

# ANKUR GUPTA

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## PROFESSIONAL EXPERIENCE & EDUCATION

2021 - Present: *University of Colorado, Boulder*  
Assistant Professor, Chemical and Biological Engineering Department  
Principal Investigator: Laboratory of Interfaces, Flow and Electrokinetics (LIFE)

2017-2020: *Princeton University*  
Postdoctoral Research Associate, Mechanical and Aerospace Engineering  
Mentor: Prof. Howard A. Stone

2012-17: *Massachusetts Institute of Technology (MIT)*  
PhD, Chemical Engineering, M.S., Chemical Engineering Practice  
Thesis Adviser: Prof. Patrick S. Doyle and Prof. T. Alan Hatton

2008-12: *Indian Institute of Technology (IIT) Delhi*  
B.Tech, Chemical Engineering, *Presidents Gold Medal*  
Thesis Adviser: Prof. Shantanu Roy

## SELECTED AWARDS & HONORS

- Dream Chemistry Lecture, Physical Chemistry of the Polish Academy of Sciences
- NSF CAREER Award, 2023
- Soft Matter Emerging Investigator, RSC Journals, 2023
- Outstanding Graduate Teaching Award, ChBE, CU Boulder, 2021, 2022, 2023
- Graduates of the Last Decade (GOLD), Alumni Award, IIT Delhi, 2022
- CU Next Award for Innovation in Teaching, 2022
- ACS Petroleum Research Fund, Doctoral New Investigator, 2022
- Defense Advanced Research Project Agency (DARPA) Riser, 2022
- Publons peer-review Award for placing in top 1% of reviewers, 2018
- Hugh Hampton Young Fellow, MIT, 2017
- Presidents Gold Medal, IIT Delhi, 2012

## RESEARCH SUMMARY

My research blends applied mathematics with modern computing approaches to tackle fundamental problems in the areas of interfacial phenomena, complex fluids, multiphase flows and electrokinetics, with applications in energy storage, sustainable technologies, and lab-on-a-chip devices. One key thrust of my research work is to understand electrolyte transport in interconnected porous electrodes to design next-generation electrochemical technologies. Another focus is to employ shape anisotropy and chemical gradients to tune the trajectory of active particles for applications in water filtration and biomedical devices.

## RESEARCH, MENTORING & TEACHING SUMMARY

- *Publications*: Total citations on Google Scholar >1950, H-index 17. Author of 32 research articles and 1 book chapter. Typical journals include Physical Review Letters, Electrochimica Acta, Soft Matter, Langmuir, Physical Review Fluids, Journal of Electrochemical Society.
- *Invited talks*: Delivered over 30 talks at universities and national labs in the US, Canada, Singapore, and India. Examples: Stanford University, National Renewable Energy Laboratory, Los Alamos National Laboratory, University of Florida, University of Wisconsin-Madison, University of California Davis, Colorado School of Mines, Michigan State University, Case Western University, University of Toronto, McGill University, University of Alberta,

National University of Singapore, Indian Institute of Science Bangalore, IIT Delhi.

- *Conference presentations*: Contributed to over 40 talks at conferences such as annual meetings of American Institute of Chemical Engineers (AIChE), American Physical Society (APS) - Division of Fluid Dynamics (DFD), American Chemical Society (ACS) Colloids, Society of Rheology (SOR).

- *Research support*: Secured funding from NSF, ACS PRF, Research Innovation Office at CU, and Academic Innovation Office at CU.

- *PhD students*: 4 advised at CU Boulder, 1 mentored at Princeton. Students received several awards such as Ryland Graduate Fellowship, ARCS Foundation Scholarship, GAANN Fellowships, Mukhopadhyay Research Award, Langmuir student award finalist at ACS Colloids. Published 5 papers as corresponding author where PhD students are lead authors.

- *Undergraduate students*: 7 advised at CU Boulder, 5 advised at Princeton, and 5 advised at MIT. Multiple students published journal articles as co-authors with one student publishing two first-author papers. 3 students at CU Boulder are funded through AIChE CHER4U program that supports students from underrepresented backgrounds to gain research experience.

- *Teaching*: Instructed 4 courses at CU Boulder, 1 at Princeton, 1 at MIT. Courses include: Graduate transport phenomena, undergraduate fluid mechanics, and an elective titled "Electrokinetics for Energy and the Environment." Received outstanding graduate teaching awards for three consecutive years in a row at CU Boulder. Student comments have repeatedly mentioned "best professor I have ever had", "best course", "lectures are awesome".

## PROFESSIONAL ACTIVITIES, SERVICE & OUTREACH SUMMARY

- *Peer review*: Refereed over 100 publication for more than 30 journals. Example journals: Physical Review Letters, Angewandte Chemie, Advanced Functional Materials, Nature Communications, Nature Computational Science, Langmuir, Soft Matter, ACS Applied Materials and Interfaces, Journal of Physics: Condensed Matter.

- *Grant review*: National Science Foundation, ACS Petroleum Research Fund, New Frontiers Research Fund Canada, Research Foundation Flanders - Belgium.

- *Session chair and poster judging*: AIChE, ACS Colloids, APS-DFD


- *Lead organizer of symposium*: "Electrokinetics for Nano and Microfluidics" symposium at the 19th U.S. National Congress on Theoretical and Applied Mechanics, 2022; received over 25 submissions from Europe, Canada, Asia and the US.

- *Service at CU Boulder*: Thesis committee member of 10 PhD students at Chemical and Biological Engineering, member of several departmental level committees.

- *Digital education*: Led the creation of IIT-JEE Lectures YouTube channel for high school students in India, which attracted 9,000+ subscribers and 180,000+ views (2015-2018). Developed interactive teaching simulations to teach undergraduate fluid mechanics such as drop shapes on different planets ([link](#)) and Rankine tornado ([link](#)). Developed interactive blogs to make energy research accessible to undergraduates and high school students.

- *Industry experience*: Haldor Topsoe (Denmark), Corning Glass (Corning, NY and Wilmington, NC), Alcon (Fort Worth, TX and Atlanta, GA).

## PUBLICATIONS

 Google Scholar profile, >1,950 citations, h index=17

‡ denotes corresponding author, \* denotes equal contribution

### Work from University of Colorado Boulder

11 total, 9 as corresponding author with students as first-author

6 published, 1 submitted, 4 to be submitted within 12 weeks

1. S. Roychowdhury, A. Ganguly and **A. Gupta**<sup>‡</sup>  
*Translational and Rotational Mobility of Self-phoretic Particles with Arbitrary Interaction Potentials to be submitted in July 2023*
2. F. Henrique, P. J. Zuk, and **A. Gupta**<sup>‡</sup>  
*Effective Kirchhoff's Laws for Electric-Double-Layer Charging in Porous Media to be submitted in June 2023*

3. N. Jarvey, F. Henrique, and **A. Gupta**<sup>‡</sup>  
*Asymmetric rectified electric fields in multicomponent electrolytes with surface reactions to be submitted in June 2023*
4. B. M. Alessio, and **A. Gupta**<sup>‡</sup>  
*Diffusiophoresis-Enhanced Biological Turing Patterns to be submitted in May 2023*
5. A. Seal, U. Tiwari, **A. Gupta**, and A. G. Rajan  
*Incorporating Ion-Specific van der Waals and Soft Repulsive Interactions in the Poisson-Boltzmann Theory of Electrical Double Layers submitted, [link]*
6. J.G. Lee, R. R. Raj, C. P. Thome, N. B. Day, P. Martinez, N. Bottenus, **A. Gupta**, and C. Wyatt Shields  
*Bubble-Based Microrobots with Rapid Circular Motions for Epithelial Pinning and Drug Delivery Small, 2023, 2300409*
7. A. Ganguly, and **A. Gupta**<sup>‡</sup>  
*Going in circles: Slender body analysis of a self-propelling bent rod Physical Review Fluids, 08, 014103, 2023 [link]*
8. R. R. Raj, C. Wyatt Shields, and **A. Gupta**<sup>‡</sup>  
*Two-dimensional diffusiophoretic colloidal banding: Optimizing the spatial and temporal design of solute sinks and sources Soft Matter, 19, 892, 2023 [link]*
9. F. Henrique, P. J. Zuk, **A. Gupta**<sup>‡</sup>,  
*Effects of Asymmetry in Valence and Diffusivities on Transport of a Binary Electrolyte in a Cylindrical Pore Electrochimica Acta, 433, 141220, 2022 [link]*
10. N. Jarvey, F. Henrique, **A. Gupta**<sup>‡</sup>,  
*Ion Transport in an Electrochemical Cell: A Theoretical Framework to Couple Dynamics of Double Layers and Redox Reactions for Multicomponent Electrolyte Solutions Journal of the Electrochemical Society, 169, 093506, 2022 [link]*
11. F. Henrique, P. J. Zuk, **A. Gupta**<sup>‡</sup>,  
*Charging Dynamics of Electrical Double Layers Inside a Cylindrical Pore: Predicting the Effects of Arbitrary Pore Size Soft Matter, 18, 198, 2022 [link]*

#### Work prior to University of Colorado Boulder

12. B. M. Alessio, S. Shim, **A. Gupta**, H. A. Stone  
*Diffusioosmosis-driven dispersion of colloids: a Taylor dispersion analysis with experimental validation Journal of Fluid Mechanics, 94, A23, 2022 [link]*
13. **A. Gupta**, A.R. Konicek, M.A. King, A. Iqtidar, M. Yeganeh, H.A. Stone  
*The Effect of Gravity on the Shape of a Droplet on a Fiber: Nearly Axisymmetric Profiles with Experimental Validation Physical Review Fluids, 6, 063602, 2021 [link]*
14. B.M. Alessio, S. Shim, E. Mintah, **A. Gupta**, H.A. Stone  
*Diffusiophoresis and Diffusioosmosis in Tandem: Two-dimensional Particle Motion in the Presence of Multiple Electrolytes Physical Review Fluids, 6, 054201, 2021 [link]*
15. **A. Gupta**<sup>‡</sup>, A. Govind Rajan, Emily A. Carter, H.A. Stone<sup>‡</sup>  
*Thermodynamics of Electrical Double Layers with Electrostatic Correlations The Journal of Physical Chemistry C, 124, 26830, 2020 [link]*
16. **A. Gupta**<sup>‡</sup>, A. Govind Rajan, Emily A. Carter, H.A. Stone<sup>‡</sup>  
*Ionic layering and overcharging in a Poisson-Boltzmann model Physical Review Letters, 125, 188004, 2020 [link]*
17. **A. Gupta**<sup>‡</sup>, P. J. Zuk <sup>‡</sup>, H.A. Stone <sup>‡</sup>  
*Charging dynamics of overlapping double layers in a cylindrical nanopore Physical Review Letters, 126, 076001, 2020 [link]*

18. **A. Gupta**, S. Shim, H.A. Stone  
*Diffusiophoresis: From dilute to concentrated electrolytes*  
Soft Matter, 16, 6975, 2020 [[link](#)] *highlighted in inside front cover*
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 [[link](#)]
20. J.L. Wilson, S. Shim, E. Yu, **A. Gupta**, H.A. Stone  
*Diffusiophoresis in Multivalent Electrolytes*  
Langmuir, 36, 7014, 2020 [[link](#)]
21. **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 [[link](#)]
22. 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](#)]
23. **A. Gupta**, B. Rallabandi, H.A. Stone  
*Diffusiophoretic and Diffusioosmotic Velocities for Mixtures of Valence-asymmetric Electrolytes*  
Physical Review Fluids, 4, 043702, 2019 [[link](#)]
24. 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](#)]
25. **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](#)]
26. **A. Gupta\***, H. Lee\*, P.S. Doyle  
*Oil Recovery from Micropatterned Triangular Troughs during a Surfactant Flood*  
Langmuir, 34, 10644, 2018 [[link](#)]
27. 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](#)]
28. **A. Gupta\***, H. Lee\*, P.S. Doyle  
*Controlled Liquid Entrapment over Patterned Sidewalls in Confined Geometries*  
Physical Review Fluids, 2, 094007, 2017 [[link](#)]
29. **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](#)]
30. 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](#)]
31. **A. Gupta**, V. Narsimhan, T.A. Hatton, P.S. Doyle  
*Kinetics of Change in Droplet Size during Nanoemulsion Formation*  
Langmuir, 32, 11551, 2016 [[link](#)]
32. 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](#)]
33. **A. Gupta**, H.B. Eral, T.A. Hatton, P.S. Doyle  
*Nanoemulsions: Formation, Properties and Applications*  
Soft Matter, 12, 2826, 2016 [[link](#)]

34. **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](#)]
35. 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](#)]
36. 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](#)]
37. **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

### Presentations from University of Colorado Boulder

1. Dream Chemistry Lecture, Physical Chemistry of the Polish Academy of Sciences, 07/13/2023
2. ACS Colloids, Keynote in Emulsions, foams and Surfactants, 06/06/2023
3. Stanford University, Fluid Mechanics Seminar 05/03/2022
4. National Renewable Energy Laboratory, 04/08/2022
5. Los Alamos National Laboratory, Physics Colloquium, 02/03/2022
6. Baylor University, Mechanical Engineering, 10/07/2021
7. University of Florida, Chemical Engineering, 10/04/2021
8. Complex Fluids Seminar Series, Carnegie Mellon University, 04/16/2021
9. Soft Matter Coffee Hour (SMATch), Princeton University, Chemical Engineering, 09/16/2020

### Presentations prior to University of Colorado Boulder

10. University of Alberta, Chemical Engineering, 04/15/2019
11. National University of Singapore, Chemical Engineering, 04/01/2019
12. Case Western Reserve University, Chemical Engineering, 03/25/2019
13. Michigan State University, Chemical Engineering, 03/05/2019
14. University of Colorado Boulder, Chemical Engineering, 02/28/2019
15. Colorado School of Mines, Chemical Engineering, 02/21/2019
16. University of Oklahoma, Chemical Engineering, 02/15/2019
17. Indian Institute of Technology (IIT) Delhi, Chemical Engineering, 02/05/2019
18. Indian Institute of Science (IISc) Bangalore, Chemical Engineering, 01/30/2019
19. University of California Davis, Chemical Engineering, 01/10/2019
20. University of Wisconsin Madison, Chemical Engineering, 12/05/2018
21. University of Waterloo, Chemical Engineering, 08/31/2018
22. Ryerson University, Mechanical and Industrial Engineering, 08/29/2018
23. Ryerson University, Chemical Engineering, 08/29/2018
24. McMaster University, Chemical Engineering, 08/28/2018
25. McGill University, Chemical Engineering, 08/24/2018
26. University of Toronto, Chemical Engineering, 08/08/2018
27. University of British Columbia, Mechanical Engineering, 08/02/2018
28. Air Products, Allentown Pennsylvania, 03/03/2017
29. Complex Fluids Group, Princeton University, 12/19/2016
30. The Dow Chemical Company, Midland, Michigan, 10/25/2016
31. Indian Institute of Technology (IIT) Delhi, Chemical Engineering, 03/18/2016

## CONTRIBUTED PRESENTATIONS

### Presentations from University of Colorado Boulder

1. A. Ganguly, S. Roychowdhury, and **A. Gupta**  
*Phoretic and Self-Phoretic Motion of Microparticles With Arbitrary Interaction Potentials*  
97<sup>th</sup> American Chemical Society, Colloids and Interface Science, Raleigh, NC
2. A. Ganguly and **A. Gupta**  
*Slender body analysis of a self-propelling bent rod*  
97<sup>th</sup> American Chemical Society, Colloids and Interface Science, Raleigh, NC
3. R. R. Raj, J. G. Lee, **A. Gupta**, and C. W. Shields  
*Impact of geometry on the frequency-dependent response of acoustic microrobots*  
97<sup>th</sup> American Chemical Society, Colloids and Interface Science, Raleigh, NC
4. F. Henrique, P. J. Zuk, and **A. Gupta**  
*Effective Kirchoff's Laws for Double-Layer Charging in Porous Media*  
97<sup>th</sup> American Chemical Society, Colloids and Interface Science, Raleigh, NC
5. B. M. Alessio and **A. Gupta**  
*Programmable colloidal assembly: Turing patterns induced via diffusiophoresis*  
97<sup>th</sup> American Chemical Society, Colloids and Interface Science, Raleigh, NC
6. N. Jarvey, F. Henrique and **A. Gupta**  
*AREFs in multicomponent electrolytes with electrochemical reactions due to imbalance in ionic strength*  
97<sup>th</sup> American Chemical Society, Colloids and Interface Science, Raleigh, NC
7. N. Jarvey, F. Henrique and **A. Gupta**  
*Coupled ionic transport due to double layers and redox reactions: Impact of multiple ions, background electrolytes, and Frumkin-Butler-Volmer Kinetics*  
97<sup>th</sup> American Chemical Society, Colloids and Interface Science, Raleigh, NC
8. R. R. Raj, C. W. Shields and **A. Gupta**  
*Diffusiophoretic colloidal highways: Optimizing the colloidal banding induced by two-dimensional solute gradients*  
97<sup>th</sup> American Chemical Society, Colloids and Interface Science, Raleigh, NC
9. A. Ganguly, **A. Gupta**  
*To turn or not to turn: Slender body analysis for a self-propelling axially asymmetric bent rod*  
75<sup>th</sup> APS- Division of Fluid Dynamics, Indianapolis, IN
10. R. Raj, C. Wyatt Shields, **A. Gupta**  
*Rational Design of Two-Dimensional Colloidal Banding*  
75<sup>th</sup> APS- Division of Fluid Dynamics, Indianapolis, IN
11. N. Jarvey, F. Henrique, **A. Gupta**  
*Dynamics of Multicomponent Electrolyte Transport Including the Effects of Electrical Double Layers and Redox Reactions*  
75<sup>th</sup> APS- Division of Fluid Dynamics, Indianapolis, IN
12. F. Henrique, P. J. Zuk, **A. Gupta**  
*Electrical-Double-Layer Charging in a Complex Network of Pores*  
75<sup>th</sup> APS- Division of Fluid Dynamics, Indianapolis, IN
13. A. Christensen, **A. Gupta**, G. Chen, W. Peters, M. Knoblauch, H. Stone, K. Jensen  
*Optimal geometry for surface-enhanced diffusion*  
75<sup>th</sup> APS- Division of Fluid Dynamics, Indianapolis, IN
14. R. Raj, C. Wyatt Shields **A. Gupta**  
*Two-Dimensional Diffusiophoretic Banding of Colloidal Particles*  
2022 Annual AIChE Meeting, Phoenix, AZ
15. A. Ganguly, **A. Gupta**  
*Control of Phoretic Self-Propulsion through Particle Geometry: Slender-Body Analysis for an Asymmetric Bent Rod*  
2022 Annual AIChE Meeting, Phoenix, AZ

16. F. Henrique, N. Jarvey, **A. Gupta**  
*Transport in Electrochemical Capacitors: Effects of Porous Geometry, Electrolyte Asymmetry, and Redox Reactions*  
2022 Annual AIChE Meeting, Phoenix, AZ
17. A. Ganguly, R. Raj, **A. Gupta**  
*Impact of Surface Heterogeneity on Diffusiophoresis of Colloids in a Mixture of Electrolytes and Non-electrolytes*  
96<sup>th</sup> American Chemical Society, Colloids and Interface Science, Golden, CO
18. R. Raj, C. W. Shields IV, **A. Gupta**  
*Programmable Two-dimensional Diffusiophoretic Banding of Colloidal Particles*  
American Chemical Society, Colloids and Interface Science, Golden, CO
19. A. Ganguly, **A. Gupta**  
*Control of Phoretic Self-Propulsion through Particle Geometry: Slender-body Analysis of an Asymmetric Bent Rod*  
96<sup>th</sup> American Chemical Society, Colloids and Interface Science, Golden, CO
20. F. Henrique, P. J. Zuk, **A. Gupta**  
*Transport of Binary Electrolytes in a Cylindrical Pore: Effects of Overlapping Double Layers and Asymmetry in Ion Valences and Diffusivities*  
96<sup>th</sup> American Chemical Society, Colloids and Interface Science, Golden, CO
21. N. Jarvey, F. Henrique, **A. Gupta**  
*Charging of an Electrochemical Cell: Theoretical Framework to Simulate Coupled Dynamics of Double Layers and Redox Reactions for Arbitrary Number of Ions*  
96<sup>th</sup> American Chemical Society, Colloids and Interface Science, Golden, CO
22. J. G. Lee, R. R. Raj, C. Thome, **A. Gupta**, C. W. Shields  
*Bubble-based Acoustic Propellers for Sustained Corticosteroid Delivery in the Bladder*  
96<sup>th</sup> American Chemical Society, Colloids and Interface Science, Golden, CO
23. C. Thome, J. Bendorf, J. G. Lee, **A. Gupta**, C. W. Shields  
*Don't Go Breaking My Charge: Induced Charge Electrophoresis of Surface-Modified Janus Particles*  
American Chemical Society, Colloids and Interface Science, Golden, CO
24. N. Jarvey, F. Henrique, **A. Gupta**  
*Charging of an Electrochemical Cell: Theoretical Framework to Simulate Coupled Dynamics of Double Layers and Redox Reactions for Arbitrary Number of Ions*  
19<sup>th</sup> U.S. National Congress on Theoretical and Applied Mechanics, Austin, TX
25. F. Henrique, P. J. Zuk, **A. Gupta**  
*Charging Dynamics of Electrochemical Capacitors*  
19th U.S. National Congress on Theoretical and Applied Mechanics, Austin, TX
26. N. Jarvey, F. Henrique, **A. Gupta**  
*Impact of Faradaic Reactions on the Charging Dynamics of the Electrical Double Layers*  
74<sup>th</sup> APS - Division of Fluid Dynamics, Phoenix, AZ
27. F. Henrique, P. J. Zuk, **A. Gupta**  
*Influence of Relative Debye Length on Electric-Double-Layer Charging Inside a Nanopore*  
74<sup>th</sup> APS - Division of Fluid Dynamics, Phoenix, AZ
28. F. Henrique, **A. Gupta**  
*Charging and Discharging Dynamics of Electrical Double Layers inside Nanopores: From Thin to Overlapping Double Layers*  
2021 Annual AIChE Meeting, Boston, MA

#### **Presentations prior to University of Colorado Boulder**

29. **A. Gupta**, A.R. Konicek, M.A. King, A. Iqtidar, M. Yeganeh, H.A. Stone  
*The Effect of Gravity on the Shape of a Droplet on a Fiber: Nearly Axisymmetric Profiles with Experimental Validation*  
2021 Annual AIChE Meeting, Boston, MA

30. **A. Gupta**, P. J. Zuk, S. Shim, H. A. Stone  
Thick Double Layers: From Energy Storage to Diffusiophoresis  
73<sup>rd</sup> APS - Division of Fluid Dynamics, Chicago, IL
31. **A. Gupta**, A. G. Rajan, E. Carter, H. A. Stone  
Electrical Double Layers: Predicting Overcharging and Layering of Ions using Continuum Model  
72<sup>nd</sup> APS - Division of Fluid Dynamics, Seattle, WA
32. **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, FL
33. **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, PA
34. **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, MN
35. **A. Gupta**, T. A. Hatton, P. S. Doyle  
Nanoemulsion Formation: Controlling and Predicting Droplet Size  
2017 Annual AIChE Meeting, Minneapolis, MN
36. **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, MN
37. **A. Gupta**, T. A. Hatton, P. S. Doyle  
Nanoemulsion Formation: Controlling and Predicting Droplet Size  
2016 Annual AIChE Meeting, San Francisco, CA
38. **A. Gupta**, H. Lee, T. A. Hatton, P. S. Doyle  
Controlled Oil Entrapment through Photo-Patterned Obstacles  
2016 Annual AIChE Meeting, San Francisco, CA
39. **A. Gupta**, T. A. Hatton, P. S. Doyle  
Nanoemulsion Formation: Controlling and Predicting Droplet Size  
90th ACS Colloids Meeting, Cambridge, MA
40. **A. Gupta**, T. A. Hatton, P. S. Doyle  
Nanoemulsion Formation: Controlling and Predicting Droplet Size  
90th ACS Colloids Meeting, Cambridge, MA
41. **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
42. **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, PA

## MENTORING EXPERIENCE

### 1. Graduate Students Advisees

Nathan Jarvey, University of Colorado Boulder, graduate research, 2021 - present  
 Filipe Henrique, University of Colorado Boulder, graduate research, 2021 - present  
 Arkava Ganguly, University of Colorado Boulder, graduate research, 2022 - present  
 Ritu Raj (co-advised), University of Colorado Boulder, graduate research, 2022 - present  
 Jessica Wilson, Princeton University, graduate research, 2019-2020

### 2. Undergraduate Students Advisees

Cora Becker, University of Colorado Boulder, undergraduate research, 2023-present



Grace Origer, University of Colorado Boulder, undergraduate research, 2023-present  
Benjamin M. Alessio, University of Colorado Boulder, undergraduate research, 2023 - present  
Eliot Rusley, University of Colorado Boulder, undergraduate research, 2022 - present  
Zoe Cruse, University of Colorado Boulder, undergraduate research, 2022 - present  
Sajan Williams, University of Colorado Boulder, undergraduate research, 2022 - present  
William Steinfort, University of Colorado Boulder, undergraduate research, 2022  
Alex Jimenez, University of Colorado Boulder, undergraduate research, 2021  
Jackson Shropshire, University of Colorado Boulder, undergraduate research, 2020  
Benjamin M. Alessio, Princeton University, undergraduate research, 2020 - 2021  
Azmaine Iqtidar, Princeton University, undergraduate research, 2020  
Comsin Andrei, Princeton University, undergraduate research, 2019  
Cameron McKensize, Princeton University, undergraduate thesis, 2018-19  
Connor H. Matthews, Princeton University, undergraduate research, 2018-19  
Lisa E. Archibald, MIT, undergraduate research, 2016-17  
Mohammad Alsobay, MIT, undergraduate course project, 2015  
Galym Saparbaiuly, MIT, undergraduate course project, 2015  
Elezhan Zhakiya, MIT, undergraduate course project, 2015  
Robbie Shaw, MIT, undergraduate research, 2014-15

### 3. Awards/Honors to Advisees

June 2023: Nathan Jarvey, GAANN Fellowship  
April 2023: Ritu Raj, NSF Graduate Research Fellowship  
April 2023: Ben Alessio, NSF Graduate Research Fellowship  
April 2023: Zoe Cruse, Undergraduate Research Award  
January 2023: Ritu Raj, GAANN Fellowship  
July 2022: Filipe Henrique, Langmuir Student Finalist, ACS Colloids  
April 2022: Arkava Ganguly, Mukopadhyay Graduate Fellowship  
January 2022: Nathan Jarvey, GAANN Fellowship  
September 2021: Filipe Henrique, Ryland Graduate Fellowship

## TEACHING EXPERIENCE

### 1. Instructor, Fluid Mechanics (CHEN3200)

University of Colorado Boulder, Spring 2023

Course level: undergraduate, class strength: 67

*Evaluated as "teaching style to be phenomenal", "lectures are very informational, concise, and delivered really well on behalf of Prof Gupta", " Professor truly knows what he's doing and how to teach, utilizing the perfect mix of lecturing and example problems."*

### 2. Instructor, Transport Phenomena (CHEN5210)

University of Colorado Boulder, Fall 2022

Course level: graduate, class strength: 29

*Received the outstanding graduate teaching award from the Department of Chemical and Biological Engineering, CU Boulder, 2023*

*Evaluated as "One of the best teachers I have had", "This course was taught at what I believe is an impeccable level", "Ankur's teaching style is just fantastic." "I wish every CHEN graduate course could be taught by Ankur." "Honestly the best taught course I've taken in a few years. I can't think of a single thing in the course that I wish was better."*

### 3. Instructor, Transport Phenomena (CHEN5210)

University of Colorado Boulder, Fall 2021

Course level: graduate, class strength: 18

*Received the outstanding graduate teaching award from the Department of Chemical and Biological Engineering, CU Boulder, 2022*

*Evaluated as "Professor Gupta's teaching style was very engaging", "Dr Gupta gives highly effective lectures which engage students", "Ankur is the best professor I have ever had"*

4. **Instructor, Transport Phenomena (CHEN5210)**  
University of Colorado Boulder, Spring 2021  
Course level: graduate, class strength: 34  
*Received the outstanding graduate teaching award from the Department of Chemical and Biological Engineering, CU Boulder, 2021*  
*Evaluated as "Ankur Gupta is a phenomenal instructor", "Ankur was the best professor I have ever had", "Professor Gupta is the best example I have seen of teaching effectively in both virtual and hybrid modes."*
5. **Guest Lecturer, Advanced Heat and Mass Transfer (CBE505)**  
Princeton University, Spring 2020  
Course level: graduate, class strength: 25  
Responsibility: developed and delivered 3 lectures on electrokinetics (*delivered remotely due to COVID-19*)
6. **Instructor, Electrokinetics for Energy and the Environment (MAE 559)**  
Princeton University, Fall 2018  
Evaluation: 3.75/5 (lectures), 4.0/5 (course content)  
Course level: graduate, class strength: 20 (including audit, listeners)  
Responsibility: developed and delivered 75% of lectures
7. **Graduate Instructor, Fluid Mechanics (10.301)**  
MIT, Spring 2017  
Evaluation: 6.2/7 (lectures), 6.9/7 (recitations)  
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>)
8. **Teaching Assistant, Transport Processes (10.302)**  
MIT, Fall 2014  
Evaluation: 6.5/7  
Course level: undergraduate, class strength: 71
9. **Teaching Assistant, Junior Design Course (CHL471)**  
IIT Delhi, Spring 2012  
Course level: undergraduate, class strength: 120
10. **Instructor of Mathematics and Physics, Vidyamandir Classes**  
Delhi, 2009-11  
Course level: high school, class strength: 400 (40 × 10)

## PROFESSIONAL SERVICE

1. **Referee for journals**  
Nature Communications, Nature Physics, Angewandte Chemie, Physical Review Letters, Journal of Fluid Mechanics, Advanced Functional Materials, ACS Applied Materials & Interfaces, Langmuir, Soft Matter, Food and Bioproducts Processing, AIChE Journal, Physical Review Fluids, Physical Review E, Physical Review Applied, Chemical Engineering & Processing: Process Intensification, Industrial & Engineering Chemistry Research, Food & Function, Journal of Physics: Condensed Matter, Journal of Dispersion Science and Technology, Colloids and Surfaces A: Physicochemical and Engineering Aspect, Food Hydrocolloids, International Journal of Multiphase Flows, Food Research International, Journal of Agricultural and Food Chemistry, Fluid Dynamics & Materials Processing, Carbohydrate Polymers, European Journal of Lipid Science & Technology, Journal of Colloid & Interface Science, Food Chemistry, Comprehensive Reviews in Food Science and Food Safety, International Journal of Heat & Mass Transfer, The European Physical Journal E, Journal of Micromechanics & Microengineering, Comprehensive Reviews in Food Science & Food Safety, Physica A: Statistical Mechanics and Its Applications
2. **Grant Proposal Reviewer**  
Foundation of Scientific Research - Flanders  
ACS Petroleum Research Fund  
National Frontiers in Research Fund, Canada

National Science Foundation  
Israel Science Foundation

**3. Organizer or chair of sessions at scientific meetings**

*Interfacial and Nonlinear Flows: Multiphase and Fields*, AIChE Annual Meeting, 2023  
*Microfluidic and Microscale Flows: Multiphase and Fields*, AIChE Annual Meeting, 2022  
*Electrokinetics for Nano- and Microfluidics*, USNCTAM, 2022  
*General Aspects for Colloids and Interface*, ACS Colloids, 2022  
*Interfacial and Nonlinear Flows: Multiphase and Fields*, AIChE Annual Meeting, 2021

## **SERVICE AT UNIVERSITY OF COLORADO BOULDER**

**1. Departmental committees and service**

Teaching Quality Framework Committee, 2021-present  
Graduate Committee 2021-present  
Preliminary Exam Committee

**2. Thesis committees**

Gesse Roure, 2021 - present  
Paige Brimley, 2021 - present  
Cooper Thome, 2021 - present  
Nate Schwindt, 2022 - present  
Katarina Odak, 2022 - present  
Luis Kitsu, 2022 - present  
Yifeng Mao, 2022 - present  
Benjamin Rich, 2023 - present

## **OUTREACH ACTIVITIES**

**1. Digital simulations for teaching**

Droplet shape on different planets ([link](#))  
Digital rheometer ([link](#))  
Direction of shear force between parallel plates ([link](#))  
Magnitude of force for an impinging jet ([link](#))  
Rankine tornado ([link](#))

**2. Digital simulations for research outreach**

Charging into a porous sphere ([link](#))