

CURRICULUM VITAE

Ankur Gupta

Postdoctoral Research Associate

Department of Mechanical and Aerospace Engineering, Princeton University

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<https://scholar.princeton.edu/ankurg>

Professional Experience & Education

- Spring 2021 onwards Tenure-Track Assistant Professor, Chemical and Biological Engineering Department
University of Colorado, Boulder
Principal Investigator: Laboratory of Interfaces, Flow and Electrokinetics (LIFE)
- 2017-present Postdoctoral Research Associate, Mechanical and Aerospace Engineering
Princeton University
Adviser: Prof. Howard. A. Stone
Research area: Electrokinetics, energy storage, wetting on textured surfaces
- 2012-17 PhD, Chemical Engineering
Massachusetts Institute of Technology (MIT)
Advisers: Prof. Patrick S. Doyle and Prof. T. Alan Hatton
Research area: Nanoemulsions, microscale flows, soft matter
- 2012-14 M.S., Chemical Engineering Practice
Massachusetts Institute of Technology (MIT)
- 2008-12 B.Tech, Chemical Engineering
Indian Institute of Technology (IIT) Delhi
Adviser: Prof. Shantanu Roy
Awarded with the prestigious Presidents' Gold Medal for securing highest GPA across all majors in the graduating class of 2012

Selected Awards & Honors

- 2018 Publons Peer-review Award for placing in top 1% of reviewers
- 2016-17 Hugh Hampton Young Fellow, MIT
- 2017 Individual Citation Award for Teaching and Outreach, MIT
- 2016 Dow Travel Award, 2016 Annual AIChE Meeting
- 2014 Student-Member Travel Grant, 86th Annual SOR Meeting
- 2012 Presidents' Gold Medal, highest GPA across all majors in the graduating class of 2012, IIT Delhi
- 2012 Kalpana Chawla Scholarship for contributions to research, IIT Delhi
- 2008 Selected among top 35 students for Indian National Physics Olympiad

Publications

[link to google scholar profile](#)

* denotes equal contribution

21. **A. Gupta**, P. J. Zuk, H.A. Stone
Charging dynamics of overlapping double layers in a cylindrical nanopore under review
20. **A. Gupta**, S. Shim, H.A. Stone
Diffusiophoresis: From dilute to concentrated electrolytes accepted, Soft Matter, 2020, <https://doi.org/10.1039/D0SM00899K>

19. **A. Gupta**
Nanoemulsions, invited book chapter in *Nanoparticles for Biomedical Applications: Fundamental Concepts, Biological Interactions and Clinical Applications*
 edited by Eun Ji Chung, Lorraine Leon and Carlos Rinaldi, Elsevier publication
18. J.L. Wilson, S. Shim, E. Yu, **A. Gupta**, H.A. Stone
Diffusiophoresis in Multivalent Electrolytes
 Langmuir, 36, 7014, 2020,
17. **A. Gupta**, S. Shim, L. Issah, C. McKenzie, H.A. Stone
Diffusion of multiple electrolytes cannot be treated independently: Model predictions with experimental validation
 Soft Matter, 15, 9965, 2019
16. Y. Liu, B. Rallabandi, L. Zhu, **A. Gupta**, H.A. Stone
Pattern formation in oil-in-water emulsions exposed to a salt gradient
 Physical Review Fluids, 4, 084307, 2019 [[link](#)]
15. **A. Gupta**, B. Rallabandi, H.A. Stone
Diffusiophoretic and Diffusioosmotic Velocities for Mixtures of Valence-asymmetric Electrolytes
 Physical Review Fluids, 4, 043702, 2019 [[link](#)]
14. K. Singh, **A. Gupta**, A. Buchner, F. Ibis, J.W. Pronk, D. Tam, H.B. Eral
A Low-cost Centrifugal Homogenizer for Emulsification & Mechanical Cell Lysis
 Journal of Colloidal and Interface Science, 547, 127, 2019 [[link](#)]
13. **A. Gupta**, H. A. Stone
Electric Double Layers: Effect of Asymmetry in Electrolyte Valence on Steric Effects, Dielectric Decrement and Ion-Ion Correlations
 Langmuir, 34, 11971, 2018 [[link](#)]
12. **A. Gupta***, H. Lee*, P.S. Doyle
Oil Recovery from Micropatterned Triangular Troughs during a Surfactant Flood
 Langmuir, 34, 10644, 2018 [[link](#)]
11. A.Z.M. Badruddoza*, **A. Gupta***, B.L. Trout, A.S. Myerson, P.S. Doyle
Low Energy Nanoemulsions as Templates for the Formulation of Hydrophobic Drugs
 Advanced Therapeutics, 1700020, 2018 [[link](#)]
10. **A. Gupta***, H. Lee*, P.S. Doyle
Controlled Liquid Entrapment over Patterned Sidewalls in Confined Geometries
 Physical Review Fluids, 2, 094007, 2017 [[link](#)]
9. **A. Gupta***, A.Z.M. Badruddoza*, T.A. Hatton, P.S. Doyle
A General Route for Nanoemulsion Synthesis using Low Energy Methods at Constant Temperature
 Langmuir, 33, 7118, 2017 [[link](#)]
8. H. Lee*, **A. Gupta***, T.A. Hatton, P.S. Doyle
Controlled Entrapment of Liquid Isolated Chambers through Photo-patterned Obstacles
 Physical Review Applied, 7, 004013, 2017 [[link](#)]
7. **A. Gupta**, V. Narsimhan, T.A. Hatton, P.S. Doyle
Kinetics of Change in Droplet Size during Nanoemulsion Formation
 Langmuir, 32, 11551, 2016 [[link](#)]
6. S.G.Lee, H. Lee, **A. Gupta**, P.S. Doyle
Site-selective In Situ Grown Carbonate Micromodels with Tunable Geometry, Porosity, and Wettability
 Advanced Functional Materials 26, 4896, 2016 [[link](#)]
5. **A. Gupta**, H.B. Eral, T.A. Hatton, P.S. Doyle
Nanoemulsions: Formation, Properties and Applications
 Soft Matter, 12, 2826, 2016 [[link](#)]

4. **A. Gupta**, H.B. Eral, T.A. Hatton, P.S. Doyle
Controlling and Predicting Droplet Size of Nanoemulsions: Scaling Relations with Experimental Validation
Soft Matter, 12, 1452, 2016 [[link](#)]
3. G.C.L. Goff, J. Lee, **A. Gupta**, W.A. Hill, P.S. Doyle
High-Throughput Contact Flow Lithography
Advanced Science, 2, 10, 2015 [[link](#)]
2. H. Lee, R.L. Srinivas, **A. Gupta**, P.S. Doyle
Sensitive and Multiplexed On-Chip microRNA Profiling in Oil-Isolated Hydrogel Chambers
Angewandte Chemie, 127, 2507, 2015 [[link](#)]
1. **A. Gupta**, S. Roy
Euler-Euler Simulation of Bubbly Flow in a Rectangular Bubble Column: Experimental Validation with Radioactive Particle Tracking
Chemical Engineering Journal, 225, 818, 2015 [[link](#)]

Invited Talks

1. University of Alberta, Chemical Engineering, 04/15/2019
2. National University of Singapore, Chemical Engineering, 04/01/2019
3. Case Western Reserve University, Chemical Engineering, 03/25/2019
4. Michigan State University, Chemical Engineering, 03/05/2019
5. University of Colorado Boulder, Chemical Engineering, 02/28/2019
6. Colorado School of Mines, Chemical Engineering, 02/21/2019
7. University of Oklahoma, Chemical Engineering, 02/15/2019
8. Indian Institute of Technology (IIT) Delhi, Chemical Engineering, 02/05/2019
9. Indian Institute of Science (IISc) Bangalore, Chemical Engineering, 01/30/2019
10. University of California Davis, Chemical Engineering, 01/10/2019
11. University of Wisconsin Madison, Chemical Engineering, 12/05/2018
12. University of Waterloo, Chemical Engineering, 08/31/2018
13. Ryerson University, Mechanical and Industrial Engineering, 08/29/2018
14. Ryerson University, Chemical Engineering, 08/29/2018
15. McMaster University, Chemical Engineering, 08/28/2018
16. McGill University, Chemical Engineering, 08/24/2018
17. University of Toronto, Chemical Engineering, 08/08/2018
18. University of British Columbia, Mechanical Engineering, 08/02/2018
19. Air Products, Allentown Pennsylvania, 03/03/2017
20. Complex Fluids Group, Princeton University, 12/19/2016
21. The Dow Chemical Company, Midland, Michigan, 10/25/2016
22. Indian Institute of Technology (IIT) Delhi, Chemical Engineering, 03/18/2016
23. The Bigger Role of Nanoemulsions, invited interview, Chemical Today
(link: <http://bit.ly/2uwri8E>)

Conference Presentations

1. **A. Gupta**, A. G. Rajan, E. Carter, H. A. Stone
Electrical Double Layers: Predicting Overcharging and Layering of Ions using Continuum Model
72nd APS - Division of Fluid Dynamics, Seattle, Washington, 11/26/2019
2. **A. Gupta**, B. Rallabandi, J. L. Wilson, S. Shim, H. A. Stone
Diffusiophoretic Velocity for Mixture of Electrolytes with Asymmetric Ion Valences
2019 Annual AIChE Meeting, Orlando, Florida, 11/13/2019

3. **A. Gupta**, H. A. Stone
Electric Double Layers: Effect of Asymmetry in Electrolyte Valence on Finite Ion Size Effects, Dielectric Decrement and Ion-Ion Correlations
2018 Annual AIChE Meeting, Pittsburgh, Pennsylvania, 11/01/2018
4. **A. Gupta**, A. Z. M. Badruddoza, P. S. Doyle
A General Route for Nanoemulsion Synthesis Using Low Energy Methods at Constant Temperature
2017 Annual AIChE Meeting, Minneapolis, Minnesota, 11/02/2017
5. **A. Gupta**, T. A. Hatton, P. S. Doyle
Nanoemulsion Formation: Controlling and Predicting Droplet Size
2017 Annual AIChE Meeting, Minneapolis, Minnesota, 10/31/2017
6. **A. Gupta**, H. Lee, T. A. Hatton, P. S. Doyle
Controlled Liquid Entrapment through Photo-Patterned Obstacles and Patterned Surfaces
2017 Annual AIChE Meeting, Minneapolis, Minnesota, 10/30/2017
7. **A. Gupta**, T. A. Hatton, P. S. Doyle
Nanoemulsion Formation: Controlling and Predicting Droplet Size
2016 Annual AIChE Meeting, San Francisco, California, 11/15/2016
8. **A. Gupta**, H. Lee, T. A. Hatton, P. S. Doyle
Controlled Oil Entrapment through Photo-Patterned Obstacles
2016 Annual AIChE Meeting, San Francisco, California, 11/14/2016
9. **A. Gupta**, T. A. Hatton, P. S. Doyle
Nanoemulsion Formation: Controlling and Predicting Droplet Size
90th ACS Colloids Meeting, Cambridge, Massachusetts, 06/07/2016
10. **A. Gupta**, T. A. Hatton, P. S. Doyle
Nanoemulsion Formation: Controlling and Predicting Droplet Size
90th ACS Colloids Meeting, Cambridge, Massachusetts, 06/07/2016
11. **A. Gupta**, H. B. Eral, T. A. Hatton, P. S. Doyle
Controlling and Predicting droplet Size of Nanoemulsions
10th Annual European Rheology Conference, Nantes, France, 04/16/2015
12. **A. Gupta**, H. B. Eral, T. A. Hatton, P. S. Doyle
Understanding the Physics of Nanoemulsion Formation
The Society of Rheology 86th Annual Meeting, Philadelphia, Pennsylvania, 10/07/2014

Referee Experience

Independently reviewed more than 80 papers in over 25 different journals (link to Publons profile)

1. Angewandte Chemie
2. Advanced Functional Materials
3. ACS Applied Materials & Interfaces
4. Langmuir
5. Soft Matter
6. Food and Bioproducts Processing
7. AIChE Journal, Physical Review Fluids
8. Chemical Engineering & Processing: Process Intensification
9. Industrial & Engineering Chemistry Research
10. Food & Function
11. Journal of Physics: Condensed Matter
12. Journal of Dispersion Science and Technology

13. Colloids and Surfaces A: Physicochemical and Engineering Aspect
14. Food Hydrocolloids
15. International Journal of Multiphase Flows
16. Food Research International
17. Journal of Agricultural and Food Chemistry
18. Fluid Dynamics & Materials Processing
19. Carbohydrate Polymers
20. European Journal of Lipid Science & Technology
21. Journal of Colloid & Interface Science
22. Food Chemistry
23. Comprehensive Reviews in Food Science and Food Safety
24. International Journal of Heat & Mass Transfer
25. The European Physical Journal E
26. Journal of Micromechanics & Microengineering
27. Comprehensive Reviews in Food Science & Food Safety
28. Physica A: Statistical Mechanics and Its Applications
29. Physical Review Letters
30. Physical Review Fluids
31. Journal of Fluid Mechanics
32. Foundation of Scientific Research - Flanders (FWO, Brussels) (grant review)

Teaching Experience

1. **Instructor, Electrokinetics for Energy and the Environment (MAE 559)**
 Princeton University, Fall 2018
 Course level: graduate, class strength: 20 (including audit, listeners)
 Responsibility: developed and delivered 75% of lectures
 Evaluation: 3.75/5 (lectures), 4.0/5 (course content)
2. **Graduate Instructor, Fluid Mechanics (10.301)**
 MIT, Spring 2017
 Course level: undergraduate, class strength: 58
 Responsibility: 40% lectures, 50% recitations
 designed and recorded a supplementary video lecture series (web link: <http://bit.ly/2tN87UX>)
 Evaluation: 6.2/7 (lectures), 6.9/7 (recitations)
3. **Teaching Assistant, Transport Processes (10.302)**
 MIT, Fall 2014
 Course level: undergraduate, class strength: 71
 Evaluation: 6.5/7
4. **Teaching Assistant, Junior Design Course (CHL471)**
 IIT Delhi, Spring 2012
 Course level: undergraduate, class strength: 120
5. **Instructor of Mathematics and Physics, Vidyamandir Classes**
 Delhi, 2009-11
 Course level: high school, class strength: 400 (40 × 10)

Mentor Experience

1. Ben Alessio, Princeton University, undergraduate research, 2020
2. Azmaine Iqtidar, Princeton University, undergraduate research, 2020
3. Comsin Andrei, Princeton University, undergraduate research, 2019
4. Cameron McKensize, Princeton University, undergraduate thesis, 2018-19
5. Connor H. Matthews, Princeton University, undergraduate research, 2018-19
6. Lisa E. Archibald, MIT, undergraduate research, 2016-17
7. Mohammad Alsobay, MIT, undergraduate course project, 2015
8. Galym Saparbaiuly, MIT, undergraduate course project, 2015
9. Elezhan Zhakiya, MIT, undergraduate course project, 2015
10. Robbie Shaw, MIT, undergraduate research, 2014-15

Industrial Experience

1. Consultant, Alcon Incorporated, Dallas, TX and Atlanta, GA, 11-12/2013
2. Consultant, Corning Incorporated, Corning, NY and Wilmington, NC, 09-10/2013
3. Student Intern, Haldor Topose, Lyngby, Denmark, 05-07/2011

Leadership Roles

1. **Mechanical & Aerospace Engineering Postdoctoral Association, Princeton University, 2018-present**
Organized several 'Meet the Faculty' luncheons to facilitate interaction amongst postdoctoral researchers and faculty members within the department
2. **Founder, iitjeelectures.com, 2015-present**
Creating free online lectures to democratize high school education in India, leading a group of 3 members
More than 150 videos available on our youtube channel, over 10,000 subscribers and 100,000 views
Partial content uploaded on MIT OCW high school page (link: [urlhttp://bit.ly/2tobvc0](http://bit.ly/2tobvc0))
3. **Graduate Student Adviser Board, Chemical Engineering, MIT, 2013-16**
Conceptualized and successfully implemented Open Labs for improving the adviser selection process; the initiative is now an integral part of fall semester schedule
Active member of several GSAB initiatives like Student-Adviser Review Form
4. **Board Member, Association for India's Development, MIT, 2014-17**
Actively involved in raising awareness about socio-economic issues through articles and workshops
Organized a fund raiser with a budget of over \$25,000 for grass root development projects in India
5. **Dorm Coordinator, Tang Hall Residents Association, MIT, 2015-16**
Implemented a swift feedback system in the dorm by installing suggestion boxes at strategic locations
Organized several creative workshops such as 'Conflict Management' and 'Money Management 101'
Awarded with the best officer award for exceptional service and resident welfare

References

Prof. Patrick S. Doyle
Robert T. Haslam (1911) Professor
Chemical Engineering, MIT
e-mail: pdoyle@mit.edu
Relationship: PhD adviser

Prof. Howard A. Stone
Donald R. Dixon '69 and Elizabeth W. Dixon Professor
Mechanical & Aerospace Engineering, Princeton University
e-mail: hastone@princeton.edu
Relationship: Postdoc adviser

Prof. Fikile R. Brushett
Cecil and Ida Green Career Development Chair
Chemical Engineering, MIT
e-mail: brushett@mit.edu
Relationship: Co-instructor

Prof. T. Alan Hatton
Ralph Landau Professor
Chemical Engineering, MIT
e-mail: tahatton@mit.edu
Relationship: PhD adviser

Prof. James W. Swan
Texaco-Mangelsdorf Career Development Professor
Chemical Engineering, MIT
e-mail: jswan@mit.edu
Relationship: PhD thesis committee member

Prof. Shantanu Roy
Professor
Chemical Engineering, IIT Delhi
e-mail: roys@chemical.iitd.ac.in
Relationship: Undergraduate thesis supervisor

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