R. Dwyer
 - b. *Electroless Plating of Thin Gold Films Directly onto Silicon Nitride Thin Films and into Micro- and Nanopores*. Julie C. Whelan, Y. M. Nuwan D. Y. Bandara, Buddini I. Karawdeniya, and Jason R. Dwyer.
 - c. *Photoinitiated covalent surface functionalization for enhanced control over electroless deposition on silicon nitride*. Y. M. Nuwan D. Y. Bandara, Buddini I. Karawdeniya, Brian Velleco, Julie Whelan, and Jason R. Dwyer.
26. **(INVITED LECTURE)** *Thin-membrane nanochannels for nanopore single-molecule sensing and transmission electron microscopy of liquid samples*. Pittcon Conference & Expo, March 8-12, 2015, New Orleans, LA, USA
- a. [+1 undergraduate poster presentation]. *Photochemical and Thermal Control over Electrolessly Gold-plated Film Structure on Thin Silicon Nitride to Target Sensing Applications*. Caitlin M. Masterson, Y.M. Nuwan D.Y. Bandara, Brian D. Velleco, Julie C. Whelan, Buddini Iroshika Karawdeniya, Jason R. Dwyer.
27. **(invited presentation)** *Nanofluidics for single particle imaging and sensing*. Chemistry seminar, Worcester Polytechnic Institute, October 1, 2014.
28. **(invited presentation)** *Liquid electron microscopy and nanopore sensing: Two portals to the molecular world*. Physikalisch-Technische Bundesanstalt (National Metrology Institute of Germany), Berlin, Germany, July 21, 2014.
29. *Probing Nanoscale Structure and Interaction in Highly Constrained Environments and in Free Solution: Nanopore Force Spectroscopy and Liquid Electron Microscopy*. Gordon Research Conference on Single Molecule Approaches to Biology (Understanding Life at a Higher Resolution). Lucca, Italy, July 13-18, 2014. [poster presentation]
30. *Ultrathin membrane devices for diverse, high-performance nanoscale detection applications*. Gordon Research Conference on Bioanalytical Sensors (Twenty First Century Technologies for Probing Biological Systems). Newport, RI, June 22-27, 2014. [poster presentation]
- a. [+4 graduate student poster presentations] *Modern Alchemy: Electroless Plating of Gold onto Silicon Nitride*. Julie C. Whelan, Buddini Iroshika Karawdeniya, Y.M. Nuwan D.Y. Bandara, Brian D. Velleco, Sarah Golden, Caitlin Masterson, Jason R. Dwyer.
 - b. *Photopatterned Electroless Gold Deposition on Silicon Nitride: Enhanced Control Over a Powerful Sensing Platform Interface*. Nuwan Bandara, Buddini Karawdeniya, Julie Whelan, Brian Velleco, Jason R. Dwyer.
 - c. *1. Harnessing biology for single-molecule sensing; 2. Electroless Gold-Plated Silicon Nitride Chips: An Adventitious Substrate for SERS*. Buddini I. Karawdeniya, Julie Whelan, Y.M. Nuwan D.Y. Bandara, Brian Velleco, Caitlin Masterson, Caitlin R. Ross, Jason R. Dwyer.
 - d. **(student award winner)** *SERS Signal Degradation of Thin Gold Films on Silicon Nitride*. Brian Velleco, Buddini Karawdeniya, Nuwan Bandara, Julie Whelan, Caitlin Masterson, Sarah Golden and Jason R. Dwyer.
31. **(invited presentation)** *Nanopore sensors and liquid TEM cells*. NIST Research Group Seminar, Boulder, CO, March 13, 2014 (invited, could not deliver the talk).
32. **(invited presentation)** *Liquid electron microscopy and nanopore sensing: Two portals to the molecular world*. Analytical Chemistry Seminar, Department of Chemistry, Colorado State University, Ft. Collins, CO, March 12, 2014.

33. (invited presentation) *Nanoscience and Nanotechnology*. Osher Lifetime Learning Institute, Kingston, RI, November 6, 2013.
34. (invited lecture) *Probing Nanoscale Structure and Interaction in Highly Constrained Environments and in Free Solution: Nanopore Force Spectroscopy and Liquid Electron Microscopy*, Chemistry Seminar, Department of Chemistry, University of Massachusetts, Dartmouth, Oct. 23, 2013.
35. (invited lecture) *Probing Nanoscale Structure and Interaction in Highly Constrained Environments and in Free Solution: Nanopore Force Spectroscopy and Liquid Electron Microscopy*, Physical Chemistry Seminar, Department of Chemistry, Boston University, Boston, MA, Oct. 9, 2013.
36. (invited lecture) *Nanofabricated sensors and electron microscopy on submerged samples*. University of Rhode Island School of Oceanography Marine and Atmospheric Chemistry Seminar, Narragansett, RI, Oct. 4, 2013.
37. (invited presentation) *Nanofluidic cell for high-resolution, in-liquid transmission electron microscopy*. Osher Lifetime Learning Institute, Kingston, RI, May 1, 2013.
38. *Using conductance to characterize surface-coated, single-molecule nanopore sensor interfaces*. 245th ACS National Meeting, New Orleans, LA, April 7-11, 2013.
39. *Nanofluidic cell for high-resolution, in-liquid transmission electron microscopy*. 245th ACS National Meeting, New Orleans, LA, April 7-11, 2013.
40. (**KEYNOTE LECTURE**) *Nanopores: Portals to the Molecular World*. Chemical Biophysics Symposium, Toronto 2013, Canada, April 19-21, 2013.
41. (invited lecture) *Through the ultrathin window and into the nanoscale hole: I. Transmission electron microscopy (TEM) of liquid-phase samples and II. Nanopore force spectroscopy of molecular interactions*. Department of Chemistry, Tufts University, Medford, MA, January 29, 2013.
42. (invited lecture) *Nanopores and Nanofluidics: Molecular imaging and manipulation*. Nabsys, Inc., Providence RI, January 17, 2013.
43. (invited lecture) *Through the ultrathin window and into the nanoscale hole: I. Transmission electron microscopy (TEM) of liquid-phase samples and II. Nanopore force spectroscopy of molecular interactions*. Department of Chemistry, University of New Hampshire, Durham, NH, April 4, 2013
44. *Characterizing single-molecule nanopore sensors: Performance limits of conductance-based methods*. 244th ACS National Meeting, Philadelphia, PA, August 19-23, 2012.
45. *Exploring the dramatic dependence of ssDNA:histone assembly on oligomer length*. 244th ACS National Meeting, Philadelphia, PA, August 19-23, 2012.
46. *Nanopore force spectroscopy for bioanalysis and biophysics*. Gordon Conference: Bioanalytical Sensors. Newport, RI, June 17-22, 2012.
47. (**INVITED LECTURE**) *Single nucleotide resolution using nanopore force spectroscopy*. GTC 2nd Next Generation Sequencing Conference, Boston, USA, May 30-31, 2012.
48. (invited lecture) *Nanopores: Portals to the Molecular World*. Department of Physics, University of Wisconsin-Milwaukee, May 4, 2012.
49. (**INVITED LECTURE**) *Solid-state nanopore force spectroscopy and in situ nanopore sizing—performance limits*. Nanopores Conference 2012, Lanzarote, Spain, Feb. 6-10, 2012.
50. (invited lecture) *Building and using the molecular-scale laboratory*. Rhode Island College, Providence, RI, January 27, 2012.
51. (**INVITED LECTURE**) *Nanotechnology: Forging a better future one molecule at a time*. URI Honors Colloquium, University of Rhode Island, October 18, 2011.
52. (invited lecture) *Biosensing with Nanopore Force Spectroscopy*. Analytical Chemistry Chemistry Seminar, Department of Chemistry, University of Massachusetts, Lowell. Sept. 21, 2011.
53. (**INVITED LECTURE**) *Nanopore sequencing and the demonstration of single base pair resolution*. Gordon Research Conference: Nucleosides, nucleotides & oligonucleotides, Newport, RI, July 3-8, 2011.
54. *Solid-State Nanopore Force Spectroscopy*. NHGRI Advanced Sequencing Technology Grantee Meeting and NHGRI Advanced Sequencing Technology Development Meeting. San Diego, CA, April 4-6 and 6-7, 2011.
55. (invited lecture) *Nanopores: Portals to the Molecular World*. Amgen Seminar Series in Chemical Engineering, University of Rhode Island, Kingston, RI. February 17, 2011.
56. (**INVITED LECTURE – PRINCIPAL SPEAKER**) *Synthetic nanopore force spectroscopy*. International Symposium: Advanced Science and Technology for Single Molecular Analysis of DNA and Related Molecules, Kyoto, Japan, January 24-26, 2011.

57. (invited lecture) *Nanotechnology*. Oceanography 2030. W. Alton Jones Campus, URI. West Greenwich, RI. January 12-13, 2011.
58. *Synthetic nanopore force spectroscopy for clinical genotyping*. ACS Fall 2010 National Meeting, Boston, MA, August 22-26, 2010.
59. *Nanopore Force Spectroscopy for Genotyping Applications*. Department of Physics Seminar Series, University of Rhode Island, November 20, 2009.
60. (invited lecture) *Nanopores: Portals to the Molecular World*. Department of Chemistry Seminar Series, University of Rhode Island, October 5, 2009.
61. (**INVITED LECTURE**) *Synthetic Nanopore Force Spectroscopy*. NHGRI 2009 Sequencing Technology Development Grantee Meeting (Closed Meeting), La Jolla, California, March 29-31, 2009.
62. *Artificial nanopores for biophysical investigations and bioanalytical applications*. Frontiers in Biophysics 2009, Simon Fraser University, Burnaby, British Columbia, January 23, 2009.
63. *Nanopore force spectroscopy*. BioFest 2009, UBC, January 16, 2009.
64. (invited lecture) *Hydrogen bonding in DNA: Ultrafast vibrational dynamics of base pairs and waters of hydration*. Biophysics Seminar, Simon Fraser University, Burnaby, British Columbia, January 12, 2009.
65. (invited lecture) *Strongly-driven melting of metals viewed in real-time and real space using femtosecond electron diffraction*. Bereich Seminar A, Max-Born-Institute, Berlin, Germany, October 25, 2007.
66. (invited lecture) *Molecular movie-making: Capturing ultrafast structural dynamics with femtosecond infrared spectroscopy and femtosecond electron diffraction*. Atomic, Molecular and Optical Physics Seminar, Department of Physics, University of British Columbia, Vancouver, Canada, Oct. 2, 2007.
67. *Molecular movie-making: Capturing ultrafast structural dynamics with femtosecond infrared spectroscopy and femtosecond electron diffraction*. Chen Group, Department of Chemistry, Cornell University, Ithaca, USA, September 28, 2007.
68. (invited lecture) *Molecular movie-making: Capturing ultrafast structural dynamics with femtosecond infrared spectroscopy and femtosecond electron diffraction*. Sonderseminar des Centrum für Angewandte Photonik. Universität Konstanz, Konstanz, Germany, July 6, 2007.
69. *Ultrafast N-H vibrational dynamics in the DNA model base pair 7-azaindole dimer*. Thirteenth International Conference on Time-Resolved Vibrational Spectroscopy. Freising, Germany, May 19-25, 2007.
70. (invited lecture) *Molecular movie-making: Capturing ultrafast structural dynamics with femtosecond infrared spectroscopy and femtosecond electron diffraction*. Kavli Insitute of Nanoscience, Delft University of Technology, Delft, The Netherlands, April 27, 2007.
71. *Ultrafast dynamics of vibrational N-H stretching excitations in the 7-azaindole dimer*. Deutschen Physikalischen Gesellschaft, Duesseldorf, Germany, March 19-23, 2007.
72. (invited lecture) *Molecular movie-making: Capturing ultrafast structural dynamics with femtosecond infrared spectroscopy and femtosecond electron diffraction*. Department of Chemistry, University of Calgary, Calgary, Canada, March 15, 2007.
73. (invited lecture) *Ultrafast structural dynamics: From vibrational dynamics in DNA base pair analogues with femtosecond infrared spectroscopy to atomic-level movies of melting using femtosecond electron diffraction*. Departments of Chemistry and Physics, University of Western Ontario, London, Canada, March 7, 2007.
74. (invited lecture) *Ultrafast structural dynamics: From vibrational dynamics in DNA base pair analogues with femtosecond infrared spectroscopy to atomic-level movies of melting using femtosecond electron diffraction*. Department of Chemistry, Harvard University, Boston, U.S.A., December 14, 2006.
75. (invited lecture) *Structure and Function: Studies with Femtosecond Infrared Spectroscopy and Femtosecond Electron Diffraction*. Temps Group, Institute for Physical Chemistry, Christian Albrechts University, Kiel, Germany, November 6, 2006.
76. *Ultrafast melting in metals probed with femtosecond electron diffraction*. XX Congress of the International Union of Crystallography (IUCr2005), Florence, Italy, August 23-31, 2005 [J.R. Dwyer, R.E. Jordan, C.T. Hebeisen, M. Harb, R. Ernstorfer, and R.J.D. Miller, poster].
77. *Femtosecond electron diffraction: A direct probe of ultrafast structural dynamics*. German-Canadian Workshop: Young Scientists in Photonics, Munich, Germany, June 10-12, 2005.

78. **(INVITED LECTURE)** *Femtosecond electron diffraction: A direct probe of ultrafast structural dynamics*. Second International Conference on “Photo-Induced Phase Transitions: Cooperative, Non-linear and Functional Properties” (PIPT), University of Rennes, France, May 24-28, 2005.
79. **(AWARD LECTURE)** *An atomic-level view of ultrafast structural dynamics using femtosecond electron diffraction*. Donald J. Le Roy Prize in Physical Chemistry Lecture, Department of Chemistry, University of Toronto, Toronto, Canada, April 27, 2005.
80. **(INVITED LECTURE)** *Femtosecond electron diffraction: A direct probe of strongly-driven melting dynamics in metals*. The Study of Matter at Extreme Conditions Conference (SMEC) 2005, Miami, Florida, April 17-21, 2005.
81. *Femtosecond electron diffraction: A tool to probe ultrafast structural dynamics*. Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Berlin, Germany, January 25, 2005.
82. *Ultrafast melting dynamics probed with femtosecond electron diffraction*. Institute of Physical Chemistry, University of Zurich, Zurich, Switzerland, January 21, 2005.
83. *Femtosecond electron diffraction: A tool to probe ultrafast structural dynamics*. Molecular Physics and Physical and Chemical Chemistry Seminars, Laboratoire de Spectroscopie Ultrarapide, École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland, January 18, 2005
84. **(invited lecture)** *Femtosecond electron diffraction: A tool to probe ultrafast structural dynamics*. Swiss Light Source, Villigen, Switzerland, January 17, 2005.
85. *Femtosecond electron diffraction: The quest for the molecular movie*. Scherer Research Group, University of Chicago, Chicago, USA, January 7, 2005.
86. **(invited lecture)** *Femtosecond electron diffraction: The quest for the molecular movie*. Department of Chemistry, Brock University, Canada, September 10, 2004.
87. *Structural dynamics via femtosecond electron diffraction: The nature of ultrafast laser-induced melting*. 87th Canadian Chemistry Conference, London, Canada, May 29-June 1, 2004 [J.R. Dwyer, R.E. Jordan, C.T. Hebeisen, B.J. Siwick and R.J.D. Miller, poster].
88. **(INVITED LECTURE)** *Making movies of molecules with femtosecond electron wavepackets*. Conference on Lasers and Electro-Optics Pacific Rim, Taipei, Taiwan, December 15-19, 2003.
89. *Femtosecond electron diffraction: Ultrafast melting dynamics revealed*. Canada-Germany Young Scientists in Photonics Workshop, Ottawa, Canada, September 2-3, 2003.
90. *Femtosecond electron diffraction: A direct probe of ultrafast structural dynamics*. The 39th IUPAC Congress and the 86th Conference of the Canadian Society for Chemistry, Ottawa, Canada, August 10-15, 2003.
91. *Ultrafast electron diffraction: Towards a structural probe of femtosecond molecular reaction dynamics*. University of Toronto Chemical Biophysics Symposium, Toronto, Canada, April 12-14, 2002 [J.R. Dwyer, B.J. Siwick, R.E. Jordan and R.J.D. Miller, poster].
92. *Ultrafast electron diffraction: A tool to probe reaction dynamics*. University of Toronto Physical Chemistry Seminar Series, Toronto, Canada, January 16, 2001.
93. *Ultrafast electron diffraction: Probing structural dynamics on the femtosecond timescale*. Photonics Research Ontario Student/Industry Retreat, Niagara-on-the-Lake, Canada, February 25-26, 2001 [B.J. Siwick, J.R. Dwyer, R.E. Jordan and R.J.D. Miller, poster].
94. *Ultrafast electron diffraction: Towards a direct probe of reaction dynamics*. 84th Conference of the Canadian Society for Chemistry, Montreal, Canada, May 26-30, 2001 [J.R. Dwyer, B.J. Siwick, R.E. Jordan and R.J.D. Miller, poster].
95. *Ultrafast electron diffraction: Reaction dynamics at the atomic level*. 16th Annual Symposium on Chemical Physics, Waterloo, Canada, November 3-5, 2000 [J.R. Dwyer, C. Belzile, B.J. Siwick, R.E. Jordan and R.J.D. Miller, poster].
96. Undergraduate poster presentations

Funding

1. NSF EPSCoR 1004057, Geoff Bothun (Chem Eng, PI); JRD Thrust Lead., September 2017-August 2022, \$19M.
2. Champlin Foundation, Mindy Levine (PI), JRD, Shahla Yekta, Michael McGregor, Cindy Graham Brittain, Sue Geldardt, Silvana Ngo, Arijit Bose, Thomas Boving, *Chemistry from the Back Row: Engaging Students Using a Suite of State-of-the Art Chemical Instruments for the Real-Time Visualization of Chemical Reactions and Phenomena*, 2017, \$162,000.

3. Rhode Island Research Alliance (RI Science & Technology Advisory Council), *Nanofluidic Profiling of Marine Biopolymers: Synthetic and Sensing Tools for Environmentally- and Economically-Driven Aquatic Monitoring*, May 2017-May 2018, \$90,000.
4. URI Council for Research Proposal Development Grant, A Noninvasive Treatment for Resurrecting Biofouled Single-Molecule Nanofluidic Sensors, July 2017-June 2018, \$14,250.
5. NSF CAREER AWARD CBET-1150085, *Enhancing molecular recognition biosensing with nanopore force measurements*, May 2012-May 2018, \$400,000.
6. NIH R01 subcontract, *Nanopore array force spectroscopy chip for rapid clinical genotyping*, \$56,363 (direct costs).
7. Champlin Foundations, Xinyuan Chen (PI), Wei Lu, Samantha Meenach, Bingfang Yan, Geoffrey Bothun, Yi Zheng, Jason R. Dwyer. *Microfabrication Technology: An Urgent Need for Hands-On Learning at the University of Rhode Island*, \$170,000 (2015).
8. Champlin Foundations, Geoff Bothun (co-PI), Arijit Bose (co-PI), Jason R. Dwyer, Vinka Oyanedel-Craver, David Worthen, *An Advanced Hyperspectral Imaging System to Observe Nanoscale Materials and Processes across STEM*, \$154,000 (2014).
9. Champlin Foundations, Jason R. Dwyer (PI), Mindy Levine, Geoff Bothun, Abraham Kovoov, *Advanced Instrumentation for Probing Structure and Physiological Function of Purified Target Molecules*, \$130,000 [awarded 2013/2014].
10. Senior Investigator NSF 1330406 *Collaborative Research: North East Water Resources Network*, (PI Art Gold, URI) \$2,000,000; \$200k to JRD. 08/01/2013-07/31/2017.
11. NSF REU Supplement for CBET 1150085, ~\$8,000 (2013)
12. URI Council for Research Proposal Development Grant, *Lowering the barriers to nanofabrication of nanopore single-molecule biomedical sensors*, July 2013-2014, \$15,000.
13. Rhode Island Nanotechnology Consortium, *A Nanofluidic Single-Molecule Characterization and Control Platform* (Dwyer, Keunhan Park & Radha Narayanan), 2012-2013, \$8000.
14. Champlin Foundations, Brenton DeBoef, Cindy Brittain, Jason R. Dwyer, Geoff Bothun, *A High Performance Liquid Chromatography—Mass Spectrometry Instrument*, \$142,566. [2010/2011]
15. Rhode Island Foundation, *Developing a low-cost, nanofabricated device for early, bedside cancer diagnosis*, \$15,000.
16. University of Rhode Island Council for Research, *Molecular analysis by nano-ruler: Using nanoparticle swelling to identify chemical species*, \$10,000.
17. Faculty start-up funds (URI)

Student Supervision

Graduate students

Elaine Foun (2010-2013 M.Sc., now at Fujifilm), Julie Whelan (2017 Ph.D. expected), Nuwan Bandara (Ph.D. Physical Chemistry expected 2018), Buddini Karawdeniya (Ph.D. Analytical Chemistry expected 2018), Jon W. Nichols (Ph.D. Analytical Chemistry expected 2020), Robert Chevalier (Ph.D. Analytical Chemistry expected 2021).

Award-winning graduate research

Nuwan Bandara: 2016 Eastern Analytical Symposium research prize; 2015 URI Graduate School research fellowship.

Buddini Karawdeniya: 2016 Eastern Analytical Symposium research prize; 2016 URI Graduate School research fellowship, 2015 SciX conference poster prize.

Undergraduate students

Travis Leffert (B.Sc. 2010, staff scientist at Two Pore Guys, Inc.), A.J. Laperche, Cameron Frament (2009-2012; accepted to PhD Biophysics program at U. Colorado, Boulder), Leslie McCabe (scientist with Blount Fine Foods), Lucas Ginsberg (2012-2012; accepted to Berkeley chemistry PhD program), Elana Viola, Ian Tompkins (CHM 353, spring 2012; research assistant summer 2012), Dan Wilson (CHM 353, summer 2012; PhD student Tufts), Caitlin Ross (res. asst. summer 2012, 2013), Josh Morimoto (2013), Sarah Golden (2013), Cory Lawton (2013), Joshua Doyle (summer 2014), Sarah Golden (2014), Caitlin Masterson (2014, employed also at Hanna Instruments, now PhD student Brown Chemistry), Jessika da Rocha Silva (2014; exchange student from Brazil), Jayce Napolitano (2014), Catherine Linh (2015 spring & summer), Ben Rickson (2016 & 2017 summer), Adriana Mendieta (2016 summer), Michael Auten (2016-2017 academic), Ben Rickson (2017 summer); Melissa Morris (2017 fall), Sam Toppa (2017 fall).

Award-winning undergraduate research:

Caitlin M. Masterson: 2014 Eastern Analytical Symposium research prize.

Cameron M. Frament: 2011 URI Undergraduate Research Initiative grant, 2012 Life Sciences, Physical Sciences and Engineering undergraduate student research award and 2012 Eastern Analytical Symposium undergraduate research prize (<http://www.uri.edu/news/releases/index.php?id=6440>).

Ian Tompkins: 2012 URI Undergraduate Research Initiative, *Research in 3D-Printing and rapid prototyping of high-sensitivity, low-cost diagnostic medical devices.*

Dan Wilson: 2013 URI Undergraduate Research Initiative, *How small is small? Measuring Bespoke Nanoscale Devices with a Real-time Visible Spectrometer.*

High School Students

Diondra Perillo (Bayview Academy, Spring 2013; majoring in bioinformatics at U. Michigan), *Nanopore Current Blockage Simulations*, Nathan Meehan (Bishop Hendricken High School, Summer 2015), Priyanka Bonifaz (Spring 2016 term, Barrington High School junior; RI Science Fair top 10 plus: Yale Science and Engineering Award, American Chemical Society Award, Ricoh Sustainable Development Award).

Teaching Experience

Spring 2017	<i>CHM 414: Instrumental Methods of Analysis</i>
Fall 2016	<i>CHM 506: Chemical Analysis.</i> -Specially designed course for incoming graduate students to give an interdisciplinary overview of chemistry through chemical analysis. Course integrates textbook, literature, and discussion through a flipped classroom approach.
Spring 2015	<i>CHM 414: Instrumental Methods of Analysis</i> -Designed the lecture-based course to provide support to student self-instruction from sources including textbooks and the modern literature: the emphasis in this course was to prepare senior students for the experience of learning in a professional scientific setting outside of a university classroom.
Fall 2014	<i>CHM 506: Chemical Analysis.</i> -Specially designed course for incoming graduate students to give an interdisciplinary overview of chemistry through chemical analysis. Course integrates textbook, literature, and discussion through a flipped classroom approach.
Spring 2014	<i>CHM512: Advanced Analytical Chemistry II.</i> -Designed the course to fully integrate Mathematica symbolic and numeric mathematics into the study of analytical chemistry. Addressed a student unfamiliarity with computer programming skills and provided a rigorous framework for introducing new subjects.
Fall 2013	<i>CHM 511: Advanced Analytical Chemistry I.</i> -Delivered as a fully flipped classroom.
Spring 2010/11/12	<i>CHM 512: Advanced Analytical Chemistry II. (Graduate lecture course)</i> -Designed lecture course to emphasize problems from modern literature. -Incorporated a major independent project to design a new diagnostic instrument, and to consider commercial requirements of such a device.
Fall 2009/10/11/12	<i>CHM 642, 643, 644: Graduate Chemistry Seminars</i> <i>CHM 212: Quantitative Analysis (Undergraduate lecture + lab course)</i> -Delivered lectures that incorporated practical examples of principles from the modern chemical literature. -Designed and oversaw laboratory instruction.
Fall-Spring, Summer 2009/10/11/12	<i>CHM 353, 354: Undergraduate Student Research</i> -Designed independent research projects to introduce undergraduate students to modern chemical research.
Spring 2012	<i>CHM 642, 643, 644: Graduate Seminar Series</i>

Spring
2011-2014, 2016,
2017

-Closely mentored students in writing abstracts, planning and delivering talks based on the literature and on their Ph.D. research.
NUR 160: Exploring Global Health guest lecture on *Portable Medical Diagnostics*.

Service, University of Rhode Island

- Committees & Commissions
 - URI President's Commission on People with Disabilities (2016-2019)
 - University Laboratory and Chemical Safety Committee (2016-)
 - Council for Research, appointed 2014-2017
 - Intellectual Property Committee 2015-2017 (seconded by Council for Research)
 - Champlin Foundations URI Provost's Proposal Review & Development Committee (summer 2015)
 - Hiring Committee, Executive Director of University of Rhode Island American Association of University Professors (URI AAUP)
- Mentorship
 - Organized RI Summer Nano Talks student seminar series (2012, 2013)
- Teaching
 - Guest lecturer for URI NUR 160: Exploring Global Health: *Portable Medical Diagnostics*. March 30, 2011. April 4, 2012. April 3, 2013. April 2, 2014. April 6, 2016.
 - Invited lecturer for 2011 URI Honors Colloquium series
 - Guest lecturer for 2011 URI Honors class, Oct. 20, 2011
- Chemistry building
 - Media outreach campaign *Essential 2 Healthcare: Chemistry Professor Jason Dwyer*. Print interview and photo campaign. Polling station information hand-outs.
 - Laboratory planning sessions. Proposed "showcase laboratory" concept to tie in with fundraising, proposed fully-enclosed working areas to ensure forward-compliance with health and safety regulations.
- Academic Planning and Administrative
 - Graduate School Retreat planning session, Nov. 18, 2011.
 - Dean's External Advisory Council Presentation, June 19, 2013
 - Reviewed workplace health and safety documentation for maintenance and facilities personnel for Stacey Snow, URI Chemical Hygiene Officer.
- Academic
 - Committee member: Aihong Xi (CHE, Bothun, 2012), Nicole Cook (CHM, Levine, 2013), Hanno Teiwes (MCE, Faghri, 2014); Austin Brown (CHM, Smith/Oxley, 2016); Kurt Fastnacht (CHM, Kiesewetter), Timo Kuester (CHE, Bothun), Zachary Brown (CHM, Lucht), Benjamin Smith (CHM, Levine), Oleg Kazakov (CHM, Kiesewetter).
 - Ph.D. comprehensive examinations: Santosha Ammu (physics, 2009), Sreekanth Suravajjala (chemistry, 2009), Alexander Karabadzak (physics, 2011), Kaoru Tominaga (Pharmacy, 2012), Pratik Sheth (Pharmacy, 2012), Austin Brown (chemistry, 2016).
 - Ph.D. examinations: Glen Holden (chemistry, 2010), Santosha Ammu (chair, physics, 2011), Alexander Karabadzak (physics, 2010), Kaoru Tominaga (Pharmacy, 2013), Pratik Sheth (Pharmacy, 2013).

Service, Department of Chemistry, University of Rhode Island

- Committees
 - Graduate admissions committee (2009-2015)
 - Graduate curriculum committee (2012-present): Undertaking a substantial overhaul of the graduate chemistry curriculum to institute greater interdisciplinary training. Mission statement: *To enable our students to make new discoveries and invent new applications, we must inculcate them with a rigorous understanding of fundamental chemical*

principles, delivered through courses firmly rooted in the interdisciplinary nature of the field.

- Search Committee for a Chemistry Lecturer (summer 2014)
- Search Committee for a Physical/Analytical Chemist (2014)
- Chair's Advisory Committee (2015-)
- Chair, Chemistry Safety Committee (2015-)
- Search Committee for a Physical/Analytical Chemist (2015) [two open positions]
- Search Committee for a Physical/Analytical Chemist (2016)
- Initiatives and Special Activities
 - Delivered a CV workshop to URI chemistry undergraduates, arranged by the departmental student organization (2/22/2017)
 - Spearheaded an annual chemistry research poster session for incoming and current chemistry graduate students (2013).
 - Instituted a number of departmental health and safety procedures including a no-glove policy in hallways and an improvement to the after-hours gas cylinder exchange procedure (2009-).
 - "Getting the most out of graduate school" event (April 26, 2012; August 9, 2013): an ongoing series of events to improve the chemistry graduate experience. Included participation from chemical engineering and mechanical engineering.
 - "Doors Open Chemistry" event (Jan. 19, 2012, Nov. 6, 2012, fall semester 2013-2015): a series of events to nurture an open, active and interdisciplinary research environment amongst student researchers.
 - Instituted Hypercube Scholar Program in the department (2011).
 - Introduced electronic scheduling for seminar speakers (2010-2011).
 - Initiated Dell printer program, leading to several new free advanced printers for department use (2009).
 - Arranged for URI students to be able to attend invitation-only (top schools) Novartis *Women in Chemistry* event taking place in parallel with the 2010 Boston ACS meeting.
- Speakers hosted
 - 2016 – Dr. Erik T.J. Nibbering (Max Born Institute, Germany), Prof. Chia-Kuang (Frank) Tsung (Boston College Chemistry), Kwok-Fan Chow (UMass Lowell Chemistry), Min Chen (UMass Amherst Chemistry).
 - 2015 – Prof. Charles Mace (Tufts Chemistry).
 - 2014 – Prof. Charles Mace (Tufts Chemistry; cancelled due to weather), Prof. Ron Grimm (WPI Chemistry), Prof. Arne Gericke (WPI Chemistry),
 - 2013 – Sunshine Menezes (Metcalf Institute, URI Graduate School of Oceanography), Jianmin Gao (Boston College Chemistry), Mingdi Yang (UMass Lowell, Chemistry), Paul Whitford (Northeastern Physics), Wesley Wong (Biological Chemistry & Molecular Pharmacology and Pediatrics, Harvard), Xin Chen (Boston University, Chemistry), John Oliver (NabSys, Inc.), Prof. Robert Dempski (WPI, Chemistry),
 - 2012- Ryan Hili (Harvard University Chemistry), Marco Masia (Boston University, Sassari)
 - 2011-Sam Thomas III (Tufts Chemistry), Yong Wang (UConn, Engineering), Tse-Ming (Bob) Hsin (UMass Lowell Chemistry), Ethan Schonbrun (Rowland Institute, Harvard University)..
 - 2010-Ludovico Cademartiri (Harvard University Chemistry), James Whitten (UMass Lowell Chemistry).
 - 2009-Matthew Holden (UMass Amherst Chemistry), Murugappan Muthukumar (UMass Amherst Polymer Science and Engineering), Andre Marziali (UBC Canada Physics).

Professional Activities

- Councilor, AES Electrophoresis Society (2018-2021).
 - Awards Chair, 2018.
- Session Chair, AES Mid-Career Award Session, Annual AES Meeting at SciX 2018, Atlanta, GA, October 21-24.

- Co-chair of AES Symposium, FACSS SciX 2016 & 2017.
- Symposium Session Chair, FACSS SciX 2015 *Biopolymers in Electric Fields*, Providence, RI, Sept. 27-Oct. 2, 2015.
- ACS Symposium Presider: *Nanotechnology for Analytical Sensing and Spectroscopy Based Applications*, ACS Fall National Meeting, Boston, USA, August 16-20, 2015.
- ACS Session Chair, Spring National Meeting, New Orleans 2013, *Transformative Nanotechnologies: Energy and Environment, Solutions and Challenges (Focused on Materials Development and Analyses)*
- Advisory Board, 3rd Next Generation Sequencing Conference, Global Technology Community, Monrovia, CA (2012-2013)
- NIH Grant Review Panel Member: NHGRI Revolutionary Sequencing Technology grants (2/23/12, 3/26/14; 3/2016). This funding program was glowingly featured in Nature (2014) **507**, 273 and 294-295—a rare feat for a granting program.
- NSF external grant reviewer (2009, 2012, 2013)
- Reviewer
 - ACS Sensors
 - Analytical Chemistry
 - Analyst
 - Cell Biochemistry and Biophysics
 - ELECTROPHORESIS
 - JACS (4 times)
 - Journal of Chemical Physics
 - Journal of Physics: Conference Series
 - Journal of Physical Chemistry (3 times)
 - Journal of Physical Chemistry Letters (2015)
 - Journal of Photochemistry & Photobiology, B: Biology
 - Langmuir
 - MRS Proceedings
 - Nature Biotechnology
 - Nature Nanotechnology (4 times)
 - PLoS One
 - Physical Chemistry Chemical Physics (2 times)
 - Sequencing
 - U.S. Environmental Protection Agency (EPA) Prize Competition - 2017 Innocentive Advanced Septic System Nitrogen Sensor Challenge
 -
- External reviewer, Ph.D. Chemistry committee, Alexandra Aubé, University of Montreal, Canada
- ACS Session Chair & Organizer, Fall National Meeting, Boston, 2010, *Clinical Applications of Sensors*.
- Session Chair, Nanopores Conference 2012, Lanzarote, Spain.
- Session Chair, GTC 2nd Next Generation Sequencing Conference, Boston, USA, May 30-31, 2012
- Policy pre-2009
 - DFAIT Canada-Germany science panel discussion on scientific cooperation, Photonics Research Ontario round-table on scientific cooperation, lab tour for Ontario Asst. Deputy Minister of Technology, femtosecond laser facility planning session for the Canadian Light Source.

Public Outreach and Media

- 2017 Guest session leader at April 2017 Dreyfus Foundation sponsored weeklong science camp for middle school girls
- 2014
 - Invited lecture, *Science Communication* at the Sustainable Nanotechnology Organization-sponsored *Communicating Nanostuff* Workshop at the 3rd USA Science and Engineering Festival, Washington, D.C., April 25, 2014.
 - Guest session leader at April 2014 Dreyfus Foundation sponsored weeklong science camp for middle school girls

- 2013
- Guest lecture, *Nanoscience and Nanotechnology*. Osher Lifetime Learning Institute *The Cutting Edge: Thinking Big in Scientific Inquiry* at URI course, Kingston, RI, November 6, 2013 with graduate students guest speakers.
 - Guest lecture, *Nanofluidic cell for high-resolution, in-liquid transmission electron microscopy*. Osher Lifetime Learning Institute *The Future is Here* course, Kingston, RI, May 1, 2013.
 - Faculty mentor (Ian Tompkins) for a guest lecture on 3D printing at the Osher Lifetime Learning Institute, Kingston, RI, May 8, 2013.
 - Laboratory tour for Cranston Outreach Math Program (August 14, 2013)
 - Guest session leader at April 2013 Dreyfus Foundation sponsored weeklong science camp for middle school girls
 - Mentor for high school student Diondra Perillo (Bayview Academy, Spring 2013), *Nanopore Current Blockage Simulations*
- 2012
- Warwick Beacon*, quoted in “It’s not rocket science” and “Students display questioning minds at science fair”, March 20, 2012.
 - Providence Phoenix Q&A on nanotechnology* 9/25/11
 - Front page media coverage of NSF CAREER award in Sun Publishing Co. newspapers* (Wood River Press, Charlestown Press, etc.)
 - Coverage of NSF CAREER award in Providence Business News Rhode Island Science & Engineering Fair* Judge.
- 2010-2013
- 2010
- Essential 2 Healthcare: Chemistry Professor Jason Dwyer*
<http://essential2ri.org/YesOn2/essential-2/essential-2-healthcare-chemistry-professor-jason-dwyer/>
 Photo and text-based outreach for URI Chemistry building campaign explaining my research focus on rapid portable diagnostics. Numerous written drafts to ensure the need for a new building was made without denigrating the quality of work done currently.
- 2008
- Making the MOST out of media relations*
 Department of Physics, University of British Columbia.
 Conceived of and organized a presentation by the public affairs office at UBC to a general audience of scientists on why and how to talk to the media about science. Subsequently organized a similar media training presentation for the School of Population and Public Health (2008)
 - Rising Stars of Research*
 Poster competition judge for Canadian competition at the University of British Columbia.
- 2007
- UN Migrant Workers’ Day*
 Rundfunk Berlin-Brandenburg (RBB) Radio
 Interview with a German radio news magazine about my experience as a foreign scientific worker in Germany.
- 2007
- Ultrafast laser science*
 Hauptstadtstudio Berlin, ZDF Morgenmagazin
 Interview with a German television news magazine focusing on ultrafast science and technology in Berlin. Provided visual demonstrations of femtosecond laser operation.
- 2004
- One Second/Bullet Time*
 Discovery Channel/France 5
 Documentary feature interview (20 minutes of 60 minutes total length) discussing what happens on the timescale of femtoseconds, how it is possible to investigate these ultrafast processes and why it is interesting to know about them. Several days were spent offscreen providing technical explanations.
- 2003
- Femtosecond electron diffraction*
 SpaceTV news (Canadian national television network)
 Media interview explaining the basics of the technique of femtosecond electron diffraction for a general audience, as well explaining what insights the technique offers into the physical world.
- 2001
- Frontiers in ultrafast science*

- Organized an introductory lecture for undergraduate students at Trinity College, Canada, on recent advances in ultrafast optical science.
- 2000 *Why science?*
Organized a gathering of undergraduate science students and research leaders in chemistry, physics and mathematics with the goal of inspiring the next generation of scientists.

Entrepreneurship & Consulting

- Co-founder: Insight Nanofluidics
- Awarded 2012 Ontario Centres of Excellence *Market Readiness* Phase I grant, \$25k; 2013 Ontario Centres of Excellence Market Readiness Phase 2A, \$125k, VentureStart \$30k.

Special Training

- 2008 *Molecular Biology Techniques Workshop*
Dr. David Ng, Michael Smith Labs, University of British Columbia.
-week-long hands-on training in molecular biology techniques.
- 2008 *Laboratory Biological Safety*
University of British Columbia, Dept. of Health, Safety and Environment.
National Coaching Certification Program, Levels 1 & 2 Theory
Coaching Association of Canada. Formal training in coaching approaches.

Professional memberships

- Member, American Chemical Society (2009-)