
Shana O. Kelley

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Education

Ph.D.	Chemistry	1999
California Institute of Technology		
B.A.	Chemistry (<i>summa cum laude</i>)	1994
Seton Hall University		

Professional experience

Distinguished Professor	University of Toronto	2013-present
Professor	University of Toronto	2007-2013
Professor*	Boston College, Chemistry	2006
<i>(*direct promotion from Assistant Professor)</i>		
Assistant Professor	Boston College, Chemistry	2000-2006
NIH Postdoctoral Fellow	Scripps Research Institute, Mol. Bio.	1999-2000

Awards and honors

Distinguished Visiting Fellow, Rowland Institute, Harvard University	2018
ACS Inorganic Nanoscience Award	2017
Gabor A. and Judith K. Somorjai Visiting Miller Professorship (UC Berkeley)	2017
NSERC Brockhouse Prize	2016
SLAS Innovation Award	2016
Fellow, American Institute of Biological and Medical Engineers	2016
Fellow, Canadian Academy of Health Sciences	2016
Distinguished Professor Award	2013
Fulbright Canada Chair at the California NanoSystems Institute, UCLA	2013
Steacie Prize	2011
University of Toronto Inventor of the Year	2011
NSERC E.W.R. Steacie Fellowship	2010
Named one of "Canada's Top 40 under 40"	2009
Pittsburgh Conference Achievement Award	2006
Camille Dreyfus Teacher-Scholar Award	2005
TR100: Voted a top 100 innovator by MIT's Technology Review	2004
Alfred P. Sloan Fellowship	2004
NSF CAREER award	2004
Research Corporation Innovation Award	2000
Dreyfus New Faculty Award	2000
NIH Postdoctoral Fellowship	1999-2000
Herbert Newby McCoy Thesis Award (Caltech)	1999
Everhart Distinguished Graduate Student Award (Caltech)	1998

Professional activities

Board Director, Ontario Genomics, 2017 - present
Board Trustee, Fight Against Cancer Trust, 2017 – present
Editorial Advisory Board, ACS Chemical Biology, 2017 – present
Editorial Advisory Board, Journal of the American Chemical Society, 2016 – present
Executive Leadership Team, Medicine by Design (CFREF), 2016 - present
Panel Member, NIH ISD panel, 2016 – present
Associate Editor, ACS Sensors, 2015 – present
Program Committee, ACS Biological Chemistry Div., 2016 – present
Co-Founder and Board Director, Xagenic Inc., 2010 – 2017 (acquired by General Atomics)
Co-Founder and Consultant, GeneOhm Sciences, 2000 – 2006 (acquired by Becton Dickinson)

Publications from Kelley Group research

1. "Single Cell mRNA Cytometry via Sequence-Specific Nanoparticle Clustering and Trapping." M. Labib, R.M. Mohamadi, M. Poudineh, S.U. Ahmed, I. Ivanov, C.L. Huang, M. Moosavi, E.H. Sargent, S.O. Kelley
Nature Chemistry, **2018**, in press.
2. "Combinatorial Probes for High-Throughput Electrochemical Analysis of Circulating Nucleic Acids." J. Das, I. Ivanov, T.S. Safaei, S.O. Kelley
Angew. Chem. Intl. Ed., **2018**, in press, doi: 10.1002/ange.201800455.
3. "Catalyst Electro-redeposition Controls Morphology and Oxidation State for Selective Carbon Dioxide Reduction." P. De Luna, R. Quintero-Bermudez, C. T. Dinh, M. B. Ross, O. S. Bushuyev, P. Todorovic, T. Regier, S. O. Kelley, P. Yang, E. H. Sargent
Nature Catalysis, **2018**, in press, doi:10.1038/s41929-017-0018-9.
4. "Profiling Circulating Tumour Cells and Other Biomarkers of Invasive Cancers." M. Poudineh, E.H. Sargent, K. Pantel
Nature Biomedical Engineering, **2018**, in press, doi: 10.1038/s41551-018-0190-5.
5. "Tracking the Dynamics of Circulating Tumor Cell Phenotypes Using Nanoparticle-Mediated Magnetic Ranking." M. Poudineh, P.M. Aldridge, S. Ahmed, B.J. Green, L. Kermanshah, V. Nguyen, C. Tu, R.M. Mohamadi, R.K. Nam, A. Hansen, S.S. Sridhar, A. Finelli, N.E. Fleshner, A.M. Joshua, E.H. Sargent, S.O. Kelley,
Nature Nanotechnology, **2017**, 12, 274-282.
6. "Delivery and Release of Small-Molecule Probes in Mitochondria Using Traceless Linkers." E.K. Lei and S.O. Kelley,
J. Am. Chem. Soc., **2017**, 139, 9455-9458.
7. "High-Curvature Nanostructuring Enhances Probe Display for Biomolecular Detection." P. De Luna, S. S. Mahshid, J. Das, B. Luan, E.H. Sargent, S.O. Kelley, R. Zhou,
Nano Letters, **2017**, 17, 1289-1295.
8. "Chemistry-Driven Approaches to Ultrasensitive Nucleic Acid Analysis." S.J. Smith, C.R. Nembr, S.O. Kelley,
J. Am. Chem. Soc. **2017**, 139, 1020-1028.
9. "Biexciton Resonances Reveal Exciton Localization in Stacked Perovskite Quantum Wells." M.H. Elkins, R. Pensack, A.H. Proppe, O. Voznyy, L.N. Quan, S.O. Kelley, E.H. Sargent, G.D. Scholes,
Journal of Physical Chemistry Letters, **2017**, 8, 2895-3901.
10. "Profiling Functional and Biochemical Phenotypes of Circulating Tumour Cells Using a Two-Dimensional Sorting Device." M. Poudineh, M. Labib, S. Ahmed, L.N.M. Nguyen, L. Kermanshah, R.M. Mohamadi, E.H. Sargent, S.O. Kelley,
Angew. Chem. Intl. Ed., **2017**, 56, 163-168.
11. "Advancing Ultrasensitive Molecular and Cellular Analysis Methods to Speed and Simplify the Diagnosis of Disease." S.O. Kelley,
Acc. Chem. Res., **2017**, 50, 503-507. ("Holy Grails in Chemistry" issue)
12. "Enhancing the Potency of Nalidixic Acid toward a Bacterial DNA Gyrase with Conjugated Peptides." M. Ahmed & S.O. Kelley,
ACS Chemical Biology, **2017**, 12, 2563-2569.
13. "Amplified Micromagnetic Field Gradients Enable High-Resolution Profiling of Rare Cell Subpopulations." M. Poudineh, E.H. Sargent, and S.O. Kelley,
ACS Appl. Mater. Inter., **2017**, 9, 25683-2569.
14. "Multifunctional Quantum Dot-DNA Hydrogels." L. Zhang, S.R. Jean, S. Ahmed, P.M. Aldridge, X. Li, F. Fan, E.H. Sargent, S.O. Kelley
Nature Communications, **2017**, doi: 10.1038/s41467-017-00298-w.

15. "Isolation of Phenotypically-Distinct Cancer Cells using Nanoparticle-Mediated Sorting." B.J. Green, L. Kermanshah, M. Labib, S.U. Ahmed, P.N. Silva, L. Mahmoudian, I.-H. Chang, R.M. Mohamadi, J.V. Rocheleau, S.O. Kelley
ACS Appl. Matl. Inter. **2017**, 9, 20435-20443.
16. "Steric Hindrance Assay for Secreted Factors in Stem Cell Culture." W. Zhou, S.S. Mahshid, W. Wang, A. Vallee-Belisle, P.W. Zandstra, E.H. Sargent, S.O. Kelley
ACS Sensors, **2017**, 2, 495-500.
17. "Bioassays: Universal Sensitivity Booster." S.O. Kelley
Nature Biomedical Engineering, **2017**, 1, 88.
18. "Power-Free, Digital and Programmable Dispensing of Picoliter Droplets using a Digit Chip." A. Mephram, J.D. Besant, A. Weinstein, I.B. Burgess, E.H. Sargent, S.O. Kelley
Lab Chip, **2017**, 17, 1505-1514.
19. "Biomolecular Steric Hindrance Effects Are Enhanced on Nanostructured Microelectrodes." S.S. Mahshid, A. Vallee-Belisle, S.O. Kelley
Analytical Chemistry, **2017**, 89, 9751-9757.
20. "Electrochemical DNA-Based Immunoassay That Employs Steric Hindrance to Detect Small Molecules Directly in Whole Blood." S.S. Mahshid, F. Ricci, S.O. Kelley, A. Vallee-Belisle
ACS Sensors, **2017**, 2, 718-723.
21. "Broadband Epsilon-near-Zero Reflectors Enhance the Quantum Efficiency of Thin Solar Cells at Visible and Infrared Wavelengths." A.J. Labelle, M. Bonifazi, Y. Tian, C. Wong, S. Hoogland, G. Favraud, G. Walters, B. Sutherland, M. Liu, J. Li, X. Zhang, S.O. Kelley, E.H. Sargent, A. Fratalocchi
ACS Appl. Matl. Inter. **2017**, 9, 5556-5565.
22. "New Technologies for Rapid Bacterial Identification and Antibiotic Resistance Profiling." S.O. Kelley
SLAS Technology, **2017**, 22, 113-121.
23. "What are Clinically-Relevant Levels of Cellular and Biomolecular Analytes?" S.O. Kelley
ACS Sensors, **2017**, 2, 193-197.
24. "Mixed Quantum Dot Solar Cells." Z. Yang, J. Z Fan, A.H. Proppe, F. P. García de Arquer, D. Rossouw, O. Voznyy, X. Lan, M. Liu, G. Walters, R. Quintero-Bermudez, B. Sun, S. Hoogland, S.O. Kelley, E. H. Sargent
Nature Communications, **2017**, DOI: 10.1038/s41467-017-01362-1.
25. "DNA Clutch Probes for Circulating Tumor DNA Analysis." J. Das, I. Ivanov, E.H. Sargent, S.O. Kelley
J. Am. Chem. Soc. **2016**, 138, 11009-11016.
26. "Mitochondrial DNA Repair and Replication Proteins Revealed by Targeted Chemical Probes." S.M. Wisnovsky, S.R. Jean, S.O. Kelley,
Nature Chemical Biology, **2016**, 12, 567-573.
27. "Enhanced Electrocatalytic Carbon Dioxide Reduction via Field-Inducted Reagent Concentration." M. Liu, Y. Pang, B. Zhang, P. De Luna, O. Voznyy, J. Xu, X. Zheng, C. T. Dinh, F. Fan, C. Cao, F. P. García de Arquer, T. S. Safaei, A. Mephram, A. Klinkova, E. Kumacheva, T. Filleter, D. Sinton, S.O. Kelley and E. H. Sargent,
Nature, **2016**, 537, 382-386.
28. "Mechanistic Control of the Growth of Three-Dimensional Gold Sensors." S. Mahshid, A.H. Mephram, S.S. Mahshid, I.B. Burgess, T.S. Safaei, E.H. Sargent, S.O. Kelley,
J. Phys. Chem. C, **2016**, 120, 21123-21132.
29. "High-Density Nanosharp Microstructures Enable Efficient CO₂ Electroreduction." T.S. Safaei, A. Mephram, X. Zheng, Y. Pang, C.-T. Dinh, D. Sinton, S.O. Kelley, E.H. Sargent,
Nano Letters, **2016**, 11, 7224-7228.

30. "Mitochondrial Chemical Biology: New Probes Elucidate the Secrets of the Powerhouse of the Cell." S.M. Wisnovsky, E. Lei, S.R. Jean, *Cell Chemical Biology*, **2016**, 23, 917-927.
31. "Electrochemical Methods for the Analysis of Clinically-Relevant Biomolecules" M. Labib, E.H. Sargent, S.O. Kelley, *Chem. Rev.*, **2016**, 116, 9001-9090.
32. "Mitochondria-Targeted Doxorubicin: a New Therapeutic Strategy Against Doxorubicin-Resistant Osteosarcoma." I. Buondonno, E. Gazzano, S.R. Jean, V. Audrito, J. Kopecka, M. Fanelli, I. C. Salaroglio, C. Costamagna, I. Roato, E. Mungo, C. M. Hattinger, S. Deaglio, S.O. Kelley, M. Serra, C. Riganti, *Mol. Cancer Ther.*, **2016**, 15, 2640-2652.
33. "Aptamer and Antisense-Mediated Two-Dimensional Isolation of Specific Cell Subpopulations." M. Labib, B. Green, R. Mohamadi, A. Mephram, S. Ahmed, L. Mahmoudian, I.-H. Chang, E.H. Sargent, S.O. Kelley, *J. Am. Chem. Soc.* **2016**, 138, 2476-2479.
34. "Peptide-Mediated Delivery of Chemical Probes and Therapeutics to Mitochondria." S.R. Jean, M. Ahmed, E.K. Lei, S. P. Wisnovsky, S.O. Kelley, *Acc. Chem. Res.*, **2016**, 49, 1893-1902.
35. "Beyond CTC Capture: Next-Generation Devices and Materials." B. Green, T. Saberi Safaei, A. Mephram, M. Labib, R.M. Mohamadi, S.O. Kelley, *Angew. Chem. Intl. Ed.*, **2016**, 55, 1252-1265.
36. "Image-Reversal Soft Lithography: Fabrication of Nanostructured Biomolecular Detectors." T.S.S. Safaei, J. Das, S.S. Mahshid, P.M. Aldridge, E.H. Sargent, S.O. Kelley, *Advanced Healthcare Materials*, **2016**, 5, 893-899.
37. "Interrogating Circulating Microsomes and Exosomes Using Metal Nanoparticles." Y.-G. Zhou, R.M. Mohamadi, M. Poudineh, L. Kermanshah, S. Ahmed, E.H. Sargent, S.O. Kelley, *Small*, **2016**, 12, 727-732.
38. "An Electrochemical Clamp Assay for Direct, Rapid Analysis of Circulating Nucleic Acids in Serum." J. Das, I. Ivanov, S.O. Kelley, E.H. Sargent, *Nature Chemistry*, **2015**, 7, 569.
39. "Disease Detectors." S.O. Kelley, *Scientific American*, **2015**, 313, 49-51.
40. "Peptide Targeting of an Antibiotic Prodrug Towards Phagosome-Entrapped Mycobacteria." M.P. Pereira, J. Shi, S.O. Kelley, *ACS Infectious Disease*, **2015**, 1, 586-592.
41. "Mitochondrial Targeting of Doxorubicin Eliminates Nuclear Effects Associated with Cardiotoxicity." S.R. Jean, D.V. Tulumello, C. Riganti, S.U. Liyanage, S.O. Kelley, *ACS Chemical Biology*, **2015**, 10, 2007-2015.
42. "A Digital Microfluidic Device with Integrated Nanostructured Microelectrodes for Electrochemical Immunoassays." D.G. Rackus, M.D.M. Dryden, A. Zaragoza, J. Lamanna, B. Lam, S.O. Kelley, A.R. Wheeler, *Lab on a Chip*, **2015**, 15, 3776-3784.
43. "Fractal Circuit Sensors Enable Rapid Quantification of Biomarkers for Donor Lung Assessment for Transplantation." A.T. Sage, J.D. Besant, L. Mahmoudian, M. Poudineh, X. Bai, R. Zamel, M. Hsin, E.H. Sargent, M. Liu, S. Keshavjee, S.O. Kelley, *Science Advances*, **2015**, 1, e1500417.
44. "Sorting of Circulating Tumor Cells by Epithelial Antigen Expression during Disease Progression in Animal Model." N. Muhanna, A. Mephram, R. Mohamadi, H. Chan, T. Khan, M. Akens, J.D. Besant, J. Irish, S.O. Kelley, *Nanomedicine: Nanotechnology, Biology, and Medicine*, **2015**, 11, 1613-1616.

45. "In Situ Electrochemical ELISA for Specific Identification of Captured Cancer Cells." T.S. Safaei, R.M. Mohamadi, E.H. Sargent, S.O. Kelley, *ACS Appl. Matl. Interfaces*, **2015**, 7, 14165-14169.
46. "Ultrasensitive Visual Readout of Nucleic Acids using Electrocatalytic Fluid Displacement." J.D. Besant, J. Das, I.B. Burgess, W. Liu, E.H. Sargent, S.O. Kelley, *Nature Communications*, **2015**, 6, 6978.
47. "Rapid Electrochemical Phenotypic Profiling of Antibiotic-Resistant Bacteria." J.D. Besant, E.H. Sargent, S.O. Kelley, *Lab on a Chip*, **2015**, 15, 2799.
48. "Sample-to-Answer Isolation and mRNA Profiling of Circulating Tumor Cells." R.M. Mohamadi, I. Ivanov, J. Stojcic, R.K. Nam, E.H. Sargent, S.O. Kelley, *Analytical Chemistry*, **2015**, 87, 6258.
49. "Programmable Definition of Nanogap Electronic Devices with Self-Inhibited Reagent Depletion." B. Lam, W. Zhou, E.H. Sargent, S.O. Kelley, *Nature Communications*, **2015**, 6, 6940.
50. "Velocity Valleys Enable Efficient Capture and Spatial Sorting of Nanoparticle-Bound Cancer Cells." J.D. Besant, R.M. Mohamadi, P. Aldridge, Y.Li, E.H. Sargent, S.O. Kelley, *Nanoscale*, **2015**, 7, 6278.
51. "Nanoparticle-Mediated Binning and Profiling of Heterogeneous Circulating Tumor Cell Subpopulations." R.M. Mohamadi, I. Ivanov, J.D. Besant, A. Malvea, A. Mephram, J. Stojcic, A.L. Allan, L.E. Lowes, R.K. Nam, E.H. Sargent, S.O. Kelley, *Angew. Chem. Intl. Ed.*, **2015**, 54, 139. (Featured in *Science*, "Editor's Choice")
52. "Using the Inherent Chemistry of the Endothelin-1 Peptide to Develop a Rapid Assay for Pre-transplant Donor Lung Assessment." A.T. Sage, X. Bai, M. Cypel, M. Liu, S. Keshavjee, S.O. Kelley, *Analyst*, **2015**, 140, 8092-8096.
53. "Advancing the Speed, Sensitivity and Accuracy of Biomolecular Detection with Multi-Length Scale Engineering." S.O. Kelley, C.A. Mirkin, D.R. Walt, R. Ismagilov, M. Toner, E.H. Sargent *Nature Nanotechnology*, **2014**, 9, 969
54. "Highly Specific Electrochemical Analysis of Cancer Cells using Multi-Nanoparticle Labeling." Y. Wan*, Y.-G. Zhou*, M. Poudineh, T. Saberi Safaei, R.M. Mohamadi, E.H. Sargent, S.O. Kelley *Angew. Chem. Intl. Ed.*, **2014**, 53, 13145.
55. "Effect of Microelectrode Structure on Electrocatalysis at Nucleic Acid-Modified Sensors." Y. Zhou, Y. Wan, A. Sage, M. Poudineh, S.O. Kelley *Langmuir*, **2014**, 30, 14322.
56. "Structural Modifications of Mitochondria-Targeted Chlorambucil Alter Cell Death Mechanism but Preserve MDR Evasion." S.R. Jean, M.P. Pereira, S.O. Kelley, *ACS Mol. Pharm.*, **2014**, 11, 2675.
57. "Ultrasensitive Electrochemical Biomolecular Detection using Nanostructured Microelectrodes." A.T. Sage, J.D. Besant, B. Lam, E.H. Sargent, S.O. Kelley, *Acc. Chem. Res.*, **2014**, 46, 2417.
58. "Cellular Uptake of Substrate-Initiated Cell-Penetrating Poly(disulfide)s." G. Giulio, E.-K. Bang, G. Molinard, D. Tulumello, S. Ward, S.O. Kelley, A. Roux, N. Sakai, S. Matile, *J. Am. Chem. Soc.*, **2014**, 136, 6069.
59. "Three-Dimensional, Sharp-Tipped Electrodes Concentrate Applied Fields to Enable Direct Electrical Release of Intact Biomarkers from Cells." M. Poudineh, R. Mohamedi, A. Sage, L. Mahmoudian, E.H. Sargent, S.O. Kelley, *Lab on a Chip*, **2014**, 14, 1785.
60. "Molecular Vehicles for Mitochondrial Chemical Biology and Drug Delivery." S.R. Jean, D.V.

- Tulumello, S.P. Wisnovsky, E.K. Lei, M.P. Pereira,
ACS Chemical Biology, **2014**, 9, 323.
61. "Targeting Mitochondrial DNA with a Platinum-Based Anticancer Agent." S.P. Wisnovsky, J.J. Wilson, R. J. Radford, M.P. Pereira, M. Chan, R. Laposa, S.J. Lippard, S.O. Kelley, *Chemistry and Biology*, **2013**, 20, 1323.
 62. "Proximal Bacterial Lysis and Detection in Nanoliter Wells Using Electrochemistry." J.D. Besant, J. Das, E.H. Sargent, S.O. Kelley, *ACS Nano*, **2013**, 7, 8183.
 63. "Tuning the Intracellular Bacterial Targeting of Peptidic Vectors." E. Lei, M. P. Pereira, S.O. Kelley, *Angew. Chem. Intl. Ed*, **2013**, 52, 9660.
 64. "Solution-Based Circuits Enable Rapid and Multiplexed Pathogen Detection." B. Lam, R.D. Holmes, L. Live, A. Sage, E. H. Sargent, S.O. Kelley, *Nature Communications*, **2013**, 4, 2001.
 65. "Bacterial Detection Sensitivity of Nanostructured Microelectrodes." J. Das, S.O. Kelley, *Analytical Chemistry*, **2013**, 85, 7333.
 66. "Delivery of Doxorubicin to Mitochondria." G. Chamberlain, D. Tulumello, S.O. Kelley, *ACS Chemical Biology*, **2013**, 8, 1389-1395.
 67. "An Electrochemical ELISA Featuring Proximal Reagent Generation: Detection of HIV Antibodies in Clinical Samples." A. Bhimji, A. Zaragoza, L. Live, S.O. Kelley, *Analytical Chemistry*, **2013**, 85, 6813-6819.
 68. "Optimized Templates for Bottom-Up Growth of High-Performance Integrated Biomolecular Detectors." B. Lam, R.D. Holmes, J. Das, M. Poudineh, A. Sage, E.H. Sargent, S.O. Kelley, *Lab on a Chip*, **2013**, 13, 2569-2575.
 69. "Re-directing an Alkylating Agent to Mitochondria Alters Drug Target and Cell Death Mechanism." R. Mourtada, S. B. Fonseca, S.P. Wisnovsky, M.P. Pereira, X. Wang, R. Hurren, J. Parfitt, L. Larsen, R.A.J. Smith, M.P. Murphy, A.D. Schimmer, S.O. Kelley, *PLoS One*, **2013**, 8, e60253.
 70. "Rapid and Specific Electrochemical Detection of Prostate Cancer Cells Using an Aperture Sensor Array." M. Moscovici, A. Bhimji, S.O. Kelley, *Lab on a Chip*, **2013**, 13, 940.
 71. "Chip-Based Nanostructured Sensors Enable Accurate Identification and Classification of Circulating Tumor Cells in Prostate Cancer Patient Blood Samples ." I. Ivanov, J. Stojic, A. Stanimirovic, E. Sargent, R.K. Nam, S.O. Kelley, *Analytical Chemistry*, **2013**, 85, 398.
 72. "DNA-Based Programming of Quantum Dot Properties." K.B. Cederquist, S.O. Kelley, *WIREs: Nanomedicine and Nanobiotechnology*, **2013**, 5, 86.
 73. "An Ultrasensitive, Universal Detector Based on Neutralizer Displacement." J. Das, K.B. Cederquist, P. Lee, E.H. Sargent, S.O. Kelley *Nature Chemistry*, **2012**, 4, 642.
 74. "Nanostructured Biomolecular Detectors: Pushing Performance at the Nanoscale." K. Cederquist, S.O. Kelley *Current Opinion in Chemical Biology*, **2012**, 16, 415.
 75. "Polymerase Chain Reaction-Free, Sample-to-Answer Bacterial Detection in 30 Minutes with Integrated Cell Lysis." B. Lam, Z. Fang, E.H. Sargent, S.O. Kelley *Analytical Chemistry*, **2012**, 84, 21.
 76. "Tuning the Activity of Mitochondria-Penetrating Peptides for Delivery or Disruption." K.L. Horton, M.P. Pereira, K.M. Stewart, S.B. Fonseca, S.O. Kelley *ChemBiochem*, **2012**, 13, 476.

77. "DNA-Based Programming of Quantum Dot Valency, Luminescence and Complex Self-Assembly."
G. Tikhomirov, S. Hoogland, P.E. Lee, A. Fischer, E.H. Sargent, S.O. Kelley
Nature Nanotechnology, **2011**, 6, 485.
78. "Development of Novel Peptides for Mitochondrial Drug Delivery: Amino Acids Featuring Delocalized Lipophilic Cations."
K. Stewart, R. Mourtada, S.O. Kelley
Pharmaceutical Research, **2011**, 28, 2808.
79. "Peptide-Chlorambucil Conjugates Combat Pgp-Dependant Drug Efflux."
S.B. Fonseca & S.O. Kelley
ACS Medicinal Chemistry Letters, **2011**, 2, 419.
80. "Direct Genetic Analysis of Ten Cancer Cells: Tuning Molecular Probe Design for Efficient mRNA Capture."
E. Vasilyeva, Z. Fang, M. Minden, E.H. Sargent, S.O. Kelley
Angewandte Chemie, **2011**, 50, 4137. (Voted a "VIP" paper)
81. "Hierarchical Nanotextured Microelectrodes Overcome the Molecular Transport Barrier to Achieve Rapid, Direct Bacterial Detection."
L. Soleymani, Z. Fang, B. Lam, X. Bin, E. Vasilyeva, A. Ross, E.H. Sargent, S.O. Kelley
ACS Nano, **2011**, 5, 3360.
82. "Maximizing the Therapeutic Window of an Antimicrobial Drug by Imparting Mitochondrial Sequestration in Human Cells."
M.P. Pereira & S.O. Kelley
J. Am. Chem. Soc., **2011**, 133, 3260.
(Featured in *C&E News*, Faculty of 1000).
83. "Re-routing Chlorambucil to Mitochondria Enhances Potency and Combats Drug Resistance in Cancer Cells."
S.B. Fonseca, M.P. Pereira, R. Mourtada, M. Gronda, R. Hurren, M.D. Minden, A.D. Schimmer, S.O. Kelley
Chemistry and Biology, **2011**, 18, 445.
84. "Solvatochromic Reagents for Multicomponent Reactions and their Utility in the Development of Cell-Permeable Macrocyclic Peptide Vectors"
B.H. Rotstein, R. Mourtada, S.O. Kelley, A.K. Yudin,
Chemistry, **2011**, 17, 12257.
85. "Protein Detection Using Arrayed Microsensor Chips: Tuning Sensor Footprint to Achieve Ultrasensitive Readout of CA-125 in Serum and Whole Blood."
J.Das & S.O. Kelley
Analytical Chemistry, **2011**, 83, 1167.
86. "Nanostructuring of Sensors Determines the Hybridization of Biomolecular Capture."
X. Bin, E.H. Sargent, S.O. Kelley
Analytical Chemistry, **2010**, 82, 5928.
87. "Nucleic Acid-Passivated Nanocrystals: Biomolecular Templating of Form and Function."
N. Ma, G. Tikhomirov, S.O. Kelley
Accounts of Chemical Research, **2010**, 43, 173.
88. "The Antiparasitic Agent Ivermectin Induces Chloride-Dependent Membrane Hyperpolarization and Cell Death in Leukemia Cells."
S. Sharmeen, M. Skrtic, M.A Sukhai, R. Hurren, M. Gronda, X. Wang, S.B. Fonseca, H. Sun, M.D. Minden. R. Batey, A. Datti, J. Wrana, S.O. Kelley, A.D. Schimmer
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L. Soleymani, Z. Fang, E.H. Sargent, S.O. Kelley
Nature Nanotechnology, **2009**, 4, 844.
90. "Direct, Electronic MicroRNA Detection Reveals Expression Profiles in 30 Minutes."
H. Yang, A. Hui, G. Pampalakis, L. Soleymani, F.-F. Liu, E. H. Sargent, S.O. Kelley
Angewandte Chemie, **2009**, 48, 8461.
91. "A General Phase-Transfer Protocol for Metal Ions and its Application in Nanocrystal Synthesis. "
J. Yang, E.H. Sargent, S.O. Kelley, J. Ying
Nature Materials, **2009**, 4, 844.
92. "Direct Profiling of Cancer Biomarkers in Tumour Tissue Using a Multiplexed Nanostructured Microelectrode Integrated Circuit. "
Z. Fang, L. Soleymani, G. Pampalakis, M. Yoshimoto, J.A. Squire, E. H. Sargent, S.O. Kelley
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L. Soleymani, X. Sun, H. Yang, B.J. Taft, E. H. Sargent, S.O. Kelley
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S.B. Fonseca, M. Pereira, S.O. Kelley
Adv. Drug. Del. Rev. **2009**, 61, 953.
95. "One-step Synthesis of DNA-Programmed Semiconductor Nanocrystals."
N. Ma, E.H. Sargent, S.O. Kelley
Nature Nanotechnology, **2009**, 4, 121.
96. "Direct Electrocatalytic mRNA Detection Using PNA-Nanowire Sensors."
Z. Fang & S.O. Kelley
Anal. Chem., **2009**, 81, 612.
97. "An Electrochemical Immunosensor Based on Antibody-Nanowire Conjugates."
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121. "Programming Nanoparticle Growth using Nucleic Acid Ligands."
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M.A. Lapiere, M.M. O'Keefe, B.J. Taft, and S. O. Kelley
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K.P. Mahon, R.F. Ortiz Meoz, and S. O. Kelley
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S.O. Kelley in *Electroanalytical Methods for Biological Materials*, Marcel Dekker, NY, **2002**.
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L.M. Wittenhagen and S.O. Kelley
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Post-doctoral and graduate research publications

141. "Intercalative Stacking: A Critical Feature of DNA Charge-Transport Electrochemistry."
E.M. Boon, N.M. Jackson, M.D. Wightman, S.O. Kelley, M.G. Hill, and J.K. Barton
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S.O. Kelley, S.V. Steinberg, and P. Schimmel, *J. Biol. Chem.* **2001**, 276, 10607.
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S.O. Kelley, S. V. Steinberg, and P. Schimmel
Nature Structural Biology **2000**, 7, 862.
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Nature Structural Biology **2000**, 7, 5.
146. "Single-Base Mismatch Detection Based on Charge Transduction Through DNA".
S.O. Kelley, E.M. Boon, N.M. Jackson, M.G. Hill, and J.K. Barton
Nucl. Acids Res. **1999**, 27, 4830.
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T. Fiebig, S.O. Kelley, C. Wan, C. R. Treadway, J.K. Barton, A. Zewail,
Proc. Natl. Acad. Sci., U.S.A. **1999**, 96, 6014.
148. "Femtosecond Dynamics of the DNA Intercalator Ethidium and Electron Transfer with Mononucleotides." T. Fiebig, C. Wan, S.O. Kelley, J.K. Barton, A. Zewail,
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Damage to Guanines in Ethidium-DNA Assemblies."
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Biochemistry **1998**, 37, 15933.
 153. "Radical Migration Through the DNA Helix: Chemistry at a Distance."
S.O. Kelley & J.K. Barton
Metal Ions Biol. Sys. **1998**, 26, 211.
 154. "DNA-Mediated Electron Transfer from Ethidium to a Modified Base."
S.O. Kelley & J.K. Barton,
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 155. "Photoinduced Electron Transfer in Ethidium-Modified Duplexes."
S.O. Kelley, R.E. Holmlin, E.D.A. Stemp, and J.K. Barton
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S.O. Kelley, J. K. Barton, N.M. Jackson, and M. Hill
Bioconj. Chem. **1997**, 8, 31.

Recent invited conference lectures (2012 – present)

Pittcon, Orlando, FL (3/12)
Gordon Research Conference on Peptide Chemistry and Biology, Ventura, CA (3/12)
Biotech City, Montreal (5/12)
Canadian Society for Pharmaceutical Sciences, Toronto, ON (6/12)
ACS National Meeting, Philadelphia (8/12)
Emerging Molecular Diagnostics, Washington DC (08/12)
RSC Challenges in Nanochemistry, Xiamen, China (8/12)
Molecular Med Tri-Con, San Francisco (2/13)
Gordon Research Conference in Bioorganic Chemistry, NH (6/13)
American Peptide Symposium, Hawaii (6/13)
National Organic Symposium, Seattle (06/13)
European Cancer Congress, Amsterdam (10/13)
Molecular Med Tri-Con, San Francisco (2/14)
ACS National Meeting, Dallas, TX (3/14)
fNANO Conference, Snowbird, UT (4/14)
Bioanalytical Sensors Gordon Research Conference, Newport, RI (6/14)
International Nanomedicine Conference, Sydney, Australia (7/14)
ISACS 15 Challenges in Nanoscience, San Diego, CA (8/14)
Next Generation Diagnostics, Washington, DC (8/14)
Circulate, Boston, MA (11/14)
ACS National Meeting, Denver, CO (INOR, COLL (2x) 3/15)
TechConnect, Washington DC (6/15)
Drug Discovery and Therapy World Congress, Boston, MA (07/15)
Lab on a Chip World Congress, San Diego, CA (9/15)
Biofluid Biopsies, Boston, MA (11/15)
Materials Research Society Annual Meeting, Boston, MA (12/15)
Society for Lab Automation, San Diego, CA (1/16)

Pittcon, Atlanta, GA (3/16)
Molecular Med Tri-Con, San Francisco (3/16)
Circulating Biomarkers Congress, Boston, MA (3/16)
Gordon Research Conference, Rare Cells, M Holyoke, MA (8/16)
Next Gen Dx Summit, Washington DC (8/16)
Chemical Biology Approaches to Assessing and Modulating Mitochondria, Royal Society, UK (9/16)
Biofluid Biopsies, Boston, MA (11/16)
Micro and Nanotechnology in Medicine, Hawaii (12/16)
Pittcon, Chicago, IL (3/17)
ACS National Meeting, San Francisco, CA (4/17)
Canadian Society for Chemistry National Meeting (5/17)
Next Generation Dx, Washington, DC (8/17)
ACS National Meeting, Washington, DC (8/17)
Liquid Biopsies and Minimally Invasive Diagnostics, San Diego, CA (10/17)
Targeting Mitochondria, Berlin, Germany (10/17)

Recent invited lectures at universities/companies/government agencies (2012 – present)

University of British Columbia (2/12)
Texas Women's University (3/12)
California Institute of Technology (3/12)
Boston University (5/12)
Georgia Institute of Technology (1/13)
University of California, Berkeley (2/13)
Stanford University (2/13)
Purdue University (4/13)
University of Calgary (4/13)
McGill University (5/13)
University of California, Los Angeles (5/13)
Tel Aviv University (3/14)
University of California, San Diego (4/14)
University of Minnesota (5/14)
University of California, Santa Barbara (5/14)
University of Texas, Austin (10/14)
California Institute of Technology, John D. Roberts Lecture (11/14)
University of Alberta, Macgregor Lecture (4/15)
University of Geneva (4/15)
University of California, San Francisco (9/15)
Genentech (9/15)
University of Maryland, Baltimore (10/15)
University of Massachusetts, Amherst (11/15)
Wayne State University (12/15)
University of Montreal (3/16)
University of California, Davis (3/16)
Purdue University (4/16)
National Institute of Standards and Technoogy (4/16)
University of Washington (5/16)
Chinese Academy of Sciences, Shanghai, China (9/16)
University of Connecticut (10/16)
Ohio State University (10/16)
Northwestern University (12/16)
University of Rochester (2/17)
California Institute of Technology (2/17)
Georgia Institute of Technology (4/17)

University of California, Berkeley (8/17)
Harvard University (10/17)
California Institute of Technology (10/17)
Yale University (10/17)
University of Michigan (11/17)

Courses taught at University of Toronto

BCH311 (2009 – present) *Information Transmission in Biological Systems*
PHC320 (2007 – 2009) *Pharmaceutical Chemistry: Frontiers*
BCH2021 (2009) *Molecular Machines, Biosensors & Nanotechnology*
BCH2024 (2014, 2016) *Micro- and Nanotechnologies for Biology and Medicine*
Prior to U. Toronto: Biophysical Chemistry, Chemical Biology, Biochemistry,

Patents and patent applications

Issued

6,649,350 Electrochemical sensor using intercalative, redox-active moieties (US, Germany)
6,461,820 Electrochemical sensor using intercalative, redox-active moieties (US, Germany)
6,221,586 Electrochemical sensor using intercalative, redox-active moieties (US, Germany)
6,958,216 DNA-bridged carbon nanotube arrays (US)
7,202,037 Electrochemical sensor using intercalative, redox-active moieties (US, Germany)
7,741,033 Electrocatalytic nucleic acid hybridization detection (US, Germany, Spain, France, UK, Ireland, Italy)
7,361,470 Electrocatalytic nucleic acid hybridization detection (US, Canada, Germany, Spain, France, UK, Ireland, Italy)
8,888,969 Nanostructured microsensors and biosensing devices employing same (US, Canada, China, Germany, Spain, France, UK, Italy, Netherlands, Hong Kong, India, Japan, Singapore)
9,173,952 Mitochondrial penetrating peptides as carriers for antimicrobials (US, China)
9,132,198 Mitochondrial penetrating peptides as carriers for anticancer compounds (US, China)
9,335,289 Bioprobes and methods of use thereof (US)
9,217,179 Systems and methods for multiplexed electrochemical detection (US, UK, Germany, France)
9,772,329 Protein detection method (US, China, Hong Kong, Russia, Germany, France, Spain, UK, Ireland Italy)

In Process

PCT/US2012/024015 Versatile and sensitive biosensor
PCT/US2012/020965 Protein detection method
PCT/US2012/028721 Diagnostic and sample preparation devices and methods
PCT/US2013/054395 Systems, devices, and methods for identifying a disease state in a biological host using internal controls
PCT/CA2014/050371 Device for capture of particles in a flow
PCT/CA2015/051102 Electrochemical antibiotic susceptibility testing device
PCT/CA2016/051128 Device for magnetic profiling of particles in a flow
PCT/CA2016/000259 Electrochemical assay for a protein analyte
PCT/US2016/022030 An electrochemical clamp assay

Provisional Patents

62/524,161 Mitochondria-targeted releasable linker
62/545,081 Cellular mRNA determination by binning cells magnetically

M.Sc. and Ph.D. students supervised

M.Sc. (graduated)

Xiaopeng Miao (2006), research assistant in China
Jessica Rose (2006), teacher
Davis Holmes (2011), M.D. student, U. Toronto
Mario Moscovici (2011), M.D. student, U. Toronto
Sean Guo (2011), Senior Business Analyst, Target
Rida Mourtada (2012), Ph.D. student, MIT
Lema Yousif (2012), Ph.D. student, U. Muenster

Ph.D. (graduated)

Brad Taft (2005), Director R&D, Mindera Dx
Jay Carreon (2006), Adjunct Faculty at Vassar College
Melissa Lapierre-Devlin (2006), Assoc. Director Operations, Takeda Pharmaceuticals
Kerry Mahon (2006), Director of Business Development, Verily Life Sciences
Marc Roy (2006), Sr. Principal Scientist, Pfizer
Lisa Wittenhagen (2006), Sr. Director Advanced Analytics, Adheris Health
Erin Prestwich (2006), Asst. Professor, University of Toledo
Stanley Lue (2007), Sr. Biochemist, Siemens Healthcare
Marcel Roberts (2007), Asst. Professor, John Jay College of Criminal Justice
Nan Ma (2009), Professor, Soochow University
Kelly Stewart Marsh (2010), Sr. Scientist, Agios Pharmaceuticals
Kristin Horton (2010), Sr. Scientist, Takeda Pharmaceuticals
Zhichao Fang (2010), Scientist, Bristol Myers Squibb
Leyla Soleymani (2010), Asst. Professor, McMaster University
Sonali Fonseca (2012), Manager, Deal Strategy, PwC
Brian Lam (2014), Postdoc, University of British Columbia
Andrew Sage (2015), Postdoc, University Health Network
Justin Besant (2015), Associate Consultant, ZS Associates
Mahla Poudineh (2016), Postdoc, Stanford University (Soh Group)
Tina Saberi Safaei (2016), Postdoc, University of Toronto
Simon Wisnovsky (2016), Postdoc, Stanford University (Bertozzi Group)
Sae Rin Jean (2016), Scientist, Eutropics Pharmaceuticals, Boston, MA

Ph.D. (in progress)

Peter Aldridge
Bill Duong
Surath Gomis
Brenda Green
Leyla Kermanshah
Eric Lei
Wenhan Liu
Adam Mephram
Carine Nemr
Monorina Mukhopadhyay
Tanja Sack
Fan Xia
Wendi Zhou