Patrick S. Doyle
Robert T. Haslam (1911) Professor of Chemical Engineering
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Education:

School	Degree	Date
University of Pennsylvania	BSE	1992
Stanford University	MS	1993
Stanford University	PhD	1997

Ph.D. Thesis: "Dynamic Simulations of Flexible Polymer Molecules: Rheology of Unbound Dilute Solutions and Polymer Brushes" supervised by Eric Shaqfeh and Alice Gast

Principal Fields of Interest: Nanoemulsions, Enhanced Oil Recovery, Single Molecule DNA Dynamics, Polymer Physics, Transport Phenomena, Rheology, Microfluidics, Colloids, Drug Formulations

Non-MIT Experience:

Employer	Position	Beginning	Ending
Texaco	Summer Intern	June 1989	Sep. 1989
Texaco	Summer Intern	June 1990	Sep. 1990
Texaco	Summer Intern	June 1991	Sep. 1991
B.P. Chemicals	Summer Intern	June 1992	Sep. 1992
Institute Curie	Postdoctoral Fellow	June 1997	Sep. 2000

History of MIT Appointments:

Rank	Beginning	Ending
Charles and Hilda Roddey Asst. Professor	Dec. 2000	July 2005
Doherty Assistant Professor	Aug. 2005	July 2006
Associate Professor w/o tenure	July 2006	June 2008
Associate Professor with tenure	July 2008	June 2011
Full Professor with tenure	June 2011	present
Singapore Research Professor	Jan 2013	Dec 2013
Robert T. Haslam (1911) Professor	October 2014	present

Consulting Record:

Firm	Beginning	Ending
Butterworth-Heinemann	Feb. 2001	Feb. 2002

Beckman-Coulter	Nov. 2004	Feb. 2005
Applied Biosystems	Sept. 2005	Dec. 2006
Genome Corp. – Scientific Advisory Board	Oct. 2007	Jan. 2009
U.S. Genomics - consultant	Sept. 2008	Jan. 2010
T2 Biosystems- consultant	Sept. 2009	Oct. 2010
Firefly Bioworks Inc. – founder, head of SAB, member of Board of Directors	Sept. 2009	January 2015
Achira Biolabs – Scientific Advisory Board	Sept. 2011	Present
Takata – Americas (TK Holdings Inc.) - consultant	May 2012	June 2012
LaVit Life- consultant	April 2012	June 2012
Lariat Biosciences – Scientific Advisory Board	Nov 2013	Present
Croucher Foundation (Hong Kong)- advisor	Jan 2014	June 2014
OCP S.A., Morocco – consultant	August 2014	Present
Life Technologies- expert witness	Nov. 2014	Jan 2016

Department and Institute Committees:

Activity	Beginning	Ending
ChE Graduate Admissions & Recruiting	Jan. 2001	2009
France-MIT Program	Jan. 2001	May 2004
ChE Graduate Advising	Sept. 2001	present
ChE Long Range Planning Committee	Dec. 2004	Aug. 2007
ChE Micro/Nano Seminar Series (MEMS@MIT)	Jan. 2008	Dec. 2008
ChE Safety Committee	Jan. 2010	Jan. 2012
ChE Undergraduate Advising	Sept. 2008	present
NIH Biomechanics Training Grant at MIT executive committee	July 2010	August 2012
Graduate Officer in Chemical Engineering	Feb. 2012	January 2015
ChE Faculty Recruiting Committee	Jan. 2012	Present
ChE Committee for Online Education	Oct. 2013	Present
MIT-France Seed Fund Selection Committee	October 2014	December 2014
Executive Officer in Chemical Engineering	January 2015	July 2016
Graduate Officer in Chemical Engineering	June 2016	present

Professional service:

Activity	Beginning	Ending
AIChE Fluids Section Poster chair	Feb. 2001	Nov 2001
Society of Rheology Poster chair	March 2001	Nov. 2001
AIChE Complex and Bio-Fluid Dynamics: Session Chair	Jan. 2002	Nov. 2002
Society of Rheology: Biorheology Session Chair	Mar. 2003	Oct. 2003
International Congress on Rheology: Nanorheology and Microfluidics Session Chair	Aug. 2004	Aug. 2004
Society of Rheology: Microrheology/microfluidics Session Chair	March 2005	Oct. 2005
AIChE: Complex/Bio- Fluids Session Chair	March 2005	Nov. 2005

Society of Rheology Short Course Organizer	Jan. 2005	Oct. 2005
AIChE – Fluids Programming Committee	Nov. 2005	Oct. 2015
American Physical Society: Microfluidics Session Chair	March 2006	March 2006
GEM4 Summer School Lecturer	August 2006	August 2006
Annual European Rheology Conference: Biorheology Session Organizer	Nov. 2006	April 2007
Program Chair for AIChE section 01J	Nov. 2006	Oct.2007
Society of Rheology Short Course Organizer	Jan. 2007	Oct. 2007
ACS Colloids Division: Executive Committee Member at Large	Jan. 2007	Dec. 2009
ACS Colloids Meeting: Physics of Colloids Session Chair	June 2007	June 2007
Society of Rheology: Biorheology Session Chair	Oct. 2007	Oct. 2007
Biomicrofluidics – Editorial Board Member	Jan. 2010	Dec. 2013
Society of Rheology Short Course Organizer	Jan. 2010	Oct. 2010
SMART-BioSym: Thrust 1 Leader (Bio-engineering of Molecules)	Oct. 2008	Present
Society of Rheology- Bingham Award Committee	Oct. 2011	Oct 2013
AIChE- Biofluids Session Chair	Nov. 2013	Nov. 2013
SMART-BioSym: Cross Thrust Leader (Biofilm Ecomechanics)	Jan. 2014	Present

Awards Received:

Texaco Philanthropic Foundation Scholarship	May 1988
National Scholarship Award of AIChE	May 1992
Stanford Chemical Engineering Distinguished Service Award	May 1995
Lieberman Fellowship	Sept. 1996
Chateaubriand Fellowship	May 1997
Institute Curie Postdoctoral Fellowship	May 1998
Fondation de la Recherche Medicale Postdoctoral Grant	May 1999
PolyPops Innovation Award	July 2001
NSF Career Award	March 2003
3M Innovation Award	July 2003
Doherty Chair	March 2005
U. of Delaware Colburn Memorial Lecturer	May 2006
U. of Notre Dame Thiele Lecturer	Sept. 2006
Deshpande Lemelson Project for “High Societal Impact”	Feb. 2008
Van Ness Award Lectures at RPI	Oct. 2008
Royal Society of Chemistry Journal Grant Award for International Authors	Oct. 2008
‘Pioneers in Miniaturization’ from Royal Society of Chemistry/Corning Inc./ Lab on Chip Journal	Oct. 2008
Rothschild-Yvette Mayent Award Scholar at Institut Curie	Jan. 2009
Guggenheim Fellowship	April 2009
Stratis V. Sotirchos Memorial Lectureship, FORTH/ICE-HT Greece	May 2009
Joliot Chair, ESPCI Paris (École supérieure de physique et de chimie industrielles de la ville de Paris)	Nov. 2009

Royal Society of Chemistry Soft Matter Lectureship Award	Aug. 2012
Singapore Research Professorship Chair	Jan. 2013
Michael Mohr Outstanding Faculty Award	May 2013
Michael Mohr Outstanding Faculty Award	May 2014
Robert T. Haslam (1911) Chair	October 2014
Singapore Research Professorship Chair	January 2016

Current Organization Membership:

Organization	Offices Held
American Chemical Society	Executive Committee Member at Large, 2007-2009
American Physical Society	
American Institute of Chemical Engineers	Fluids Programming Committee ('05-present) and Meeting Program Chair ('07) of Area 1J (Fluid Mechanics)
Society of Biological Engineering	
Society of Rheology	Bingham Award Committee (2011-13)

Patents Granted

1. Microstructure Synthesis by Flow Lithography and Polymerization, US Patent 7709544
   i. Licensed to Firefly Bioworks
2. Multifunctional Encoded Particles for High-Throughput Analysis, US Patent 7947487
   i. Licensed to Firefly Bioworks
3. Systems and Methods for Stretching Polynucleotides, US Patent 8148159
4. Flow Interference Lithography, US Patent 8252517
5. Colloidal Hydrogel Particles with tunable Chemistry, Geometry, and Flexibility, US Patent 8535644
6. High Precision Scanning Of Encoded Hydrogel Microparticles, US Patent 8034629
   i. Licensed to Firefly Bioworks (founder of this company)
7. Lock Release Lithography, Patent Application US 13/125,306
8. Rare Earth Spatial/Spectral Microparticle Barcodes For Labeling Of Objects And Tissues, Patent Application US Serial No. 61/801351
   i. Licensed to Motif Micro (founder of this company)

Patent Applications Pending:

1. System for electrophoretic stretching of biomolecules using micro scale T-junctions, US Patent Application 12/594,766

2. Multiplexed quantitative PCR end point analysis of nucleic acid targets, Patent Application PCT/US2009/066778.
3. Compositions, Methods, And Systems Relating To Controlled Crystallization And/Or Nucleation Of Molecular Species, Patent Application US Serial No. 13/216018
4. Polymer Matrices For Controlling Crystallization, Patent Application US Serial No. 61/917554
5. Rare Earth Spatial/Spectral Barcodes For Multiplexed Biochemical Testing, Patent Application US Serial No. 61/800995
6. Hydrogel Microstructures With Oil Isolation For Small Reaction Volumes, Patent Application US Serial No. 61/896637

Educational Development:

- Co-developed (with Prof. Roger Kamm) Open Courseware site for Molecular, Cellular and Tissue Engineering (20.410/10.537J)
- A series of videos and webpages have been developed to illustrate diffusion of simple colloids and complex molecules (DNA). These are used in 10.50 (graduate transport phenomena) and 10.537J (Biomechanics).
  web.mit.edu/10.50/www/diffuse1.html
- Developed a lab component on microrheology for the graduate course 10.537J (biomechanmics). This is the first time a lab has been part of this rather large (~50 students) course.
- Co-developed (with Prof. G.C. Rutledge) a new undergraduate course entitled "Molecular Engineering" (10.22). This course introduces concepts in statistical mechanics and relates them to material properties.
- Developed a video in coordination with WGBH entitled "Mystery Mud" for grade school children which is available online as part of the NSF digital library.
  http://www.teachersdomain.org/6-8/sci/phys/matter/mud/index.html

  To login use username: pdoyle and password:pdoyle.

- Active participation of undergraduates in research. This has taken the form of UROPS, co-ops and senior thesis work. About two thirds of the undergraduates have been women. To date, I have had 15 UROPS/undergraduates work in the lab.
- Headed the development and teaching of a new microfluidics-based IAP course for freshmen entitled "Hands-on-ChE using Microfluidics". This was taught in the IAP session of 2002, 2003 and 2004.
- Contributed content to the popular science website "How Stuff Works" to provide discussion and a figure of how researchers are stretching DNA and why this is relevant to genomic studies. The target audience of How Stuff Works is the average layperson who does not necessarily have a science degree. We worked with the writers to craft the story which is now on the website.

Papers in Refereed Journals (200 total)
https://scholar.google.com/citations?hl=en&user=qyG7UPIK1RUC

h-index 62

1. Doyle, P.S., Shaqfeh, E.S., Gast, A.P. "Dynamic Simulation of Freely Draining Flexible Polymers in Steady Linear Flows", *Journal of Fluid Mechanics*, **334**, 251-291, 1997.
2. Doyle, P.S., Shaqfeh, E.S., Gast, A.P. "Rheology of "Wet" Polymer Brushes via Brownian Dynamics Simulation: Steady vs. Oscillatory Shear", *Physical Review Letters*, **78**, 1182-1185, 1997.
3. Doyle, P.S., Shaqfeh, E.S., "Dynamic Simulation of Freely-Draining, Flexible Bead-Rod Chains: Start-Up of Extensional and Shear Flow", *Journal of Non-Newtonian Fluid Mechanics*, **76**, 43-78, 1998.
4. Doyle, P.S., Shaqfeh, E.S., McKinley, G.H., Spiegelberg, S.H., "Relaxation of Dilute Polymer Solutions Following Extensional Flow", *Journal of Non-Newtonian Fluid Mechanics*, **76**, 79-110, 1998.
5. Doyle, P.S., Shaqfeh, E.S., Gast, A.P., "Rheology of Polymer Brushes: A Brownian Dynamics Study", *Macromolecules*, **31** 5468-5474, 1998.
6. Doyle, P.S., Ladoux, B., Viovy, J.L., "Dynamics of a Tethered Polymer in Shear Flow", *Phys. Rev. Lett.*, **84**, 4769-4772, 2000.
7. Ladoux, B. and Doyle, P.S., "Stretching Tethered DNA Chains in Shear Flow", *Europhysics Lett.,* **52**, 511-517, 2000.
8. Ladoux, B., Quivy, J.P., Doyle, P.S., du Roure, O., Almouzni, G., Viovy, J.L., "Fast Kinetics of Chromatin Assembly Revealed by Single-Molecule Videomicroscopy and Scanning Force Microscopy", *PNAS*, **97**, 14251-14256, 2000.
9. Ladoux, B., Quivy, J.P., Doyle, P.S., , Almouzni, G., Viovy, J.L., "Direct imaging of single-molecules: from dynamics of single DNA chain to the study of complex DNA-protein intereactions", *Science Progress*, **84**, 267-290, 2001.
10. Doyle, P.S., Bibette, J., Bancaud, A., Viovy, J.L., "Self-Assembled Magnetic Matrices for DNA Separation in Lab on a Chip", *Science*, **295**, 2273, 2002.
11. Wagner, C., Amarouchene, Y., Doyle P., Bonn, D. "Turbulent Drag Reduction of polyelectrolyte solutions: relation with the elongational viscosity", *Europhysics Letters*, 64, 823, 2003.
12. Underhill, P.T., Doyle P.S., "On the Coarse-Graining of Polymers into Bead-Spring Chains", *Journal of Non-Newtonian Fluid Mechanics*, **122**, 3-31, 2004.
13. Randall, G.C. and Doyle, P.S. "Electrophoretic collision of a DNA molecule with an insulating post", *Phys. Rev. Lett.*, **93**(5), 058102, 2004.
14. Haghgooie, R. and Doyle, P.S. "Structural analysis of a dipole system in two-dimensional channels", *Phys. Rev. E*, **70**, 061408, 2004.
15. Doyle, P.S. and Underhill, P.T. "Brownian dynamics simulations of polymers and soft matter", In S. Yip, editor, *Handbook of Materials Modeling, volume I.* Kluwer Academic Publishers, 2619-2630, 2005.
16. Chen, Y.-L, Graham, M.D., de Pablo, J.J., Randall, G.C., Gupta, M. and Doyle, P.S. "Conformation and Dynamics of Single DNA in Parallel-Plate Slit Microchannels", *Phys. Rev. E*, **70**, 060901 (R) 2004.
17. Savin, T. and Doyle, P.S. "Static and dynamic errors in particle tracking microrheology", *Biophys. J.*, **88**, 623-638, 2005.

18. Randall, G.C. and Doyle, P.S. "DNA Deformation in Electric Fields: DNA Driven Past a Cylindrical Obstruction", *Macromolecules*, **8**, 2410-2418, 2005.
19. Savin, T. and Doyle, P.S. "Role of a finite exposure time on measuring an elastic modulus using microrheology", *Phys. Rev. E*, **71**, 041106, 2005.
20. Dendukuri, D., Tsoi, K., Hatton, T.A., and Doyle, P.S. "Controlled Synthesis of Non-Spherical Microparticles Using Microfluidics", *Langmuir*, **21**, 2113-2116, 2005.
21. Haghgooie, R. and Doyle, P.S. " Structure and dynamics of repulsive magnetorheological colloids in two-dimensional channels", *Phys. Rev. E,* 011405, **72(1)** 2005.
22. Randall, G.C. and Doyle, P.S. "Permeation Driven Flow in Silicone Microfluidic Devices", *Proc. Natl. Acad. Sci.,* **102**, 10813-18, 2005.
23. Underhill, P.T. and Doyle, P.S. "Development of bead-spring models using the constant extension ensemble", *J. Rheology*, **49**(5), 963-987, 2005.
24. Haghgooie, R., Li, C. and Doyle, P.S., "Experimental Study of Structure and Dynamics in a Monolayer of Paramagnetic Colloids Confined by Parallel Hard Walls", *Langmuir*, **22**, 3601-3605, 2006.
25. Randall, G.C., Shultz, K. and Doyle, P.S. "Methods to electrophoretically stretch DNA: microcontractions, gels, and hybrid gel-microcontraction devices", *Lab on Chip,* **6**, 516-25, 2006.
26. Dendukuri, D., Pregibon, D., Collins, J., Hatton, T.A. and Doyle ,P.S. "Continuous flow lithography for high-throughput synthesis of microparticles", *Nature Materials*, **5**, 365-369, May 2006.

Also featured in Technology Review, Nature, Analytical Chemistry, and Lab on a Chip.

27. Pregibon, D., Toner, M. and Doyle, P.S. "Magnetically- and Biologically-Active Bead-Patterned Hydrogels", *Langmuir*, **22**, 5122-5128, 2006. (**cover article**)
28. Underhill, P.T. and Doyle, P.S. "Alternative spring force law for bead-spring chain models of the worm-like chain", *J. Rheol.*, **50**(4), 513-529, 2006.
29. Kim, J.M. and Doyle, P.S. "A Brownian dynamics-finite element method for simulating DNA electrophoresis in non-homogeneous electric fields", *J. Chem. Phys.*, **125**(7), 074906, 2006.
30. Balducci, A., Mao, P., Han, J. and Doyle, P.S. "Double-Stranded DNA Diffusion in Slit-like Nanochannels", *Macromolecules*, **39**(18), 6273-6281, 2006.
31. Randall, G.C. and Doyle, P.S. "Collision of a DNA polymer with a small obstacle", *Macromolecules*, **39**(22), 7734-7745, 2006.
32. Kim, J..M. and Doyle, P.S. "Design and numerical simulation of a DNA electrophoretic stretching device", *Lab on Chip*, **7**(2), 213-225, 2007.
33. Haghgooie, R. and Doyle, P.S. "MR fluid structure in quasi-2D", *EPL*, **77**, 18002, 2007.
34. Pregibon, D., Toner, M. and Doyle, P.S. "Multi-functional Encoded Particles for High-Throughput Biomolecule Analysis", *Science*, **315**, 1393-1396, 2007.

Also feature in Nature Chemical Biology, Nature Methods, Technology Review, and the MIT Homepage

35. Dendukuri, D., Hatton, T.A., and Doyle, P.S. "Synthesis and self-assembly of amphiphilic polymeric microparticles", *Langmuir*, **23**, 4669-4674, 2007.
36. Haghgooie, R. and Doyle, P.S. "Transition from 2D to 3D behavior in the self-assembly of magnetorheological fluids confined in thin slits", *Phys. Rev. E* **75**, 061406 2007.

37. Savin, T. and Doyle, P.S. “Statistical and Sampling Issues when using Multiple Particle Tracking”, *Phys. Rev. E.* **76**, 021501, 2007.
38. Dendukuri, D., Pregibon, D., Hatton, T.A., and Doyle, P.S. "Stop-flow Lithography in a Microfluidic Device", *Lab on Chip* **7**, 818-828, 2007.
    Also featured in Chemical Technology 4, T49-56.
39. Mohan, A. and Doyle, P.S. “Unraveling of a Tethered Polymer Chain in Uniform Solvent Flow” *Macromolecules* **40**, 4301-4312, 2007
40. Hsieh, C.-C., Balducci, A. and Doyle, P.S. “An Experimental Study of DNA rotational relaxation time in nanoslits”, *Macromolecules,* **40**, 5196-5205, 2007*
41. Tang, J. and Doyle, P.S. "Electrophoretic stretching of DNA molecules using microscale T-junctions", *Appl. Phys. Lett,,* **90**, 224103, 2007.
42. Underhill, P.T. and Doyle, P.S. “Accuracy of Bead-Spring Chains in Strong Flow”, *Journal of Non-Newtonian Fluid Mechanics,* **145**, 109-123, 2007.
43. Savin, T. and Doyle, P.S. "Electrostatically-tuned rate of peptide self-assembly resolved by multiple particle tracking", *Soft Matter,* **3**, 1194-1202, 2007
44. Underhill, P.T. and Doyle, P.S. “DNA stretch during electrophoresis due to a step chain in mobility”, *Phys. Rev. E,* **76**, 011805, 2007.
45. Jang, J., Dendukuri, D., Hatton, T.A., Thomas, E.L., and Doyle, P.S., "A route to three-dimensional structures in a microfluidic device: Stop flow interference lithography", *Angew. Chem. Int. Ed.*, **46**, 1-6, 2007. (“**VIP article and cover image**”)
46. Mohan, A. and Doyle, P.S., "Stochastic modeling and simulation of DNA electrophoretic separation in a microfluidic obstacle array", *Macromolecules*, **40**, 8794-8806, 2007.
47. Kim, J.M. and Doyle, P.S., "Brownian dynamics simulation of a DNA molecule colliding with a small cylindrical post", *Macromolecules*, **40**, 9151-9163, 2007.
48. Mohan, A. and Doyle, P.S., "Effect of disorder on DNA electrophoresis in a microfluidic array of obstacles", *Phys. Rev. E*, **76**(4), 040903, 2007.
49. Balducci, A., Hsieh, C.-C. and Doyle, P.S. “Relaxation of DNA in slit-like confinement”, *Phys. Rev. Lett.*, **99**, 238102, 2007.
50. Hsieh, C.-C., Balducci, A., and Doyle, P.S., "Ionic effects on the equilibrium dynamics of DNA confined in nanoslits", *Nano Letters*, **8**, 1683-1688, 2008.
51. Panda, P., Ali, S., Lo, E., Chung, B.G., Hatton, T.A., Khademhosseini, A., and Doyle, P.S., "Stop-Flow Lithography to Generate Cell-Laden Microgel Particles", *Lab Chip*, **8**, 1056-1061, 2008.
52. Balducci, A., and Doyle, P.S., "Conformational Preconditioning by Electrophoresis of DNA through a Finite Obstacle Array", *Macromolecules*, **41**, 5485-5492, 2008.
53. Hwang, D.K., Dendukuri, D., and Doyle, P.S., "Microfluidic-based synthesis of non-spherical magnetic hydrogel particles", *Lab Chip*, **8** 1640-1647, 2008.
54. Savin, T., Spicer, P., and Doyle, P.S., "A Rational Approach to Noise Discrimination in Video Microscopy Particle Tracking", *Appl. Phys. Lett.*, **93**, 024102, 2008.
55. Hsieh, C.-C., and Doyle, P.S., "Studying Confined Polymers Using Single-Molecule DNA Experiments", *Korea-Aust. Rheol. J.*, **20**, 127-142, 2008.(**invited review**)
56. Tan, W.S., Lewis, C., Horelik, N., Pregibon, D., Doyle, P.S., and Yi, H., "Hierarchical Assembly of Viral Nanotemplates with Encoded Microparticles via Nucleic Acid Hybridization", *Langmuir*, **24**, 12483-12488, 2008.

57. Shepherd, R.F., Panda, P., Bao, Z., Sandhage, K.H., Hatton, T.A., Lewis, J.A., and Doyle, P.S., "Stop-flow lithography of colloidal, glass, and silicon microcomponents", *Advanced Materials*, **20** 4734-4739, 2008. (**cover article**).
58. Dendukuri, D., Panda, P., Haghgooie, R., Kim, J.M., Hatton, T.A., and Doyle, P.S., "Modeling of Oxygen-Inhibited Free Radical Photopolymerization in a PDMS Microfluidic Device", *Macromolecules*, **41** (22), pp 8547–8556, 2008.
59. Im, S.G., Bong, K.W, Kim, B.-S., Baxamusa, S., Hammond, P., Doyle, P.S., and Gleason, K., "Patterning Nanodomains with Orthogonal Functionalities: Solventless Synthesis of Self-Sorting Surfaces", *JACS*, **130**, 14424-14425, 2008.
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61. Im, S.G., Bong, K.W, Lee, C.-H., Doyle, P.S., and Gleason, K., "A Conformal Nano-adhesive via Initiated Chemical Vapor Deposition for Microfluidic Devices", *Lab Chip*, **9**, 411-416, 2009.
62. Trahan, D.W. and Doyle, P.S., "Simulation of electrophoretic stretching of DNA in a microcontraction using an obstacle array for conformational preconditioning", *Biomicrofluidics*, **3**, 012803, 2009.
63. Attia, R., Pregibon, D.C., Doyle, P.S., Viovy, J.-L., and Bartolo, D., "Soft microflow sensors", *Lab Chip*, **9**, 1213-1218, 2009.
64. Hwang, D.K., Oakey, J., Toner, M., Arthur, J., Anseth, K., Lee, S., Zeiger, A., Van Vliet, K., and Doyle, P.S., "Stop-Flow Lithography for the Production of Shape-Evolving Degradable Microgel Particles", *JACS,* **131**, 4499-4504, 2009.
65. Bong, K.W., Pregibon, D.C., and Doyle, P.S., "Lock release lithography for 3D and composite microparticles", *Lab Chip*, **9**, 863-866, 2009. Featured in *Chemical Technology* and the *Lab on Chip.* (**Lab on Chip "Hot Article" and cover image**)
66. Panda, P., Yuet, K.P., Hatton, T.A., and Doyle, P.S., "Tuning Curvature in Flow Lithography: A New Class of Concave/Convex Particles", *Langmuir*, **25**, 5986-5992, 2009.
67. Haghgooie, R., and Doyle, P.S., "Directed self-assembly of field-responsive fluids in confined geometries", *Soft Matter*, **5**, 1192-1197, 2009.
68. Pregibon, D.C., and Doyle, P.S., "Optimization of Encoded Hydrogel Particles for Nucleic Acid Quantification", *Anal. Chem.*, **81**, 4873-4881, 2009.
69. Dendukuri, D., and Doyle, P.S., "The Synthesis and Assembly of Polymeric Microparticles Using Microfluidics", *Advanced Materials*, **21**, 1-16, 2009. (**invited review**)
70. Chapin, S., Pregibon, D.C., and Doyle, P.S., "High-throughput flow alignment of barcoded hydrogel microparticles", *Lab Chip*, **9**, 3100-3109, 2009.
71. Panda, P., Yuet, K.P., Dendukuri, D., Hatton, T.A., and Doyle, P.S., "Temporal Response of an Initially Deflected PDMS Channel", *New J. Phys.*, **11**, 115001, 2009. ** (**invited article**)
72. Haghgooie, R., Toner, M., and Doyle, P.S., "Squishy non-spherical hydrogel microparticles", *Macromol. Rapid Commun.*, **31**, 128-134, 2010. **(**invited article**)
73. Bong, K.W., Bong, K.T., Pregibon, D.C., and Doyle, P.S., "Hydrodynamic Focusing Lithography", *Angew. Chem. Int. Ed.*, **49**, 87-90, 2010.
74. Yuet, K.P., Hwang, D.K., Haghgooie, R., and Doyle, P.S., "Multifunctional Superparamagnetic Janus Particles", *Langmuir*, **26**, 4281-4287, 2010.

75. Bong, K.W., and Chapin, S., Doyle, P.S., "Magnetic Barcoded Hydrogel Microparticles for Multiplexed Detection", *Langmuir*, **26**, 8008-8014, 2010.
76. Tang, J., Trahan, D.W., and Doyle, P.S., "Coil-Stretch Transition of DNA Molecules in Slitlike Confinement", *Macromolecules*, **43**, 3081-3089, 2010.
77. Trahan, D.W., and Doyle, P.S., "DNA collisions with a large, conducting post", *Macromolecules*, **43**, 5424-5432, 2010.
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79. Tang, J., Levy, S., Trahan, D., Jones, J., Craighead, H., and Doyle, P.S., "Revisiting the Conformational Dynamics of DNA in Slitlike Confinement", *Macromolecules*, **43**, 7368-7377, 2010.
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81. Bong, K.W., Chapin, S., Pregibon, D.C., Baah, D., Floyd-Smith, T.M., and Doyle, P.S., "Compressed-air flow control system", *Lab Chip*, **11**, 743-747, 2011.
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83. Chapin, S., Appleyard, D., Pregibon, D.C. and Doyle, P.S. "Rapid miRNA profiling with post-hybridization labeling on encoded gel particles" *Angew. Chem. Int. Ed.*, **50**, 2289-2293, 2011.
84. Trahan, D. and Doyle, P.S., "Simulating relaxation of stretched DNA in slitlike confinement", *in press Macromolecules,* **44**, 382-392, 2011..
85. Appleyard, D., Chapin, S., and Doyle, P.S. "Multiplexed protein quantification with barcoded hydrogel microparticles", *Anal. Chem.*, **83**, 193-199, 2010..
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fabricating ceramic and cell-laden microparticles," MicroTAS Proceedings, San Diego, CA, October 2008.

8. Haghgooie, R., Toner, M. and Doyle, P.S., "Microfluidics synthesis of squishy bio-mimetic particles with tunable deformability," MicroTAS Proceedings, San Diego, CA, October 2008.
9. Bong, K.W., Pregibon, D. and Doyle, P.S. "Lock Release Lithography for 3D and Composite Microparticles," MicroTAS Proceedings, Cheju, Korea October 2009.
10. Bong, K.W., Bong, K.T., Pregibon, D. and Doyle, P.S. "Using Structured Microflows to Synthesize Functional Particles," MicroTAS Proceedings, Groningen, Netherlands October 2010.
11. Chapin, S.C., Appleyard, D.C., Pregibon, D.C. and Doyle, P.S. "Rapid and Sensitive MicroRNA Profiling using Encoded Gel Particles," MicroTAS Proceedings, Groningen, The Netherlands October 2010.
12. K.W. Bong and P.S Doyle, "Flow Lithography in Gas Imperable Channels", MicroTAS Proceedings, Seattle, October 2011.
13. Chapin, S., Pregibon, D.C., Appleyard, D. and Doyle, P.S. "Ultrasensitive Detection of miRNA" MicroTAS Proceedings, Seattle, October 2011.
14. Barikbin, Z., Rahman, T., Jarde, D., Doyle, P.S. and Kahn, S. "Microfluidic Fabrication of Polymerized ionic Liquid Microgels" MicroTAS Proceedings, Okinawa, October 2012.
15. Srinivas, R. and Doyle, P.S., "Encoded Gel Particle Array for Rapid, Mutliplexed Protein Detection in Complex Media", MicroTAS Proceedings, Okinawa, October 2012.
16. J. Lee, P.W. Bisso, R.L. Srinivas, J.J. Kim, A.J. Swiston, and P.S. Doyle, "A Universal Particle Encoding Architecture" MicroTAS Proceedings, Freiburg, Germany, October 2013.
17. Srinivas, R.L., Johnson, S.D., and P.S. Doyle, "Oil-Isolated Hydrogel Microstructures for Sensitive Bioassays" MicroTAS Proceedings, Freiburg, Germany, October 2013.

Invited Lectures

1. August 1995, "Stochastic Simulation of Polymers", NATO Advanced Study Institute: Solvents and Self-Organization of Polymers, Antayla, Turkey.
2. December 1997, "A Molecular Understanding of Polymer Rheology", Department of Chemical Engineering, University of Pennsylvania, PA.
3. April 1998, "Simulations of Flexible Polymer Molecules: a Molecular Understanding of Anomalous Rheology", Laboratoire Physico-Chimie, Institut Curie, Paris, France.
4. June 1998, "Brownian Dynamic Simulations of Bead-Rod Chains During Start-Up of Extensional Flow and Relaxation", IUTAM Symposium on Viscoelastic Mechanics, Stanford, CA.
5. October 1998, "Stochastic Simulations of Flexible Polymer Molecules: a Molecular Understanding of Anomalous Rheology", Center for Systems Engineering and Applied Mechanics, Catholic University of Louvain, Belgium.
6. December 1999, "Single Molecule Studies of the Physics of DNA Molecules", Laboratoire Physico-Chimie, Institute Curie, Paris, France.
7. March 2000, "Single Molecule Dynamics in Flow", University of Marne-la-Vallée, Material Sciences Department, Marne-la-Vallée, France.

8. March 2001, “Dynamics of Single DNA Molecules in Confined Geometries and Electric Fields”, Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA.
9. May 2001, “Biofluidics in Lab-on-Chip Devices”, MIT/G.E. Nanotechnology Conference, Massachusetts Institute of Technology, Cambridge, MA.
10. May 2001, “Biopolymer Dynamics”, DuPont Experimental Station, Wilmington, DE.
11. June 2001, “Magnetosensitive Arrays for DNA Separations”, MipTech ICAR Lab Auttomation Meeting, Basel, Switzerland.
12. August 2001, “Magnetosensitive Arrays for DNA Separations”, SmallTalk Meeting, San Diego, CA.
13. August 2001, “DNA Dynamics in Fields and Flows”, Squishy Physics Talks (sponsored by Dave Weitz), Harvard University, Cambridge, MA.
14. September 2001, “Single Molecule DNA Dynamics in Microfluidic Devices”, Physics Department, Brandeis University, Waltham, MA.
15. October 2001, “Single Molecule DNA Dynamics in Microfluidic Devices”, Physics Department, University of MA, Amherst, MA.
16. December 2001, “Single Molecule DNA Dynamics in Microfluidic Devices”, MIT-MEMS Lunch Talks, MIT, Cambridge, MA.
17. February 2002, “Single Molecule DNA Dynamics in Microfluidic Devices”, General Electric-CRD, Niskayuna, NY.
18. March 2002, “Microfluidic Devices to Manipulate DNA Molecules”, 2002 MIT Engineering Conference: MEMS, Massachusetts Institute of Technology, Cambridge, MA.
19. May 2002, “Dynamics of Single Polymers and Biomolecules Under Forces and Fields", PPST Polymer Seminar Series, Massachusetts Institute of Technology, Cambridge, MA.
20. June 2002, “Single DNA Dynamics”, Mass General Hospital, Boston, MA.
21. September 2002, “DNA Dynamics in Microfluidic Devices”, New England Complex Fluids Meeting, Waltham, MA.
22. October 2002 “Dynamics of DNA/Obstacle Collisions” Tufts Chemical Engineering Department, Sommerville, MA.
23. February 2003, “Self-Assembling Colloids and DNA Dynamics in Microfluidic Devices” Lab Automation Conference, Palm Springs, CA.
24. August 2003, “Micromechanics of Self-Assembling Peptides” DuPont, Wilmington, DE.
25. October 2003, “Dynamics of Complex Liquids in Microfluidic Devices” 3M Research Talk, Minneapolis, MN.
26. October 2003, “Dynamics of Complex Liquids in Microfluidic Devices” University of Connecticut Chemical Engineering Department Seminar, Storrs, CT.
27. February 2004, “Dynamics of Complex Liquids in Microfluidic Devices” University of Washington Chemical Engineering Department Seminar, Seattle, WA.
28. May 2004, “Nonequilibrium Dynamics of Biopolymers” Shriners Hospital, Boston, MA.
29. June 2004, “DNA Chain Dynamics in Electric Fields” Biophysics Lab Seminar, Paris 7, Paris, France.
30. September 2004, “Dynamics of Complex Liquids in Microfluidic Devices” University of Pennsylvania, Philadelphia, PA.
31. September 2004, “DNA Chain Dynamics in Electric Fields” MIT Condensed Matter Physics Seminar, Cambridge, MA.

32. December 2004, “Manipulation of Biological Entities with Magnetic Fluids and Fields” N.S.F. NSE Conference, Washington, D.C.
33. February 2005, “Stretching DNA with Electric Fields” U.S. Genomics, Waltham, MA.
34. February 2005, “Dynamics of Complex Fluids in Microfluidic Devices” RPI Department of Chemical and Biological Engineering, Troy NY.
35. March 2005, “Dynamics of Complex Fluids in Microfluidic Devices” MIT Department of Chemical Engineering, Cambridge, MA.
36. September 2005, “Dynamics of Complex Fluids in Microfluidic Devices” Johns Hopkins University Department of Chemical and Biological Engineering, Baltimore, MD.
37. September 2005, “Electrophoretic Stretching of DNA” U.S. Genomics, Waltham, MA.
38. September 2005, “Dynamics of Complex Fluids in Microfluidic Devices” Applied Biosystems, Foster City, CA.

    September 2005, “Permeation Driven Flows in PDMS Microfluidic Devices” New England Complex Fluids Meeting, Waltham, MA.
39. November 2005, “Dynamics of Complex Fluids in Microfluidic Devices” Stanford University Department of Chemical Engineering, Stanford, CA.
40. March 2006, “Electrophoresis of DNA in small channels”, ACS session on Complex Fluids in Confined Geometries, Atlanta, GA.
41. March 2006, “Structure and dynamics of MR colloids in microfluidic devices”, ACS session in honor of Alice Gast, Atlanta, GA.
42. May 2006, “**Colburn Lecture**: Microfluidics: An Enabling Tool to Study Soft Matter”, University of Delaware, Department of Chemical Engineering, Newark, DE.
43. September 2006, “Microfluidics: An Enabling Tool to Study Soft Matter”, Tufts University, Department of Chemical Engineering, Medford, MA.
44. September 2006, “Microfluidics: An Enabling Tool to Study Soft Matter”, Proctor and Gamble Complex Fluids Group, Cincinnati OH.
45. September 2006, “**Thiele Lecture**: Microfluidics: An Enabling Tool to Study Soft Matter”, University of Notre Dame Department of Chemical Engineering, Notre Dame, IN.
46. September 2006, “Microfluidics: An Enabling Tool to Study Soft Matter”, University of Massachusetts Polymer Science and Engineering Department, Amherst MA.
47. November 2006, “Microfluidics: An Enabling Tool to Study Soft Matter”, University of Wisconsin Department of Chemical Engineering, Madison, WI.
48. November 2006, “Microfluidics: An Enabling Tool to Study Soft Matter”, UC Santa Barbara Department of Chemical Engineering, Santa Barbara, CA.
49. February 2007, “Probing DNA using Microfluidics”, Center for Environmental Health Sciences, MIT, Cambridge, MA.
50. June 2007, “Microfluidics: An Enabling Tool to Create Complex Materials”, Kodak “Unconventional Jetting Technologies” lecture series, Rochester, NY.
51. July 2007, “Microfluidics to Create Complex Microparticles”, Agilent Technologies, Santa Clara, CA.
52. August 2007, “Microfluidics to Create Complex Microparticles”, Luminex Corp., Austin, TX.
53. September 2007, “Microfluidics: An Enabling Tool to Study Soft Matter”, Cornell University Department of Chemical Engineering, Ithica, NY.

54. September 2007, “Microfluidics: An Enabling Tool to Study Soft Matter”, U. Michigan Department of Chemical Engineering, Ann Arbor MI.
55. October 2007, “Barcoded Microparticles for Multiplexed Biomolecule Detection”, Plenary Speaker at the Alliance for the Prudent Use of Antibiotics conference, Boston, MA.
56. November 2007, “Using Microfluidics to Create Complex Microparticles”, Harvard University Squishy Physics Series, Cambridge, MA.
57. January 2008, “DNA Simulations in Magnetic Post Arrays”, The Role of Structure in Biological, Chemical and Environmental Separations: From the Molecular to the Macro, Costa Rica
58. May 2008, “Dynamics of Confined DNA”, **Keynote speaker**, International Symposium on Applied Rehology, Seoul, South Korea.
59. June 2008, “Studying Confined Polymers using Single DNA-Molecules”, U.S. Genomics, Waltham, MA.
60. July 2008, “Barcoded Microparticles for Multiplexed Biomolecule Detection”, Novartis Research Center, Cambridge, MA.
61. October 2008, “Studying Confined Polymers using Single DNA-Molecules”, **RPI Van Ness Lectures**, Troy, NY.
62. October 2008, “Stop Flow Lithography to Create Functional Anisotropic Microparticles” **RPI Van Ness Lectures**, Troy, NY.
63. December 2008, “Stop Flow Lithography to Create Functional Anisotropic Microparticles” MRS Fall Meeting, Boston MA.
64. January 2009, “Creating Soft Functional Colloids using Microfluidics Devices”, National University of Singapore, Chemical Engineering Department Seminar, Singapore.
65. March 2009, Stop Flow Lithography to Create Functional Materials, MRS meeting, San Francisco.
66. April 2009, Creating Soft Functional Colloids using Microfluidics Devices, University of Paris 7, Laboratoire MSC (Matière et Systèmes Complexes) Department Seminar, Paris, France.
67. May 2009, Creating Soft Functional Colloids using Microfluidics Devices, Journees du GDR Micro and Nano Fluidique, Bordeaux, France.
68. June 2009, Stratis V. Sotirchos Memorial Lectureship, Patras, Greece.
69. July 2009, Creating Soft Functional Colloids using Microfluidics Devices, Laboratoire d'Analyse et d'Architecture des Systèmes <http://www.laas.fr/>Department Seminar,Toulouse France.
70. Oct. 2009, DNA Dynamics in Confinement, Institute Curie, Paris, France.
71. Oct. 2009, Microfluidic Technologies to Create Functional Materials, Institute Curie, Paris, France.
72. Oct. 2009, Microfluidic Technologies to Create Functional Materials, ESPCI, Gulliver Group, Paris, France.
73. Nov. 2009, DNA Dynamics in Confinement, Genomic Vision Inc., Paris, France.
74. Nov. 2009, DNA Dynamics in Confinement, ESPCI, Gulliver Theory Talk, Paris, France.
75. Nov. 2009, Studying Soft Matter with Microfluidics, Institute Curie- Orsay, Orsay France.
76. Oct. 2009, DNA Dynamics in Confinement, Twente BIOS Group, Netherlands.
77. Dec. 2009, Microfluidic Technologies to Create Functional Materials, Katholic Leuven University, Chemical Engineering Seminar.

78. Dec. 2009, DNA in Confinement and Electric Fields, IMA Workshop on Complex Fluids, Minneapolis.
79. Dec. 2009, Microfluidic Technologies to Create Functional Materials, ESPCI, PMMH group Cafe Talk, Paris, France.
80. Dec. 2009, Microfluidic Technologies to Create Functional Materials, Mini-Symposium: Microfluidics for Physics Chemistry and Biology, Paris.
81. Feb. 2010, Microfluidic Technologies to Create Functional Materials, Colloids and Polyelectrolytes Gordon Conference, Ventura, CA.
82. Feb. 2010, , Stop Flow Lithography for Multiplexed Diagnostics, Ragon Insitute, Charlestown, MA.
83. April 2010, Barcoded Particles for Multiplexed Assays, MRS meeting, San Francisco.
84. April 2010, Microfluidic Technologies to Create Functional Materials, University of Minnesota Chemical Engineering Department Seminar, Minneapolis, MN.
85. June 2010, "Micromechanics Training at MIT", NIH NIBIB Training Grant Symposium, Bathesda MD.
86. August 2010, "Dynamic of DNA in Slit-like Channels and Electric Fields", **Keynote speaker,** 5th Annual Pacific Rim Conference on Rheology, Sapporo, Japan.
87. August 2010, "Stop Flow Lithography to Produce Complex Microparticles", **Keynote speaker**, International Workshop on Colloids and Interface, KAIST, Daejon, South Korea.
88. August, 2010, "Microfluidics as a Tool in to Study Complex Fluids", Department Seminar, Seoul National University, Seoul, South Korea.
89. October, 2010, "Microfluidics as a Tool in to Study Complex Fluids", Department Seminar, University of Tennessee.
90. October, 2010, "Microfluidics as a Tool in to Study Complex Fluids", **Keynote speaker**, Annual Symposium of the Macromolecular Science and Engineering Center, University of Michigan.
91. October, 2010, "DNA Dynamics in Nanoconfinement", **Plenary Lecture**, New England Section of APS Annual Meeting, Brown University.
92. November 2010, "Applications of Encoded Gel Particles in Bionsensing", **Plenary Lecture,** Nanobiotechnology Session at the annual AIChE meeting, Salt Lake City, UT.
93. February 2011, "DNA Nanophysics", Soft Matter Days, Physics Department, NUS, Singapore.
94. Feb 2011, "Stop Flow Lithography and Barcoded Particles", Achira Labs, Bangalore, India.
95. April 2011, "Flow Lithography to Produce Functional Particles: *Barcoded Microgels*", **Plenary Talk**, MRS Spring Meeting, San Francisco, CA.
96. April 2011, "Flow Lithographic Methods to Create Biomimetic Particles", **Plenary Talk**, MRS Spring Meeting, San Francisco, CA.
97. April 2011, "DNA Polymer Dynamics in Confinement", Department Seminar, Institute of Physics, Academia Sinica, Taiwan.
98. April 2011, "Engineering and Applications of Complex Microparticles using Microfluidic Devices", ChE Department Seminar, National Taiwan University, Taiwan.
99. May 2011, "Engineering and Applications of Complex Microparticles using Microfluidic Devices", Department Seminar, NTU, Singapore.
100. June 2011, "Using microfluidics to produce functional microgel particles", Gordon

Research Conference, Waterville Valley, NH.

101. June 2011, “SFL to Produce Functional Microparticles”, Sanofi-Aventis Conference, MIT.

102. July 2011, “Hydrogel Lithography”, CBM/Novartis Biologics, MIT.

103. September 2011, “Using microfluidics to produce functional microgel particles”, ChE Department Seminar, GA Tech.

104. November 2011, “DNA Polymer Dynamics in Confinement”, Soft Matter Group Seminar, ETH, Zurich.

105. November 2011, “Using microfluidics to produce functional microgel particles”, **Plenary Talk**, Nanobiotech Conference, Montreux, Switzerland.

106. February 2012, “Using microfluidics to produce functional microgel particles”, **Keynote Talk,** Asian Pacific Confederation of Chemical Engineering Conference, Singapore.

107. July 2012, “Experimental Microrheology *some history, our contributions and recent interests”*, **Keynote Talk and Soft Matter Lectureship talk #1**, International Congress on Rheology, Porto, Portugal.

108. March 2012, “Synthesis and Applications of Complex Microparticles using Microfluidic Devices”, MIT Chemical Engineering department seminar.

109. October 2012, “Collective motion and assembly of particles flowing in quasi-2D microchannels”, Invited talk in Area 1J (Fluid Mechanics), AIChE Annual meeting, Pittsburgh, PA.

110. November 2012, “Encoded microgel particles for bioassays”, **Keynote Talk and Soft Matter Lectureship talk #2**, MRS Fall meeting.

111. February 2013, ILP-Colgate Meeting, MIT, “Structuring soft matter”.

112. March 2013 “Synthesis and Applications of Complex Particles using Microfluidics”, U. Wisconsin, ChE Department Seminar.

113. March 2013, “Synthesis and Applications of Complex Particles using Microfluidics”, Princeton University, ChE Department Seminar.

114. April 2013, “Soft nanoemulsion composites: synthesis, assembly, and applications“,**Soft Matter Lectureship talk #3,** ACS Annual Meeting.

115. May 2013, “DNA in tight spaces”, Brookhaven National Lab.

116. August 2013, “DNA Dynamics in tight spaces” **Keynote speaker,** Asian Chemical Congress, Singapore.

117. November, 2013 “Flow Lithography to Create Encoded Particles”, AIChE Annual Meeting.

118. November 2013, “Dynamics of DNA in Tight Spaces”, **Keynote speaker**, *International Symposium on Single Biomolecule Analysis*, Kyoto Japan.

119. December 2013, “Encoded Particles”, Boston University Photonics Center Annual Symposium.

120. December 2013 “Combing Flow and Lithography to Create Functional Particles, GDR – France Microfluidics Symposium, Bordeaux, France.

121. December 2013 “Applications of Encoded Particles”, Institute Curie, Paris,

122. December 2013, “Collective Hydrodynamics of Microparticles in Quasi-2D Microchannels”,ESPCI, Paris, France.

123. December 2013, ”Flow Lithography to Create Novel Gel Particles”, ARL, Aberdeen MD.

124. March 2014, “Dynamics of Large DNA in Nanoslits”, APS March Meeting (invited talk), Denver, CO.

125. March 2014, “Controlling Light and Microflows to Create Functional Particles”, **HKUST Distinguished Seminar,** Institute of Advanced Study, Hong Kong.

126. April 2014, “Microfluidic Technologies to Create Complex Microparticles”, Chemistry Department Seminar, Hong Kong University, Hong Kong.

127. April 2014, “Flow Lithography to Create Encoded Particles”, MESA+ Seminar, Twente, Netherlands.

128. April 2014, “Flow Lithography to Create Encoded Particles”, MRS Meeting (invited talk), San Francisco, CA.

129. June 2014, “Microfluidic Manipulation of Soft Matter”, Schlumberger, Cambridge, MA.

130. October 2014, “Applications of Barcoded Particles”, Defense Threat Reduction Agency, Fort Belvoir, VA.

131. September 2015, “Controlling Light and Microflows to Create Encoded Particles” **Plenary Lecture** at the ECIS: European Colloid and Interface Society, Bordeaux, France.

132. May 2015, “Controlling Light and Microflows to Create Encoded Particles” Instrumentation Laboratories, Bedford, MA.

133. August 2015, “Controlling Light and Microflows to Create Encoded Particles” **Keynote Talk**, Microfluidics Gordon Research Seminar, West Dover, CT.

134. November 2015, “Controlling Light and Microflows to Create Encoded Particles” SUNY Chemistry Department Seminar, Albany, NY.

135. November 2015, “Hydrogel Modules for Sensitive Bioassays” **Keynote Talk** at AICHE Annual Meeting, Salt Lake City, UT.

136. December 2015, “Microfluidic Approaches to Create Functional Gel Particles” TOSOH Corporation, MIT.

137. March 2016, PittCon, Atlanta , “Engineering Hydrogels for Sensitive microRNA Assays”.

138. April 2016, L’Oreal, visit to MIT, “Microparticle, Gels and Nanoemulsions”.

139. May 2016, Merck, Boston, “Nanoemulsions to Formulate Drugs”.

140. June 2016, L’Oreal, NJ, “Structuring Soft Matter”.

141. August 2016, India Institute of Science, Bangalore, “Microfluidic Particle Factories”.

142. August 2016, CREATE, Singapore, “Microfluidic Particle Factories”.

143. September 2016, MESA+, Twente, “Microfluidic Particle Factories”.

144. December 2016, SUTD, Distinguished Lecture Series, Singapore, “Particle Factories”.

145. March 2017, Berkeley, Bioengineering Department Seminar, “Microfluidic Particle Factories”.

146. May 2017, Ontario on a Chip – **Plenary Talk**, Toronto, “Microfluidic Particle Factories”.

147. July 2017, Flow 17 (**Keynote Talk**), Bioengineering Department Seminar, “Microfluidic Particle Factories”.

148. Sep. 2017, Gore, “Soft Matter Applications of Nanoemulsions”.

149. Dec. 2017, MRS Boston Conference, “Soft Matter Applications of Nanoemulsions”.

150. January 2018, Merck, “Formulating APIs with Hydrogels”.

151. March 2018, APS March meeting, Los Angeles CA, “Knots in Confinement”.

152. March 2018, International Symposium on Polyelectrolytes, Singapore, “DNA Knot Dynamics”.

153. April 2018, Stanford Chemical Engineering Department Seminar, “Microfluidic Technologies to Engineer Soft Matter Materials”.

154. June 2018, Leo Pharma, “Profiling miRNA in Microwells”.

155. June 2018, ACS Colloids Meeting, **Keynote Talk**, Penn State, “Microfluidic Particle Factories: 2 Startups Spun out of the Lab”.

156. October 2018, Vanderbilt Chemical Engineering Department Seminar, “Microfluidic Particle Factories”.

Student Theses

Bachelor's Theses

1. Kim Tsoi, “Capturing non-Equilibrium Colloidal Morphologies in a Microchannel”, Senior Thesis May 2004.
2. Kelly Schultz “Tethered DNA in Microchannels”, Full-time Research Co-op Student from Northeastern Student for Spring/Summer 2005.
3. Steve Maltas “Microfluidic Generation of Gel Particles”, Senior Thesis, May 2006
4. Kai Yuet “Microfluidics to Generate Magnetic Particles”, Senior Thesis, May 2009.
5. Isabelle Adrianssens (visiting student from ESPCI) “Assembly of Janus Magnetic Particles”, Senior Thesis, Aug 2010.

Master's Theses

1. Malancha Gupta “Sphere and Polymer Diffusion in Confinement”, November 2004.

Past Doctoral Students

1. Randall, Greg,"Single Molecule Analysis of DNA Electrophoresis Microdevices" 2006.
2. Haghgooie, Ramin, “Structure and Dynamics of Magnetorheological Fluids Confined in Microfluidic Devices”, 2006.
3. Savin, Thierry, “Multiple Particle Tracking to Assess the Microstructure of Biological Fluids”, 2006.
4. Underhill, Patrick, “Systematic development of coarse-grained polymer models”, 2006.
5. Dendukuri, Dhananjay, "Fabrication of Magnetic Colloids using Microfluidics," 2007 (co-supervised with Prof. Alan Hatton)
6. Mohan, Aruna, "Polymer Transport at Low Re Near Surfaces 2007. (co-supervised with Prof. Howard Brenner)
7. Hu, Yuhua, “pH Sensitive Inverse Opal Hydrogels for Gene Delivery”, 2007. (co-supervised with Darrell Irvine)
8. Balducci, Anthony, "Single DNA Dynamics in Magnetic Arrays," 2008.
9. Pregibon, Daniel, "Cell Separation using Magnetic Arrays," 2008.
10. Trahan, Daniel, “FEM/BD Simulations of DNA in Complex Electric Fields,” 2010.
11. Tang, Jing, “Electrophoretic Stretching of Single DNA Molecules,” 2010.
12. Rich, Jason, “Rheology of Clay/MR Fluid Suspensions,” 2011. (co-supervised with Gareth McKinley)
13. Panda, Priyadarshi, “Self-Assembly of Custom Colloids,” 2011. (co-supervised with Prof. Alan Hatton)
14. Kyung, Su “Structured Magnetic Colloids,” 2011. (co-supervised with Prof. Alan Hatton)

15. Bong, Ki Wan, “Advanced Flow Lithography”, 2012.
16. Chapin, Stephen, “Barcoded Particles for Diagnostics”, 2012.
17. Uspal, William, “Microparticle Flow and Assembly in Microchannels”, 2013.
18. An, Harry, “Soft Colloids”, 2014.
19. Srinivas, Rathi, “Barcoded Particles for Multiplexed Assays”, 2015.
20. Ben Renner, “Dynamics and Rheology of Entangled DNA”, 2015.
21. Birjiniuk, Alona, “Biofilm Mechanics”, 2015.
22. Ankur Gupta (joint with Alan Hatton), “Nanoemulsion in EOR”, June 2017.
23. Hyundo Lee “Rock on a Chip Microfluidic Devices”, June 2017.
24. Jae Jung Kim, “Advanced SFL”, June 2017.

Current Doctoral Students

1. Lynna Chen, “Soft, Cell-like Microparticles”, expected June 2018.
2. Li-Chiun Chen, “Dual Assembling Nanoemulsions”, expected June 2019.
3. Sarah Shapiro, “Point of Care miRNA Detection”, expected June 2019.

Previous Postdocs

1.	Ramin Haghgooie	Director of Engineering	MGH Center for Technology
2.	Chih-Chen Hsieh	Assistant Professor	University of Taiwan
3.	Dae Kun Hwang	Assistant Professor	University of Saskatchewan, Canada
4.	Ju Min Kim	Associate Professor	Anjou University, South Korea
5.	Daniel Pregibon	CTO/Co-Founder	Firefly Bioworks Inc.
6.	David Appleyard	Systems Engineer	ABS Global
7.	Matt Helgeson	Assistant Professor	UC Santa Barbara
8.	Foram Thakkar	Computational Engineer	Shell India
9.	Nakwon Choi	Senior Research Scientist	KAIST, South Korea
10.	Jungwook Kim	Assistant Professor	Sogang University, South Korea
11.	Ning Du	Patent Inspector	Singapore Patent Office
12.	Jiseok Lee	Assistant Professor	UNIST, South Korea
13.	Hyewon Lee	Research Scientist	KISTEP, South Korea
14.	H. Burak Eral	Assistant Professor	Delft University
15.	Xinghua Zhang		
16.	Gaelle Legoff		
17.	Seung Goo Lee		

18. Lilian Hsiao
19. Doug Godrin
20. Junyong Park

Current Postdocs
1. Liang Dai
2. Binu Kundukad
3. Abu Zayed Md Badruddoza
4. Augusto Tentori
5. Meysam Hashemnejad
6. Pravien Parthiban

Courses Taught

10.50 Analysis of Transport Phenomena (graduate level), Spring 2001, Fall 2002-2008

10.971 Seminar in Fluid Mechanics and Transport Phenomena (graduate level), Spring & Fall 2000-present

10.537 Molecular, Cellular and Tissue Mechanics (graduate level), Spring 2002, 2003, 2005, 2007

10.22 Molecular Engineering (undergraduate level), Spring 2004, 2006

10.301 Fluid Mechanics (undergraduate level), Spring 2008, 2012, 2013, 2014, 2016

10.26.29 Chemical/Biological Engineering Projects Laboratory (undergraduate level), Spring 2010, Spring 2015

10.492 Integrated Chemical Engineering: Applied Microfluidics (undergraduate level), Fall 2010-2012

10.S95 / 10.677 Applied Microfluidics (graduate level), Fall 2013, Fall 2014, Fall 2017, Fall 2018