

1. NAME, POSITION, AND DEPARTMENT

Derek Stein
Professor
Department of Physics and School of Engineering

2. WORK ADDRESS

182 Hope Street
Providence, RI, 02912
USA

3. EDUCATION

Ph.D. (Applied Physics) Harvard University, 2003
M.Sc. (Applied Physics) Harvard University, 1998
B.Sc. (Physics, Honours) McGill University, 1997
B.Sc. Candidate (Physics) Queen's University (Canada), 1993 – 1994

4. PROFESSIONAL ACADEMIC APPOINTMENTS

2022 – present **Brown University**, Department of Physics and School of Engineering
Professor

2014 – 2022 **Brown University**, Department of Physics and School of Engineering
Associate Professor

2014 **Ecole Normale Supérieure de Paris**, Laboratoire de Physique Statistique
Visiting Professor

2013 – 2014 **Brown University**, Department of Physics
Associate Professor

2011 – 2013 **Brown University**, Department of Physics
Manning Assistant Professor

2006 – 2011 **Brown University**, Department of Physics
Assistant Professor

2003 – 2006 **Delft University of Technology**, Kavli Institute of Nanoscience
Postdoctoral research in the group of Cees Dekker

1998 – 2002 **Harvard University**, Division of Engineering and Applied Sciences
Research Fellow in the group of Jene Golovchenko

4. OTHER PROFESSIONAL APPOINTMENTS

2018 – present **Adept Materials (formerly Techstyle Materials, Inc.)**
Founder and CEO

2002 **Agilent Technologies**, Life Sciences Technologies Laboratory
Nanopore technology transfer from Ph.D. research

1993 – 1997 **Merck-Frosst Canada**, Pharmaceutical Research and Development
Drug stability testing and gelcap research

5. COMPLETED PUBLICATIONS

Color codes for contributors:

- *Brown undergraduate student*
- *Brown graduate student*
- *Brown postdoc*

Chapters in books

1. “Ion, Polymer, and Biomolecule Transport in the Nanofluidic Regime”, **Derek Stein**, Martin van den Heuvel and Cees Dekker, in: Nanofluidics: Nanoscience and Nanotechnology, Joshua Edel and Andrew de Melo, Eds. Royal Society of Chemistry, London, (2009).
2. “Passive and Electrically Actuated Solid-State Nanopores for Sensing and Manipulating DNA”, **Zhijun Jiang**, **Mirna Mihovilovic**, **Erin Teich**, and **Derek Stein**, in: Nanopore-based technology: Single molecule characterization and DNA sequencing, M.E. Gracheva, Ed., Humana Press, Springer, New York (2012).
3. “Ion, Polymer, and Biomolecule Transport in the Nanofluidic Regime”, **Derek Stein**, Martin van den Heuvel and Cees Dekker, in: Nanofluidics: Nanoscience and Nanotechnology, Second Edition, Joshua Edel and Andrew de Melo, Eds. Royal Society of Chemistry, London, (2016).
4. “Bayesian Uncertainty Quantification for Particle-Based Simulation of Lipid Bilayer Membranes”, **Clark Bowman**, **Karen Larson**, Alexander Roitershtein, **Derek Stein**, and Anastasios Matzavinos, in: Cell Movement: Modeling and Applications, Magdalena Stolarska and Nicoleta Tarfulea, Eds. Springer Nature Switzerland AG, Basel, (2018).

Refereed journal publications

Note about authorship in the field of experimental condensed matter physics: The corresponding author with overall responsibility for the research is conventionally the last author of research papers, while the first author is conventionally the student or postdoc who made the greatest contribution to the execution of the experimental project.

1. “Ion beam sculpting at nanometre length scales”, Jiali Li, **Derek Stein**, Ciaran McMullan, Daniel Branton, Michael J. Aziz and Jene A. Golovchenko, *Nature* **412**, 166 (2001).
2. “Ion Beam Sculpting Time Scales”, **Derek Stein**, Jiali Li and Jene A. Golovchenko, *Physical Review Letters* **89**, 276106 (2002).
3. “DNA molecules and configurations in a solid-state nanopore microscope”, Jiali Li, Marc Gershow, **Derek Stein**, Eric Brandin and Jene A. Golovchenko, *Nature Materials* **2**, 611 (2003).
4. “Feedback-controlled ion beam sculpting apparatus”, **Derek Stein**, Ciaran J. McMullan, Jiali Li and Jene A. Golovchenko, *Review of Scientific Instruments* **75**, 900 (2004).
5. “Surface-charge-governed ion transport in nanofluidic channels”, **Derek Stein**, Maarten Kruijthof and Cees Dekker, *Physical Review Letters* **93**, 035901 (2004).

6. "Streaming currents in a single nanofluidic channel", Frank H.J. van der Heyden, **Derek Stein** and Cees Dekker, *Physical Review Letters* **95**, 116104(2005).
7. "Nanoscale volcanoes: accretion of matter at ion sculpted nanopores", Toshiyuki Mitsui, **Derek Stein**, Young Rok Kim, David Hoogerheide and Jene A. Golovchenko, *Physical Review Letters* **96**, 036102 (2006).
8. "Charge Inversion at High Ionic Strength Studied by Streaming Currents", Frank H.J. van der Heyden, **Derek Stein**, Koen Besteman, Serge G. Lemay and Cees Dekker, *Physical Review Letters* **96**, 224502 (2006).
9. "Pressure-driven transport of confined DNA polymers in fluidic channels", **Derek Stein**, Frank H.J. van der Heyden, Wiepke J.A. Koopmans, and Cees Dekker, *PNAS* **103**, 15853 (2006).
10. "Electrokinetic energy conversion efficiency in nanofluidic channels", Frank H.J. van der Heyden, Douwe J. Bonthuis, **Derek Stein**, Christine Meyer, and Cees Dekker, *Nano Letters*; **6** (10), 2232-2237 (2006).
11. "Power generation by pressure-driven transport of ions in nanofluidic channels", Frank H.J. van der Heyden, Douwe J. Bonthuis, **Derek Stein**, Christine Meyer, and Cees Dekker, *Nano Letters* **7**, 1022-1025 (2007).
12. "Slip-Enhanced Electrokinetic Energy Conversion in Nanofluidic Channels", [Yongqiang Ren](#) and **Derek Stein**, *Nanotechnology* **19**,195707 (2008).
13. "Conformation and Dynamics of DNA Conned in Slitlike Nanouidic Channels", Douwe J. Bonthuis, Christine Meyer, **Derek Stein**, and Cees Dekker, *Physical Review Letters* **101**, 108303 (2008).
14. "Pressure-Driven DNA Transport Across an Artificial Nanotopography", [Jackson Travis del Bonis-O'Donnell](#), [Walter Reisner](#), and **Derek Stein**, *New Journal of Physics* **11**, 075032 (2009).
(Selected as a "[Best of 2009](#)" article.)
15. "Electrokinetic Concentration of DNA Polymers in Nanofluidic Channels", **Derek Stein**, Zeno Deurvorst, Frank H.J. van der Heyden, Wiepke J.A. Koopmans, [Alan Gabel](#), and Cees Dekker, *Nano Letters* **10**, 765-772 (2010).
([SeparationsNow](#) published a news article about this work.)
16. "Electrofluidic Gating of a Chemically Reactive Surface", [Zhijun Jiang](#) and **Derek Stein**, *Langmuir* **26**, 8161-8173 (2010).
17. "Fabrication of nanopores with embedded annular electrodes and transverse CNT electrodes", [Zhijun Jiang](#), [Mirna Mihovilovic](#), [Jason Chan](#), and **Derek Stein**, *Journal of Physics: Condensed Matter*, **22**, 454114 (2010).
([IOP Science LabTalk](#) published a news article about this work.)
18. "Coulomb Forces on DNA Polymers in Charged Fluidic Nanoslits", [Yongqiang Ren](#) and **Derek Stein**, *Physical Review Letters*, **106**, 068302 (2011).
"Retraction: Coulomb Forces on DNA Polymers in Charged Fluidic Nanoslits", **Derek Stein**, *Physical Review Letters* **107**, 049901 (2011).
(*Nature* news article mentioning this retraction: *Nature* **478**, 26–28 (2011))
19. "Charge Regulation in Nanopore Ionic Field-Effect Transistors", [Zhijun Jiang](#) and **Derek Stein**, *Physical Review E*, **83**, 031203 (2011).

20. “Controlling the Conformations and Transport of DNA by Free Energy Landscaping”, [Elijah Shelton](#), [Zhijun Jiang](#), [Shutong Wang](#) and **Derek Stein**, *Applied Physics Letters*, **99**, 263112 (2011).
21. “Statistics of DNA Capture by a Solid-State Nanopore”, [Mirna Mihovilovic](#), [Nicholas Hagerty](#), and **Derek Stein**, *Physical Review Letters* **110**, 028102 (2013).
(*Physics*, *Physics Today*, *IEEE Spectrum*, *ScienceDaily*, and *NSF News* published news articles about this work.)
22. “Stiff filamentous virus translocations through solid-state nanopores”, [Angus McMullen](#), Hendrick W. de Haan, Jay X. Tang and **Derek Stein**, *Nature Communications* **5**, 4171 (2014).
23. “Entropic cages for trapping DNA near a nanopore”, [Xu Liu](#), [Mirna Mihovilovic Skanata](#) and **Derek Stein**, *Nature Communications* **6**, 6222 (2015).
(*Brown Daily Herald*, *Brown.edu*, *Nanowerk*, *ScienceDaily*, and *4-traders* published articles about this work.)
24. “Nanopore Sequencing: Forcing Improved Resolution”, **Derek Stein**, *Biophysical Journal* **109** (10), 2001–2002 (2015).
25. “Massive radius-dependent flow slippage in carbon nanotubes”, Eleonora Secchi, Sophie Marbach, Antoine Niguès, **Derek Stein**, Alessandro Siria, and Lydéric Bocquet, *Nature* **537**, 210–213 (2016).
26. “Preserving the sequence of a biopolymers monomers as they enter an electrospray mass spectrometer”, [William Maulbetsch](#), [Benjamin Wiener](#), [William Poole](#), [Joseph Bush](#), and **Derek Stein**, *Physical Review Applied* **6**, 054006 (2016).
(*Physical Review Applied* published a Synopsis article about this work.)
27. “Giant Acceleration of DNA Diffusion in an Array of Entropic Barriers” [Daniel S. Kim](#), [Clark Bowman](#), [Travis Del Bonis-O’Donnell](#), Anastasios Matzavinos, and **Derek Stein**, *Physical Review Letters* **118**, 048002 (2017).
(*ScienceDaily* published an article about this work.)
28. “The nanopore mass spectrometer”, [Joseph Bush](#), [William Maulbetsch](#), [Mathilde Lepoitevin](#), [Benjamin Wiener](#), [Mirna Mihovilovic Skanata](#), [Wooyoung Moon](#), [Cole Pruitt](#), and **Derek Stein**, *Review of Scientific Instruments* **88**, 113307 (2017).
(*AIP Scilight* published an article about this work.)
29. “Dark Matter Detection Using Helium Evaporation and Field Ionization”, Humphrey J. Maris, George M. Seidel, and **Derek Stein**, *Physical Review Letters* **119**, 181303 (2017).
(*Physics World*, *ScienceDaily*, *NewAtlas*, and *Brown Daily Herald* published articles about this work.)
30. “Nanopore Measurements of Filamentous Viruses Reveal a Sub-nanometer-Scale Stagnant Fluid Layer”, [Angus McMullen](#), Jay X. Tang, and **Derek Stein**, *ACS Nano* **11**, 11669–11677 (2017).
31. “Performance Based Simulations for Membrane-based Enclosures”, [Helen Bergstrom](#), Ryan Abendroth, Jonathan Knowles, and **Derek Stein**, *Technology|Architecture + Design* **1**, 196–207 (2017).
32. “Buckling Causes Nonlinear Dynamics of Filamentous Viruses Driven through Nanopores”, [Angus McMullen](#), Hendrick W. de Haan, Jay X. Tang, and **Derek Stein**, *Physical Review Letters* **120**, 078101 (2018).

33. “Osmotically Driven and Detected DNA Translocations” [Angus McMullen](#), [George Araujo](#), [Michele Winter](#), and **Derek Stein**, *Scientific Reports* **9**, 15065 (2019).
34. “Development of a Dark Matter Detector that Uses Liquid He and Field Ionization” [David Osterman](#), Humphrey J. Maris, George M. Seidel, and **Derek Stein**, *Journal of Physics: Conference Series* **1468**, 021071 (2020).
35. “Controlled Amplification of DNA Brownian Motion Using Electrokinetic Noise” [Shayan Laméh](#), [Lijie Ding](#), and **Derek Stein**, *Physical Review Applied* **14**, 054042 (2020).
36. “The emerging landscape of single-molecule protein sequencing technologies” Javier Alfaro, Peggy Bohländer, Mingjie Dai, Mike Filius, Cecil J. Howard, Xander F. van Kooten, Shilo Ohayon, Adam Pomorski, Sonja Schmid, Aleksei Aksimentiev, Eric V. Anslyn, Georges Bedran, Cao Chan, Mauro Chinappi, Etienne Coyaud, Cees Dekker, Gunnar Dittmar, [Nicholas Drachman](#), Rienk Eelkema, David Goodlett, Sebastien Hentz, Umesh Kalathiya, Neil L. Kelleher, Ryan T. Kelly, Zvi Kelman, Sung Hyun Kim, Bernhard Kuster, David Rodriguez-Larrea, Stuart Lindsey, Giovanni Maglia, Edward M. Marcotte, John P. Marino, Christophe Masselon, Michael Mayer, Patroklos Samaras, Kumar Sarthak, Lusía Sepiashvili, **Derek Stein**, Meni Wanunu, Mathias Wilhelm, Peng Yin, Amit Meller, and Chirlmin Joo, *Nature Methods* **8**, 604–617 (2021).
(I wrote a subsection and contributed to the editing of this ‘perspectives’ article.)
37. “Electrokinetic-Noise-Assisted Barrier Crossing in a Nanofluidic Environment”, [Shayan Laméh](#), [Tim Zhao](#), and **Derek Stein**, *Physical Review Applied* **16**, 024019 (2021).

Non-refereed journal articles

1. “Nanopores: Molecular ping-pong”, **Derek Stein**, *Nature Nanotechnology* **2**, 741-742 (2007).
2. “Viewpoint: Particles Move to the Beat of a Microfluidic Drum”, **Derek Stein**, *Physics* **9**, 46 (2016).

Manuscripts submitted for publication

1. “Electrokinetic Current Driven by a Viscosity Gradient”, [Benjamin Wiener](#), [Shayan Laméh](#), and **Derek Stein**, *Nature Communications*, under revision.
2. “A nanopore ion source delivers single amino acid and peptide ions directly into the gas phase”, [Nicholas Drachman](#), [Mathilde Lepoivin](#), [Hannah Szapary](#), [Benjamin Wiener](#), [William Maulbetsch](#), and **Derek Stein**, under revision.
3. “Analysis of peptide photofragmentation for single-molecule protein sequencing”, [Jacob Victorisz](#), [Nicholas Drachman](#), and **Derek Stein**, *iScience*, under revision.

Work in preparation

1. “Pressure-Retarded DNA Translocations of Nanopores Reveal Nanoscale Stagnant Fluid Layers”, Kun Li, Zehao Song, and **Derek Stein**, in preparation.

Abstracts

1. “Ion transport in nanofluidic channels”, **Derek Stein**, Maarten Kruithof, Frank v.d. Heyden, and Cees Dekker, *Bulletin of the American Physical Society* **49**, Number 1, V33.009 (2004).

2. "Pressure-driven polymer dynamics in nanofluidic channels", **Derek Stein**, Wiepke Koopmans and Cees Dekker, *Bulletin of the American Physical Society* **50**, Number 1, BAPS.2005.-MAR.P23.5 (2005).
3. "Mass Transport and the Ion Beam Sculpting of Solid State Nano-scale pores", Toshiyuki Mitsui, **Derek Stein**, and Jene Golovchenko, *Bulletin of the American Physical Society* **50**, Number 1, BAPS.2005.MAR.Y35.5 (2005).
4. "Pressure-driven DNA polymer transport in microfluidic and nanofluidic channels", **Derek Stein**, *Bulletin of the American Physical Society* **51**, Number 1, BAPS.2006.MAR.B7.3 (2006).
5. "Digital DNA: Physics of DNA in Nanopit Lattices", Walter Reisner, Jonas Tegenfeldt, Niels Larsen, Henrik Flyvbjerg, **Derek Stein**, and Anders Kristensen, *Bulletin of the American Physical Society* **53**, Number 2, BAPS.2008.MAR.P25.9 (2008).
6. "Dynamics of DNA molecules confined to slit-like nanofluidic channels", Christine Meyer, Douwe Jan Bonthuis, **Derek Stein**, and Cees Dekker, *Bulletin of the American Physical Society* **53**, Number 2, BAPS.2008.MAR.P25.10 (2008).
7. "Ionic Dependence of the Conformation and Dynamics of DNA Confined in Slit-like Nanofluidic Channels", Yongqiang Ren, Walter Reisner, and **Derek Stein**, *Bulletin of the American Physical Society* **54**, Number 1, BAPS.2009.MAR.A28.3 (2009).
8. "DNA Physical Mapping via the Controlled Translocation of Single Molecules through a 5-10 nm Silicon Nitride Nanopores", **Derek Stein**, Walter Reisner, Zhijun Jiang, Nick Hagerty, Charles Wood, and Jason Chan, *Bulletin of the American Physical Society* **54**, Number 1, BAPS.2009.MAR.D40.2 (2009).
9. "Electrically Gated Solid State Nanopores", Zhijun Jiang, Walter Reisner, and **Derek Stein**, *Bulletin of the American Physical Society* **54**, Number 1, BAPS.2009.MAR.D40.14 (2009).
10. "Pressure-driven single-file transport of DNA molecules along linear arrays of nanopits embedded in a slit-like nanochannel", Jackson Del Bonis-O'Donnell, Walter Reisner, Anders Kristensen, and **Derek Stein**, *Bulletin of the American Physical Society* **54**, Number 1, BAPS.-2009.MAR.W40.15 (2009).
11. "Nanopores and nanofluidics for single DNA studies", **Derek Stein**, *Bulletin of the American Physical Society* **54**, Number 1, BAPS.2009.MAR.Z7.2 (2009).
12. "The statistics of a single DNA capture by a solid-state nanopore", Mirna Mihovilovic, Nick Hagerty and **Derek Stein**, *Bulletin of the American Physical Society* **55**, Number 2, BAPS.-2010.MAR.P30.1 (2010).
13. "Fabrication of a CMOS compatible nanopore detector for DNA", Ashfaque Uddin, Kaveh Milaninia, Oguz Elibol, Jonathan Daniels, Xing Su, Madoo Varma, **Derek Stein**, and Luke Theogarajan, *Bulletin of the American Physical Society* **55**, Number 2, BAPS.2010.MAR.P30.2 (2010).
14. "Probing electrostatic interactions between DNA and the walls of slit-like nanofluidic channels", Yongqiang Ren, Walter Reisner, and **Derek Stein**, *Bulletin of the American Physical Society* **55**, Number 2, BAPS.2010.MAR.P30.12 (2010).
15. "Electro-fluidic gating in solid-state nanopores with a chemically reactive surface", **Derek Stein** and Zhijun Jiang, *Bulletin of the American Physical Society* **55**, Number 2, BAPS.2010.-MAR.P30.4 (2010).

16. "The Nanofluidic Field-Effect in Electrically Actuated Nanopores", Zhijun Jiang and **Derek Stein**, *Bulletin of the American Physical Society* **55**, Number 13, BAPS.2010.NEF.B1.11 (2010).
17. "The Statistics of DNA Capture by Solid-State Nanopore", Mirna Mihovilovic, Nick Hagerty and **Derek Stein**, *Bulletin of the American Physical Society* **55**, Number 13, BAPS.2010.NEF-B1.12 (2010).
18. "Kramers' Problem: Investigating Reaction Rate Theory Using DNA in Nanofluidic Devices", Elijah Shelton, Jackson Del-Bonis O'Donnell and **Derek Stein**, *Bulletin of the American Physical Society* **55**, Number 13, BAPS.2010.NEF.B1.13 (2010).
19. "Slip-Enhanced Electrokinetic Energy Harvesting", Shu Wang, Stephen Albright, Jonathan Beller, Yongqiang Ren and **Derek Stein**, *Bulletin of the American Physical Society* **55**, Number 13, BAPS.2010.NEF.B1.14 (2010).
20. "The Statistics of DNA Confined in a Charged Fluidic Nanoslit", Yongqiang Ren and **Derek Stein**, *Bulletin of the American Physical Society* **55**, Number 13, BAPS.2010.NEF.B1.15 (2010).
21. "The Statistics of DNA Capture and Recapture by Solid-State Nanopores", Mirna Mihovilovic, Erin Teich, Nick Hagerty, Jason Chan and **Derek Stein**, *Bulletin of the American Physical Society* **56**, Number 1, BAPS.2011.MAR.V43.1 (2011).
22. "The Nanofluidic Field-Effect in Electrically Actuated Nanopores", Zhijun Jiang and **Derek Stein**, *Bulletin of the American Physical Society* **56**, Number 1, BAPS.2011.MAR.V43.10 (2011).
23. "Non-Equilibrium DNA Dynamics Probed by Delayed Capture and Recapture by a Solid-State Nanopore", Mirna Mihovilovic, Erin Teich, Nick Hagerty and **Derek Stein**, *Bulletin of the American Physical Society* **57**, Number 1, BAPS.2012.MAR.B44.3 (2012).
24. "Nanopore Mass Spectrometry", **Derek Stein**, Joseph Bush, Mirna Mihovilovic, William Maulbetsch, Wooyoung Moon, Carthene Bazemore-Walker and Peter Weber *Bulletin of the American Physical Society* **57**, Number 1, BAPS.2012.MAR.B44.9 (2012).
25. "*fd* Virus as a Model Stiff Polymer for Translocation Experiments with Solid-State Nanopores", Angus McMullen, Xu Liu, Mirna Mihovilovic, **Derek Stein** and Jay Tang, *Bulletin of the American Physical Society* **57**, Number 1, BAPS.2012.MAR.J50.4 (2012).
26. "Studies of DNA Translocation Dynamics Using Asymmetrical Nanopores", Xu Liu, Karri DiPetrillo, Jason Chan and **Derek Stein**, *Bulletin of the American Physical Society* **57**, Number 1, BAPS.2012.MAR.J50.5 (2012).
27. "Order Preservation Between Brownian Particles Modeled By Langevin Dynamics", William Maulbetsch, William Poole, Joseph Bush, and **Derek Stein**, *Bulletin of the American Physical Society* **58**, Number 1, BAPS. 2013.MAR.A30.11 (2013).
28. "Stiff Filamentous Virus Translocations through Solid-State Nanopores", Angus McMullen, **Derek Stein**, and Jay Tang, *Bulletin of the American Physical Society* **58**, Number 1, BAPS. 2013.MAR.M44.1 (2013).
29. "Nanopore Mass Spectrometry", Joseph Bush, Mirna Mihovilovic, William Maulbetsch, Layne Frechette, Wooyoung Moon, Cole Pruitt, Carthene R. Bazemore-Walker, Peter M. Weber, and **Derek Stein**, *Bulletin of the American Physical Society* **58**, Number 1, BAPS.2013.MAR.M46.3 (2013).

30. “Probing the Influence of Coil Configuration on DNA Translocation Dynamics in Solid-State Nanopores”, Xu Liu, Karri DiPetrillo, Jason Chan, Lucas Eggers, Angus McMullen, and **Derek Stein**, *Bulletin of the American Physical Society* **58**, Number 1, BAPS.2013.MAR.N44.11 (2013).
31. “Entropic trapping of single DNA molecules emerging from a nanopore”, Xu Liu, Mirna Mihovilovic, and **Derek Stein**, *Bulletin of the American Physical Society* **59**, Number 1, BAPS.2014.MAR.Q11.12 (2014).
32. “Noise and Ionic Conductivity in Glass Nanochannels”, Benjamin Wiener, Alessandro Siria, Lydéric Bocquet, and **Derek Stein**, *Bulletin of the American Physical Society* **60**, Number 1, BAPS.2015.MAR.Q45.14 (2015).
33. “Stiff Filamentous Viruses Probe the Mobility of Counterions During Nanopore Translocations”, Angus McMullen, Jay Tang, and **Derek Stein**, *Bulletin of the American Physical Society* **60**, Number 1, BAPS.2015.MAR.G43.1 (2015).
34. “Nanoscale Electrospray Ion Sources and a New DNA Sequencing Technique”, William Maulbetsch, Joseph Bush, and **Derek Stein**, *Bulletin of the American Physical Society* **60**, Number 1, BAPS.2015.MAR.G43.4 (2015).
35. “Progress on the Detection of Single Free Helium Atoms through Field Ionization for a Dark Matter Detector”, David Osterman, Humphrey J. Maris, George M. Seidel, and Derek Stein, *Bulletin of the American Physical Society* **65**, Number 1, BAPS.2020.MAR.L10.6 (2020).
36. “Single-Molecule Sensitivity in Mass Spectrometry Using Nanoscale Ion Sources”, Nicholas Drachman, Mathilde Lepoitevin, Benjamin Wiener, and Derek Stein, *Bulletin of the American Physical Society* **65**, Number 1, BAPS.2020.MAR.S20.3 (2020).

Invited lectures

1. Sandia National Labs, Biotechnology Seminar
Albuquerque, NM, June 2000
2. McGill University, Department of Physics, Condensed Matter Seminar
Montreal, Canada, August 2001
3. National Institute of Advanced Industrial Research, Nanotechnology Research Institute
Tsukuba, Japan, October 2003
4. Okazaki Institute for Integrative Bioscience
Okazaki, Japan, October 2003
5. Kyoto University, Department of Chemistry
Kyoto, Japan, October 2003
6. Conference “Focused Workshop on Electronic Recognition of DNA Molecules”
Liege, Belgium, September 2004
7. McGill University, Physical Society Colloquium
Montreal, Canada, February 2005
8. University of Groningen, Biomed/Biochemistry colloquium
Groningen, the Netherlands, June 2005
9. Royal Netherlands Academy of Arts and Sciences, Biophysics Seminar
Amsterdam, the Netherlands, October 2005

10. University of Leiden, Lorentz Institute Seminar
Leiden, the Netherlands, November 2005
11. Purdue University, Condensed Matter Physics Seminar
West Lafayette, IN, January 2006
12. Brown University, Condensed Matter Physics Seminar
Providence, RI, February 2006
13. University of California, Santa Barbara, Physics Colloquium
Santa Barbara, CA, February 2006
14. Dalhousie University, Physics Seminar
Halifax, Canada, March 2006
15. American Physical Society, March Meeting
Symposium: "Bionanotechnology: application and fundamental aspects of processes at nano-scale"
Baltimore, MD, March 2006
16. Fritz-Haber-Institut der Max-Planck-Gesellschaft, Physical Chemistry Seminar
Berlin, Germany, April 2006
17. Lund University, Solid State Physics Seminar
Lund, Sweden, July 2006
18. Brown University, EECS Seminar
Providence, RI, November 2006
19. Johns Hopkins University, Condensed Matter Physics Seminar
Baltimore, MD, March 2007
20. Harvard University, Single-Molecule Discussion Club
Cambridge, MA, May 2007
21. University of Leipzig, Condensed Matter Physics Seminar
Leipzig, Germany, August 2007
22. University of Massachusetts Amherst, Condensed Matter Physics Seminar
Amherst, MA, September 2007
23. IMNI Nanoscience Forum, Brown University
Providence, RI, May 2008
24. International Electrokinetics Conference (ELKIN)
Santa Fe, NM, May 2008
25. Lorentz Center Workshop on the Physics of Micro- and Nanofluids
Leiden, the Netherlands, June 2008
26. TU Eindhoven, Theoretical and Polymer Physics Seminar
Eindhoven, the Netherlands, June 2008
27. Intel Corporation, Biotechnology Seminar
Santa Clara, CA, August 2008
28. MIT-Spain Workshop on Electrokinetics
Cambridge, MA, October 2008

29. International Mechanical Engineering Conference & Exposition (IMECEE)
(Keynote lecture, Microfluidics Symposium)
Boston, MA, November 2008
30. Hong Kong University of Science and Technology, Conference on Advances in Microfluidics and Nanofluidics
Hong Kong, China, January 2009
31. University of Virginia, Condensed Matter Physics Seminar
Charlottesville, VA, January 2009
32. Brown University, Physical Chemistry Seminar
Providence, RI, February 2009
33. American Physical Society, March Meeting
Symposium: "Bionanotechnology: application and fundamental aspects of processes at nano-scale"
Pittsburgh, PA, March 2009
34. University of Ottawa, Condensed Matter Physics Seminar
Ottawa, Canada, March 2009
35. University of California, Santa Barbara, CNSI Lunchtime Seminar
Santa Barbara, CA, April 2009
36. University of Houston, Physics Colloquium
Houston, TX, April 2009
37. Draper Labs, MEMS Seminar
Cambridge, MA, June 2009
38. Cambridge Healthtech Sequencing Conference
Providence, RI, September 2009
39. American Institute of Chemical Engineers, Conference
Memphis, TN, November 2009
40. Brown University, Physics Faculty Seminar
Providence, RI, November 2009
41. University of Gothenburg, Physics Seminar
Gothenburg, Sweden, November 2009
42. Niels Bohr Institute, Biocomplexity Seminar
Copenhagen, Denmark, November 2009
43. 1st POSTECH Workshop on Physics of Self-Organization in Bio/Nano-Systems
Pohang, South Korea, January 2010
44. TU Delft, BioNanoPhysics Seminar
Delft, The Netherlands, July 2010
45. Workshop on Chemi- Thermo- EN Phoresis in Complex Fluids
POSTECH, Pohang, South Korea, August 2010
46. TU Delft Mini-symposium on Nanopore Biophysics
Delft, The Netherlands, October 2010
47. Syracuse University, Condensed Matter and Biological Physics Seminar
Syracuse, NY, November 2010

48. Brandeis University, Physics Colloquium
Waltham, MA, January 2011
49. Journées Micro- et Nanofluidique
Lyon, France, May 2011
50. Brown University, UTRA Research Thursdays
Providence, RI, July 2011
51. XX International Materials Research Congress (IMRC) 2011
Symposium: “Advances in Ion-Beam Techniques and Applications”
Cancun, Mexico, August 2011
52. Brown University, Physical Chemistry Seminar
Providence, RI, September 2011
53. Brown University, Physics Colloquium
Providence, RI, November 2011
54. Northeastern University, Physics Colloquium
Boston, MA, December 2011
55. Zing Nanopores Conference 2012 (Keynote talk)
Lanzarote, Spain, February 2012
56. University of Missouri-Kansas City, Physics Colloquium
Kansas City, MO, March 2012
57. University of California Irvine, Condensed Matter Physics Seminar
Irvine, CA, May 2012
58. CECAM workshop “DNA Sequencing and Detection with Nanopores”
Pisa, Italy, June 2012
59. New York University, Physics Colloquium
New York, NY, September 2012
60. Brown University, Dynamical Systems Seminar
Providence, RI, November 2012
61. W.E. Heraeus Seminar on Transport through Nanopores: From Understanding to Engineering
Bremen, Germany, August 2013
62. Oxford Nanopore Technologies, Ltd., Lunch Seminar
Oxford, UK, August 2013
63. University of Cambridge, BSS Seminar
Cambridge, UK, August 2013
64. VNU University of Sciences, Physics Seminar
Hanoi, Vietnam, December 2013
65. CECAM workshop “Biomolecules Under Non-Natural Conditions”
Stuttgart, Germany, March 2014
66. 19th German-American Kavli Frontiers of Science Symposium
Irvine, CA, April 2014
67. CECAM workshop “Nanofluidics in physics and biology”
Lausanne, Switzerland, October 2014

68. Dartmouth University, Physics Colloquium
Hannover, NH, November 2014
69. École Normale Supérieure de Paris, Statistical Physics Seminar
Paris, France, November 2014
70. Saint Gobain Research and Development Centre Seminar
Aubervilliers, France, February 2015
71. 3rd Pioneer Workshop on Ionics and Nanofluidics
Seoul, South Korea, February 2015
72. Twente University, Soft Matter+ Colloquium
Enschede, The Netherlands, April 2015
73. University of Cambridge, BSS Seminar
Cambridge, UK, June 2015
74. Microfluidics '15 Summer School
Porquerolles, France, June 2015
75. Brown University, Joukowsy Forum "Assessing the Iran Nuclear Deal"
Providence, RI, September 2015
76. Next Generation Sequencing USA Congress and Single Cell Genomics & Transcriptomics
USA Congress
Harvard Medical School, Boston, October 2015
77. University of Arkansas, Physics Colloquium
Fayetteville, AR, April 2016
78. Delft University of Technology, Kavli Institute of Nanoscience Delft, Kavli Day workshop
Delft, The Netherlands, September 2016
79. Delft University of Technology, Bionanophysics Department Seminar
Delft, The Netherlands, September 2016
80. U.S. Cosmic Visions: New Ideas in Dark Matter workshop
College Park, MD, March 2017
81. Houghton Conference on Nonequilibrium Physics Providence, RI, May 2017
82. Canadian Biophysics Society Meeting
Montreal, QC, May 2017
83. Flow 17 Conference
Paris, France, July 2017
84. Northwestern University, Mechanical Engineering Seminar
Evanston, IL, October 2017
85. Brandeis University, MRSEC Seminar
Waltham, MA, November 2017
86. Brown University Center for Computational Molecular Biology Seminar
Providence, RI, November 2017
87. Single Molecule Protein Sequencing Conference
Delft, The Netherlands, December 2017
88. Brown University, Data Science Seminar
Providence, RI, March 2018

89. Yale University, Mechanical Engineering Seminar
New Haven, CT, March 2018
90. Brown University, Carney Institute Lunch Talk
Providence, RI, May 2018
91. From Solid State to Biophysics IX Conference
Cavtat, Croatia, June 2018
92. University of Ottawa, Physics Colloquium
Ottawa, Canada, October 2018
93. Single Molecule Protein Sequencing 2019
Jerusalem, Israel, September 2019
94. CECAM workshop “Nanopore Translocation and Nanochannel Confined Biopolymers”
Trieste, Italy, September 2021
95. Nanopore Sequencing: From Genomes to Proteomes Conference
Boston, MA, May 2022
96. From Solid State to Biophysics X Conference
Cavtat, Croatia, June 2022
97. Northeastern University, Physics Colloquium
Boston, MA, September 2022
98. McGill University, Physics Colloquium
Montreal, Canada, September 2022

RESEARCH GRANTS

Current grants

1. Oxford Nanopore Technologies Ltd. – Sponsored Research Agreement, “Development of Methods for Fragmenting and Analyzing Single Proteins,” 12/2020 – 11/2022, PI, \$285,000
2. NSF – DMR-1409577, “Studies of Viscophoresis – Drift in a Viscosity Gradient,” 07/2019 – 06/2023, PI, \$426,605
3. NIST – GFSD Fellowship Project, “Optofluidic measurement and stimulation of nanoflows for single molecule mass spectrometry,” 04/2021 – 04/2024, PI, \$81,000

Completed grants

1. NSF – DMR-0805176, “Electro-Fluidics for Single Molecule Biophysics,” 09/2008 – 08/2011, PI, \$405,000
2. NSF – DMR-0940231, “REU SUPPLEMENT: Electro-Fluidics for Single Molecule Biophysics,” 06/2009 – 08-2009, PI, \$8,000
3. NSF – DMR-0940231, “REU SUPPLEMENT: Electro-Fluidics for Single Molecule Biophysics,” 06/2010 – 08/2010, PI, \$8,000
4. Brown University – IMNI, “Electrokinetic Energy Harvesting in the Presence of Hydrodynamic Slip,” 09/2008 – 08/2010, PI (with Co-PI Kenny Breuer), \$40,000
5. Intel – Sponsored Research Agreement, “Electronic DNA Barcode Sequencing,” 01/2009 – 12/2010, PI, \$130,000

6. Brown University – IMNI, “Translocation of Actin Filaments through Solid State Nanopores,” 01/2011 – 12/2011, Co-PI (Jay Tang PI), \$40,000
7. NSF – ECCS 0958785, “MRI-R2: Acquisition of Conformal-Oxide Processing Module for Microfabrication Central User Facility,” 03/2010 – 02/2012, Co-PI (Rashid Zia PI), \$450,000
8. NSF – DMR-0922667, “MRI: Acquisition of a Focused Ion Beam Machine,” 10/2009 – 09/2012, Co-PI (David Paine PI), \$700,000
9. NIH – R21 HG005127, “Sequencing by Nanopore Mass Spectrometry,” 09/2009 – 12/2013, PI (with Co-PIs Peter Weber and Carthene Bazemore-Walker), \$1,054,518
10. NSF – ENG-0846505, “CAREER: Probing the Sequence and Dynamics of Single DNA Molecules Using Solid-State Nanopores, Optical Tweezers, and Binding Proteins,” 08/2009 – 07/2014, PI, \$400,000
11. Oxford Nanopore Technologies Ltd. – Sponsored Research Agreement, “Development of a Single-Ion Source for Nanopore Mass Spectrometry,” 02/2012 – 08/2016, PI, \$1,257,500
12. NSF – DMR-1409577, “Free Energy Landscaping for Single Molecule Biophysics,” 07/2014 – 06/2017, PI, \$375,000
13. NSF – DMR-1409577, “Studies of the Electrophoresis of Filamentous Viruses in Solid-State Nanopores,” 07/2015 – 06/2019, Co-PI (Jay X. Tang PI), \$330,000
14. Oxford Nanopore Technologies Ltd. – Sponsored Research Agreement, “Single-Molecule Protein Analysis By Nanopore Mass Spectrometry,” 08/2016 – 07/2020, PI, \$842,330

Proposals submitted

1. NSF – DMR, “MATERIALS WORLD NETWORK: Electronic Nanofluidics for Single-Molecule Biophysics,” 11/2006, PI, \$483,062
2. NSF – CBET, “CAREER: Probing the Sequence and Dynamics of Single DNA Molecules Using Solid-state Nanopores, Optical Tweezers, and Binding Proteins,” 07/2007, PI, \$1,153,320
3. Petroleum Research Fund, “Nanofluidic studies of charged polymers crossing an electrostatic energy barrier,” 11/2007, PI, \$50,000
4. Human Frontiers Science Program, “How biological ion channels tell K⁺ from Na⁺: A biomimetic approach using solid-state nanopores,” 03/2008, PI (with co-PI Maarten Vrouwenraets, University of Groningen), \$250,000
5. Catalyst Foundation, “CMOS-PHORESIS: Nanopore DNA Sizing Using Molecular Ping-Pong,” 06/2008, Co-PI (with PI Luke Theogarajan, UCSB), \$75,000
6. Packard Foundation – Packard Fellowship, “Single-Molecule DNA Sequencing with Solid-State Nanopores,” 10/2008 – 09/2013, PI, \$ 875,000
7. DOE, “The Brown University Center for Carbon Conversion (BUCCC),” 07/2009 – 06/2014, co-PI (Peter Weber, PI), \$5,000,000
8. Nine Sigma, “Electrokinetic energy harvesting using nanofluidic shock absorbers,” 07/2009 – 06/2010, PI (with co-PIs Kenny Breuer and Luke Theogarajan (UCSB)), \$1,000,000
9. Nine Sigma, “Electrokinetic energy harvesting using nanofluidic shock absorbers,” 07/2009 – 06/2012, PI (with co-PIs Kenny Breuer), \$300,000
10. NSF – CMMI, “Surface Modification of Titanium to Sense Implant Functionality,” 03/2010 – 02/2013, Co-PI (Tom Webster, PI), \$528,886

11. NSF – DGE, “IGERT: Mechanics of Living Systems,” 09/2010 – 08/2015, Co-PI (Tom Powers, PI), \$3,106,494
12. NSF – ENG, “IGERT: Mechanics of Living Systems,” 07/2011 – 06/2016, Co-PI (Tom Powers, PI), \$2
13. NSF – CHE, “MRI: Development of an Ultra-Sensitive Mass Spectrometry Tool,” 01/2011 – 12/2013, PI (with Co-PIs Jason Sello, Anubhav Tripathi, Yongsong Huang, and Peter Weber), \$1,072,821
14. NSF – CBET, “Translocation of Actin Filaments through Solid State Nanopores,” 09/2011 – 08/2014, Co-PI (Jay Tang, PI), \$424,336
15. NSF – DMR, “Free Energy Landscaping for Single-Molecule Biophysics,” 09/2011 – 08/2014, PI, \$467,412
16. DTRA, “Novel Nanopit Platforms for Nanofluidic Separation, Manipulation and Analysis of DNA,” 01/2012 – 12/2014, PI (Draper Labs, collaborators), \$600,000 (funding opportunity cancelled)
17. DoD – Army, “STTR: Entropic Landscape Controlling-Based Nanofluidic Device for Separation of Long DNA Molecules,” 01/2012 – 06/2012, subcontract by Intelligent Automation, Inc., \$30,000
18. NSF – CBET, “Translocation of Filamentous Viruses through Solid State Nanopores,” 07/2012 – 06/2015, co-PI (Jay Tang, PI), \$424,275
19. NIH – NHGRI, “Development of Single-Molecule Sequencing by Nanopore Mass Spectrometry,” 07/2012 – 06/2016, PI (with Co-PIs Peter Weber and Petia Vlahovska), \$2,267,940
20. NSF – DMR, “Free Energy Landscaping for Single-Molecule Biophysics,” 09/2012 – 08/2015, PI, \$427,538
21. NSF – CBET, “Translocation of Filamentous Viruses through Solid-State Nanopores,” 07/2013 – 06/2016, co-PI (Jay Tang, PI), \$460,457
22. NSF – DMR, “Free Energy Landscaping for Single-Molecule Biophysics,” 07/2013 – 06/2016, PI (with co-PI Anubhav Tripathi), \$449,460
23. NSF – DMR, “Free Energy Landscaping for Single-Molecule Biophysics,” 06/2014 – 05/2017, PI, \$396,547
24. NSF – CBET, “Studies of the Electrophoresis of Filamentous Viruses in Solid-State Nanopores,” 07/2013 – 06/2016, PI (with co-PI Jay Tang), \$388,525
25. NIH – R21, “Development of a Nanotube Ion Source for Single Amino Acid Mass Spectrometry,” 07/2014 – 06/2017, PI, \$550,414
26. NSF – CBET, “Studies of the Electrophoresis of Filamentous Viruses in Solid-State Nanopores”, 07/2015 – 06/2018, co-PI (with PI Jay Tang), \$399,143
27. NIH – STTR, “A Biomarker Detection Platform using Target-Specific Fusion Molecules and Nanopore-Bottle Technology”, 07/2015 – 06/2016, PI (with co-PI Trevor Morin, Two Pore Guys, Inc.), \$120,000
28. DOE – ARPA-E, “Membrane-Based Building Enclosures with Passive Thermal Energy Management”, 02/2016 – 01/2017, PI (with co-PIs Laura Briggs and Jonathan Knowles, RISD Architecture), \$3,019,457.21

29. DOE – EERE, “Membrane-Based Wall Assembly with Passive Hygrothermal Energy Management”, 07/2016 – 06/2019, PI (with co-PIs Laura Briggs and Jonathan Knowles, RISD Architecture), \$1,500,000
30. DOE – EERE, “Membrane Based Wall System for Affordable Housing”, 07/2017 – 06/2020, co-PI (with PI Jonathan Knowles, RISD Architecture), \$750,000
31. DOE – EERE, “Membrane-Based Building Enclosures with Novel Thermal and Moisture Management Capabilities”, 07/2017 – 06/2019, PI (with co-PIs Laura Briggs and Jonathan Knowles, RISD Architecture), \$500,000
32. NSF – DMR, “Experimental Studies of Viscophoresis–Drift in Viscosity Gradient”, 07/2018 – 06/2021, PI, \$406,199
33. NSF – PHY, “A New Detector to Search for Dark Matter”, 07/2018 – 06/2021, PI (with co-PIs Humphrey Maris and George Seidel), \$971,332
34. NIH – R21, “Development of a Nanopore Mass Spectrometer for Direct RNA Sequencing and for Chemically Modified Nucleotide Discovery”, 05/2020 – 04/2023, PI, \$532,409
35. NSF – Expeditions, “Collaborative Research: Expeditions: Information Encoding and Processing Using Small Molecules”, 02/2022 – 01/2029, Co-PI (Sherief Reda, PI), \$9,476,317
36. NIH – R21, “Photo-Fragmentation Methods for Single-Molecule Protein Sequencing by Nanopore Mass Spectrometry”, 05/2023 – 04/2025, PI, \$438,625

7. SERVICE

i. to the University

- | | |
|-------------|--|
| 2006 – 2008 | Physics Department Curriculum Committee |
| 2007 – 2011 | Physics Department Undergraduate Affairs Coordinator |
| 2007 – 2009 | Physics Department Qualifying Examination Committee |
| 2007 – 2008 | Faculty Search Committee, Physics Department, “Theoretical biological physics” |
| 2008 – 2010 | University Laser Safety Committee |
| 2008 – 2009 | Faculty Search Committee, Chemistry Department, “Nanoscience” |
| 2008 – 2009 | Physics Department Colloquium Committee |
| 2009 – 2018 | Physics Department representative to the Brown Institute for Brain Sciences Executive Committee (BIBSEC) |
| 2009 – 2010 | Faculty Search Committee, Chemistry Department, “Nanoscience” |
| 2009 – 2010 | Faculty Search Committee, Division of Engineering, “Microfluidics, nanofluidics and energy science” |
| 2009 – 2013 | Freshman Advisor |
| 2009 – 2012 | Steering Committee to establish an Institute for Energy Science |
| 2009 – 2013 | Founder and organizer of the Brown Energy Sciences and Technology Seminars |
| 2010 – 2013 | Sophomore Advisor |
| 2010 – 2011 | Physics Department Lab Instruction Committee |
| 2010 – 2013 | Physics Department freshman and sophomore academic advising |

2011 – 2013 Physics Department Qualifying Examination Committee
 2009 – 2010 Faculty Search Committee, Physics Department, “Condensed Matter Experiment”
 2012 – 2013 Brown Sustainability Strategic Planning and Advisory Committee
 2012 – 2013 Faculty Search Committee, Physics Department, “Experimental condensed matter physics”
 2013 – 2014 Faculty Search Committee, Physics Department, “Experimental condensed matter physics”
 2013 – 2014 Physics Department Curriculum Committee
 2013 – 2014 Physics Department Laboratory Instruction Committee
 2013 – 2014 Physics Department 1st and 2nd year advisor
 2013 – 2014 Brown Environmental Change Task Force
 2015 – 2016 Physics Department Laboratory Instruction Committee
 2015 – 2016 Physics Department Outreach Committee
 2015 – 2016 Physics Department Graduate Student Advisor
 2016 – 2017 Physics Graduate Admissions Committee (Chair)
 2016 – 2017 Faculty Search Committee, Physics Department, “Condensed Matter Experiment”
 2016 – 2017 Self-Study Committee, Physics Department
 2016 – 2019 Physics Department Outreach Committee
 2016 – 2017 Brown University Campus Planning Advisory Board
 2016 – 2017 Barus and Holley Lobby Committee
 2016 – 2019 Physics Graduate Admissions Committee (Chair)
 2017 – 2019 Physics Department Laboratory Instruction Committee
 2018 – 2022 Physics Department representative to the Carney Institute Executive Committee
 2018 – 2021 Faculty Executive Committee (FEC)
 2019 – 2020 IECV Director Search Committee, OVPR
 2019 – 2020 Physics Qualifying Exam Committee
 2020 – 2021 Ad-Hoc Physics Qualifying Exam Committee (Chair)
 2020 – 2022 Physics Department Instructional Laboratory Committee (Chair)
 2021 Undergraduate Lab Instruction Task Force
 2021 – 2022 Physics Qualifying Exam Committee
 2021 – 2022 Physics Colloquium/Seminar Committee

Served on the Ph.D. thesis committees of:

- Shanshan Wu
- Jing Lu
- Hyeran Kang
- Hyunjin Kim

- Phong Tran
- James McFarland
- Nhiem Tran
- Thomas Grimsley
- Michael Antosh
- Andrew Blaeser
- Mingming Jiang
- Liwei Jim Liu
- Ansel Blumers

Served on preliminary examination committees of:

- Jing Lu
- Phong Tran
- Hyunjin Kim
- Phong Tran
- Nhiem Tran
- James McFarland
- Jeff Shainline
- Michael Antosh
- Paul Weinger
- Sungcheol Kim
- Mingming Jiang

ii. to the profession

- Organizer, 31st Meeting of the New England Complex Fluids Workgroup
Brown University, Providence, RI, June 2007
- Review panelist for NSF and NIH (since 2008)
- Elected member-at-large, American Physical Society, New England Section, 2009 – 2011
- Session Chair, American Physical Society March Meeting, Portland, OR, 2010
- Session Chair, American Physical Society March Meeting, Boston, MA, 2012
- External Ph.D. thesis committee member Michiel van den Hout (TU Delft, Netherlands),
October 2010
- Organizer, Joint Meeting of the New England Sections of the American Physical Society and
the American Association of Physics Teachers (NES-APS/AAPT)
Brown University, Providence, RI, October 2010
- Organizing Committee, 20th German-American Frontiers of Science (GAFoS) Symposium
National Academies of Science and Humboldt Foundation
Potsdam, Germany, March 2016

- Organizing Committee, The Tony and Pat Houghton Conference on Non-Equilibrium Statistical Mechanics of Soft and Biological Systems
ICERM, Providence, RI, May 2017

Reviewer for:

(Journals)

- ACS Nano
- Advanced Materials
- Analyst
- Analytical Chemistry
- Applied Physics Letters
- Biomicrofluidics
- Biophysical Journal
- Carbon
- Chemical Physics Letters
- Chemical Society Reviews
- Current Opinion in Colloid and Interface Science
- Electrochemistry Communications
- Energy and Environmental Science
- European Physical Journal
- Informatics
- International Journal of Thermal Sciences
- JACS
- Journal of Chemical Physics
- Journal of Colloid and Interface Science
- Journal of Engineering Mathematics
- Journal of Fluid Mechanics
- Journal of Micromechanics and Microengineering
- Journal of Visualized Experiments
- Lab on a Chip
- Langmuir
- Materials Today Energy
- Microfluidics and Nanofluidics
- Nano Letters
- Nanoscale
- Nature Communications
- Nature Communications Materials
(April 2021 *Outstanding Referee*)

- Nature Methods
- Nature Nanotechnology
- Physical Review E
- Physical Review Letters
- Physics Letters A
- Physics of Fluids
- PNAS
- Proceedings A
- Scientific Reports
- Small
- Soft Matter
- Solid-State Electronics

(Funding agencies)

- Agence Nationale de la Recherche (France)
- Keck Foundation
- Canadian Institutes of Health Research (CIHR)
- European Research Council (ERC)
- National Science Foundation
- National Science Foundation of Ireland
- Natural Sciences and Engineering Research Council of Canada (NSERC)
- Nederlandse Organisatie voor Wetenschappelijk Onderzoek (Netherlands Organisation for Scientific Research)
- Ile de France, Reseau d'Excellence en Solides Poreux (France)
- United States Air Force Office of Scientific Research

iii. to the community

- Participant in the Brown NSF GK-12 outreach program (2008 – 2012)
- Teaching at Hope High School in the science classes of Ms. Mary Markey, 2008
- Hosted summer research projects of Providence Public School teachers, Joy Martin (2008), Frank McCartin (2009), and Adria Dutremble (2010)
- Speaker and Participant at the Vartan Gregorian Elementary School Science Conference Providence, RI (June 2010, June 2011)
- Keynote Speaker at the Vartan Gregorian Elementary School Science Conference Providence, RI (June 2012)
- Project Co-Director of the RISD/Brown/Erfurt 2014 Solar Decathlon team (*The New York Times* (twice), *Le Monde*, *Huffington Post*, *L'Express*, *ArchDaily*, *Green Studio Handbook* and others have featured our work.)
- Invited speaker at Inspiring Minds Providence (May 2016)

8. ACADEMIC HONORS

- Richard M. Dale Prize for Physics and Chemistry, Queen's University, 1994
- Annie Bently Lilly Prize for Math, Queen's University, 1994
- Susan Near Prize for Math, Queen's University, 1994
- Aikman Prize for Physics, McGill University, 1997
- FCAR fellowship (Quebec), 1997
- NSERC fellowship (Canada), 1997 (declined)
- Kao Scholar, Division of Engineering and Applied Sciences, Harvard University, 1998
Awarded annually to one first-year graduate student by choice of the Dean
- Materials Research Society Graduate Student Gold Award Winner, MRS fall meeting, 2001
- NSF CAREER Award, 2009
- Manning Assistant Professorship, Brown University, 2011
- Kavli Fellow, 2014
- Philip J. Bray Award for Excellence in Teaching in the Physical Sciences, Brown University, 2015

9. TEACHING

Harvard University

- Applied Physics 195, Introduction to Solid-State Physics (Teaching Fellow), 1999
- Directed 1 Undergraduate thesis

Delft University of Technology

- Directed 4 Master's theses
- Directed 2 Undergraduate theses

Brown University

- PHYS 1610, Biological Physics, Fall 2006, Fall 2008, Fall 2009, Fall 2010, Spring 2020, and Fall 2020
- PHYS 2010, Techniques in Experimental Physics, Spring 2007 and 2008
- PHYS 0560, Experiments in Modern Physics, Spring 2009, Spring 2010, Spring 2011, Spring 2017, and Spring 2018
- PHYS 1970E, The Physics of Energy, Spring 2012
- PHYS 1510, Advanced Electromagnetic Theory, Fall 2012, Fall 2013
- PHYS 0114, FYS: The Science and Technology of Energy, Spring 2013, Spring 2014, Spring 2016, and Spring 2019
- PHYS 0030, Basic Physics, Fall 2015, Fall 2016, Fall 2017, and Fall 2018
- Supervised an independent study project of 10 Brown Engineering students working on the Solar Decathlon Europe project, Fall 2013
- Directed 7 Ph.D. theses

- Directed 23 Honors theses
- Supervising 2 Ph.D. theses
- Mentored 3 Postdoctoral Fellows

VNU University of Sciences, Hanoi, Vietnam

- Short course on Electrodynamics (offered as visiting Professor), December 2013

10. ADVISING AND MENTORING

Harvard University

- Matt Thomson, Senior Thesis, 2001

Delft University of Technology

- Maarten Kruithof, Masters' Thesis, 2003
- Wiepke Koopmans, Masters' Thesis, 2004
- Zeno Deurvorst, Bachelor's Research Project, 2005
- Jeroen de Grebber, Masters' degree candidate, 2005 – 2006
- Douwe Bonthuis, Masters' Thesis, 2006
- Rosalie Driessen, Bachelor's Research Project, 2006

Brown University

Postdocs

- Dr. Walter Reisner, post-doctoral associate, 2008 – 2009
- Dr. Joseph Bush, post-doctoral associate, 2010 – 2013
- Dr. Mathilde Lepoitevin, post-doctoral associate, 2017 – 2018

Ph.D students

- Zhijun Jiang, Ph.D. 2011 (joined 2006)
- Yongqiang Ren, Ph.D. candidate, 2007 – 2011
- Mirna Mihovilovic, Ph.D. 2014 (joined 2009)
- Xu Liu, Ph.D. 2014 (joined 2009)
- Shu Wang, Ph.D. candidate, 2009 – 2011
- William Maulbetsch, Ph.D. 2018 (joined 2010)
- Angus McMullen, Ph.D. 2015 (joined 2010, Co-advisor: Jay Tang)
- Daniel Kim, Ph.D. 2017 (joined 2011)
- Benjamin Wiener, Ph.D. 2019 (joined 2012)
- Shady Shayan Lame, Ph.D. candidate, 2017 – present
- David Osterman, Ph.D. candidate, 2017 – 2020
- Nicholas Drachman, Ph.D. candidate, 2017 – present

- Kun Li, Visiting Ph.D. student, 2017 – 2019
- Brandon Pugnet, Ph.D. candidate, 2022 – present

Masters students

- Shady Shayan Lame, masters student, 2015 – 2017
- Zidong Ma, post-masters student, 2016 – 2017
- Zehao Song, masters student, 2017 – 2018
- William Brockmueller, masters student, 2017 – 2018
- Oliver Isik, 5th year masters student, 2018 – 2019
- Kanchita Klangboonkrong, masters student, 2020 – 2021

Undergraduate students

- Alan Gabel, Senior Thesis, 2008
- Simon Buttrick, undergraduate, 2007 – 2009
- Reshma Ramachandran, Senior Thesis, 2009
- Stefan Schaffer, Senior Thesis, 2009
- Nick Hagerty, Senior Thesis, 2010
- Jackson (Travis) Del Bonis-O'Donnell, Senior Thesis, 2010
- Jason Chan, undergraduate, 2008 – 2010
- Daniel Horowitz, undergraduate, 2008
- Charles Wood, undergraduate, 2008 – 2010
- Aaron Weinstein, Senior Thesis, 2009
- Matthew Kretschmer, Senior Thesis, 2010
- Noah Donoghue, undergraduate, 2009
- James Hinton, undergraduate, 2009
- Elijah Shelton, undergraduate, Senior Thesis, 2011
- Stephen Albright, undergraduate, Senior Thesis, 2013
- Jonathan Beller, undergraduate, Senior Thesis, 2011
- Erin Teich, undergraduate, Senior Thesis, 2011
- Cole Pruitt, undergraduate, Senior Thesis (Biophysics), 2011
- Ashley (Hadley) Witt, undergraduate, 2010
- Mathew Reiss, undergraduate, 2010
- William Poole, undergraduate, Senior Thesis, 2013
- Karri DiPetrillo, undergraduate, Senior Thesis, 2013
- Wooyoung Moon, undergraduate, Senior Thesis, 2013
- Lucas Eggers, undergraduate, Senior Thesis, 2013
- Aamir Imam, undergraduate, 2011
- Jaeyoon Lee, undergraduate, Senior Thesis 2014

- Jordi Negron, undergraduate, Senior Thesis, 2013
- Layne Frechette, undergraduate, 2012 – 2013
- Carolyn Shasha, undergraduate, Senior Thesis, 2013
- Robert Rozansky, undergraduate, Senior Thesis 2014
- Nicholas Bower, undergraduate, 2013 – 2014
- Ellen Goldberg, undergraduate, Senior Thesis, 2015
- Michele Winter, undergraduate, 2015 – 2016
- Alexander Iler, undergraduate, 2016
- Oliver Isik, undergraduate, Senior Thesis 2018
- Yingying Zhang, visiting undergraduate student, 2016
- Jamie Holber, undergraduate, 2016 – 2017
- Katia Matora, undergraduate, 2016 – 2017
- Sarah Marion, undergraduate, 2016 – 2016
- Hannah Szapary, undergraduate, Senior Thesis 2019
- Jason Chan, undergraduate, Senior Thesis 2019
- Tim Zhao, undergraduate, 2020 – present
- Jacob Vietorisz, undergraduate, 2020 – present
- Jackson Moore, undergraduate, 2020 – present
- Liam Storan, undergraduate, 2021 – present
- Adam Furman, undergraduate, 2021 – present
- Adnan Aldabbagh, undergraduate, 2021 – present

High school students

- Liam Cooper, Summer internship, 2010
- Kaushal Balagurusamy, Summer internship, 2016
- Anjanay Srivastav, Summer internship, 2016
- Daniel Sheinberg, Summer internship, 2018
- Christina Curran, Summer internship, 2018

Visiting high school teachers

- Joy Martin, Providence Public High School teacher, 2008
- Frank McCartin, Providence Public High School teacher, 2009
- Adria Dutremble, Providence Public High School teacher, 2010

11. PATENTS AND PATENTS PENDING

1. “Control of solid state dimensional features”, Golovchenko, Jene A., Daniel Branton, **Derek M. Stein**, Ciaran J. McMullan, and Jiali Li, U.S. Patent Number 6,464,842.
2. “Control of solid state dimensional features”, Golovchenko, J.A., D. Branton, M. J. Aziz, J. Li., **D. Stein**, and C. McMullan, U.S. Patent Number 6,783,643.
3. “Planar resonant tunneling sensor and method of fabricating and using the same”, Philip W Barth, **Derek Stein**, Curt Flory, Rick Pittaro, and Daniel Roitman, U.S. Patent Number 7,114,378.
4. “Pulsed ion beam control of solid state features”, Jene A. Golovchenko, **Derek M. Stein**, Jiali Li, U.S. Patent Number 7,118,657.
5. “Solid state molecular probe device”, Jiali Li, **Derek M. Stein**, Gregor M. Schurmann, Gavin M. King, Jene Golovchenko, Daniel Branton, Michael Aziz, U.S. Patent Number 7,258,838.
6. “Study of polymer molecules and conformations with a nanopore”, Golovchenko, J. A., J. Li, **D. Stein**, and M. H. Gershow, U.S. Patent Number 7,846,738.
7. “Systems and Methods for Determining Molecules Using Mass Spectrometry and Related Techniques”, **Derek Stein**, U.S. Patent Number 8,426,807.
8. “Devices and Methods for Containing Molecules”, **Derek M. Stein**, Mirna Mihovilovic Skanata, and Xu Liu, U.S. Patent Application 14/605,626.
9. “Architectural Membranes with an Evaporative Cooling Capability”, **Derek M. Stein**, U.S. Provisional Patent Application.
10. “Apparatus and method for passively cooling an interior”, **Derek Stein**, U.S. Patent Number 10,704,794.
11. “Multifunctional systems for passive heat and water management”, **Derek Stein**, International Patent Application Number PCT/US20 19/049249.
12. “Nanotip Ion Sources and Methods,” **Derek Stein**, Mathilde Lepoitevin, and Nicholas Drachman, International Patent Application Number PCT/US2021/028954
13. “A Single-Ion Mass Spectrometer Providing Temporal Information”, **Derek Stein**, Benjamin Wiener, and Nicholas Drachman, U.S. Provisional Patent Application.
14. “Systems and methods for analysis of peptide photodissociation for single-molecule protein sequencing”, **Derek Stein**, Nicholas Drachman, and Jacob Victorisz, U.S. Provisional Patent Application.