ANKUR GUPTA

ankur.gupta@colorado.edu | www.colorado.edu/faculty/gupta/
profile link | ankurg90 | ankurg90

EDUCATION AND TRAINING

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

RESEARCH AND PROFESSIONAL EXPERIENCE

2021 - Present: University of Colorado, Boulder
Assistant Professor, Chemical and Biological Engineering Department
Affiliations: Materials Science and Engineering Program
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

SELECTED AWARDS & HONORS

- Chemical and Engineering News Talented Twelve (2025)
- Air Force Office of Scientific Research Young Investigator (2025)
- John and Mercedes Peebles Innovation in Education Award (2024)
- Johannes Lyklema Early Career Award in Electrokinetics (2024)
- ChBE Undergraduate Teaching Award (student-voted 2024; faculty-voted 2023)
- ChBE Graduate Teaching Award, (student-voted 2024, 23, 22, 21; faculty-voted 2022)
- American Institute of Chemical Engineers (AIChE) 35 under 35, 2023
- Dream Chemistry Lecture, Physical Chemistry of the Polish Academy of Sciences, 2023
- Session Keynote Speaker, Emulsions, foams and surfactants, ACS Colloids 2023
- NSF CAREER Award, 2023
- Soft Matter Emerging Investigator, RSC Journals, 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 group, Laboratory of Interfaces, Flow, and Electrokinetics (LIFE), leverages mathematical tools to tackle interdisciplinary problems across colloidal physics, microhydrodynamics and electrochemistry. Our research aims to illuminate the underlying principles governing these systems which could help advances in material discovery, energy storage devices and miniaturized lab-on-a-chip devices. Our groups' work has been covered in CNN, The Knowable Magazine, Yahoo News, CU Boulder Today, The Discover Magazine, Chemical & Engineering News, Popular Mechanics, Interesting Engineering, MSN and many others.

PUBLICATIONS

Google Scholar profile, >3,250 citations, h index=23
Author of 46 research articles and 1 book chapter.

Work from University of Colorado Boulder

‡ denotes corresponding author, graduate trainee, undergraduate trainee and postdoc trainee

19 total published, 2 submitted, 13 as corresponding author with students as first-author. If available, 5-year impact factor listed below. Otherwise, current impact factor is listed.

1. S. Mirfendereski, and A. Gupta‡, *Imperfect Turing Patterns: Diffusiophoretic Assembly of Hard Spheres via Reaction-Diffusion Instabilities*, *under review*
2. B. M. Alessio, and A. Gupta‡, *Reaction-diffusion-chemotaxis model for human population dynamics over fractal terrains*, *under review*
3. F. Henrique, and A. Gupta‡, *Parallel Warburg Elements Describe Ionic Transport in Nanopores*, PRX Energy (**IF: N/A**), 4, 023009, 2025 [link]
4. A. R. Duarte, C. P. Thome, W. S. Hoertdoerfer, C. Praetzel, A. Pellicciotti, A. Gupta, M. A. Bevan, C. W. Shields IV, Dielectrophoresis-based polarizability measurement (DPM) for predicting induced-charge electroosmotic flows from modified surfaces, accepted, Advanced Functional Materials (**IF: 18.5**), 2424557, 2025 [link]
5. A. Ganguly, S. Roychowdhury and A. Gupta‡, *Unified mobility expressions for externally-driven and self-phoretic propulsion of particles*, Journal of Fluid Mechanics (**IF: 4.0**), 994, A2, 2024 [link]
6. F. Henrique, P. J. Zuk, and A. Gupta‡, *A Network Model to Predict Ionic Transport in Porous Materials*, Proceedings of the National Academy of Sciences (**IF: 10.8**), 121, e2401656121, 2024 [link]
   Featured in Chemical & Engineering News, Popular Mechanics, Interesting Engineering, MSN and 100 other news stories. Top 5% of all research outputs scored by Altmetric with Attention Score >800.
7. A Shah, S. Pathak, K. Lin, S. Garaj, M. Z. Bazant, A. Gupta and P. S. Doyle‡, *A universal approximation for conductance blockade in thin nanopore membranes*, Nano Letters (**IF: 11.2**), 24, 4776, 2024 [link]
8. A. Al Harraq, M. Feng, H. Gauri, R. Devireddy, A. Gupta, Q. Sun‡, and B. Bharti‡, *Magnetic control of non-magnetic living organisms*, ACS Applied Materials & Interfaces (**IF: 8.7**), 16, 7339, 2024 [link]

9. R. R Raj, A. Ganguly, C. Becker, C. W. Shields IV and A. Gupta‡, *Motion of an active bent-rod with an articulating hinge: Exploring mechanical and chemical modes of swimming*, Frontiers in Physics (**IF: 1.9** current), 11, 2023 (invited article) [link]
10. A. Ganguly, B. M. Alessio and A. Gupta‡, *Diffusiophoresis: A Novel Transport Mechanism - Fundamentals, Applications, and Future Opportunities*, Frontiers in Sensors (**IF: N/A**), 4, 2023 (invited article) [link]
11. B. M. Alessio, and A. Gupta‡, *Diffusiophoresis-enhanced biological Turing patterns*, Science Advances (**IF: 13.7**), 9, eadj2457, 2023 [link]
    Featured in CNN, The Knowable Magazine, Yahoo News, CU Boulder Today, The Discover Magazine and 40 other news stories. Selected as a top discovery of CU Boulder 2023. Top 5% of all research outputs scored by Altmetric with Attention Score >430.
12. J. G. Lee, C.P. Thome, Z. Cruse, A. Ganguly, A. Gupta, and C. Wyatt Shields IV‡, *Magnetically locked Janus particle clusters with orientation-dependent motion in AC electric fields*, Nanoscale (**IF: 5.8** current), 15, 16268, 2023 [link]
13. A. H. Christensen, A. Gupta, G. Chen, W. S. Peters, M. Knoblauch, H. A. Stone, and K. H. Jensen‡, *Optimal geometry for surface-enhanced diffusion*, Physical Review E (**IF: 2.2**), 108, 045101, 2023 [link]
14. N. Jarvey, F. Henrique, and A. Gupta‡, *Asymmetric rectified electric fields in multicomponent electrolytes with surface reactions*, Soft Matter (**IF: 2.9** current), 19, 6032, 2023 [link]
15. 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*, Physical Chemistry Chemical Physics (**IF: 3.3** current), 25, 21708, 2023 [link]
16. 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 (**IF: 13.5**), 2300409, 2023 [link]
17. A. Ganguly, and A. Gupta‡, *Going in circles: Slender body analysis of a self-propelling bent rod*, Physical Review Fluids (**IF: 2.5** current), 08, 014103, 2023 [link]
18. R. R. Raj, C. Wyatt Shields, and A. Gupta‡, *Two-dimensional diffusiophoretic colloidal banding: Optimizing the spatial and temporal design of solute sinks and sources*, Soft Matter (**IF: 2.9** current), 19, 892, 2023 [link]
    Selected as a HOT article by editors of Soft Matter, part of a collection for Emerging Investigators in Soft Matter series
19. F. Henrique, P. J. Zuk, A. Gupta‡, *Effects of asymmetry in valence and diffusivities on transport of a binary electrolyte in a cylindrical pore*, Electrochimica Acta (**IF: 5.5** current), 433, 141220, 2022 [link]
20. N. Jarvey, F. Henrique, A. Gupta‡, *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 (**IF: 3.2** current), 169, 093506, 2022 [link]
21. F. Henrique, P. J. Zuk, A. Gupta‡, *Charging dynamics of electrical double layers inside a cylindrical pore: Predicting the effects of arbitrary pore size*, Soft Matter (**IF: 2.9** current), 18, 198, 2022 [link]

Work prior to University of Colorado Boulder

22. 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]
23. 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]
24. 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]
25. **A. Gupta**‡, A. Govind Rajan, Emily A. Carter, H.A. Stone‡, *Thermodynamics of electrical double layers with electrostatic correlations*, The Journal of Physical Chemistry C, 124, 26830, 2020 [link]
26. **A. Gupta**‡, A. Govind Rajan, Emily A. Carter, H.A. Stone‡, *Ionic layering and overcharging in a Poisson-Boltzmann model*, Physical Review Letters, 125, 188004, 2020 [link]
27. **A. Gupta**‡, P. J. Zuk ‡, H.A. Stone ‡, *Charging dynamics of overlapping double layers in a cylindrical nanopore*, Physical Review Letters, 126, 076001, 2020 [link]
28. A. Gupta, S. Shim, H.A. Stone‡, *Diffusiophoresis: From dilute to concentrated electrolytes*, Soft Matter, 16, 6975, 2020 [link], *Highlighted in inside front cover*
29. 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 pulication [link]
30. J.L. Wilson, S. Shim, E. Yu, A. Gupta, H.A. Stone‡, *Diffusiophoresis in multivalent electrolytes*, Langmuir, 36, 7014, 2020 [link]
31. 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]
32. 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]
33. A. Gupta, B. Rallabandi, H.A. Stone‡, *Diffusiophoretic and diffusioosmotic velocities for mixtures of valence-asymmetric electrolytes*, Physical Review Fluids, 4, 043702, 2019 [link]
34. 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]
35. 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]
36. A. Gupta, H. Lee, P.S. Doyle‡, *Oil recovery from micropatterned triangular troughs during a surfactant flood*, Langmuir, 34, 10644, 2018 [link]
37. 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 Theraputics, 1700020, 2018 [link]

38. A. Gupta, H. Lee, P.S. Doyle‡, *Controlled liquid entrapment over patterned sidewalls in confined geometries*, Physical Review Fluids, 2, 094007, 2017 [link]
39. 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]
40. 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]
41. A. Gupta, V. Narsimhan, T.A. Hatton, P.S. Doyle‡, *Kinetics of change in droplet size during nanoemulsion formation*, Langmuir, 32, 11551, 2016 [link]
42. 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]
43. A. Gupta, H.B. Eral, T.A. Hatton, P.S. Doyle‡, *Nanoemulsions: Formation, properties and applications*, Soft Matter, 12, 2826, 2016 [link]
44. 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]
45. 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]
46. 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]
47. 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. Area Plenary, Fluid Mechanics, AIChE 2025, 11/03/2025
2. Chemical and Biomedical Engineering, University of Wyoming, 03/24/2025
3. Invited Speaker, Masters Union, 12/09/2024
4. Invited Speaker, Rishihood University, 11/25/2024
5. Invited Speaker, Indian Institute of Technology (IIT) Delhi, 11/12/2024
6. Nonlinear Waves Seminar, Applied Mathematics, CU Boulder, 10/08/2024
7. Johannes Lyklema Early Career Award Honorary Lecture, 15th International Symposium on Electrokinetics, 09/18/2024
8. Invited Speaker, 15th International Symposium on Electrokinetics, 09/18/2024
9. Invited Speaker, Innovation Day, Science History Institute, Philadelphia, 09/09/2024
10. Chemical and Biological Engineering, University of Wisconsin, Madison, 04/23/2024
11. Brigham Young University, Chemical Engineering, 11/30/2023
12. Dream Chemistry Lecture, Physical Chemistry of the Polish Academy of Sciences, 07/13/2023

13. ACS Colloids, Keynote in Emulsions, foams and Surfactants, 06/06/2023
14. Stanford University, Fluid Mechanics Seminar 05/03/2022
15. National Renewable Energy Laboratory, 04/08/2022
16. Los Alamos National Laboratory, Physics Colloquium, 02/03/2022
17. Baylor University, Mechanical Engineering, 10/07/2021
18. University of Florida, Chemical Engineering, 10/04/2021
19. Complex Fluids Seminar Series, Carnegie Melon University, 04/16/2021

Presentations prior to University of Colorado Boulder

20. Soft Matter Coffee Hour (SMATch), Princeton University, Chemical Engineering, 09/16/2020
21. University of Alberta, Chemical Engineering, 04/15/2019
22. National University of Singapore, Chemical Engineering, 04/01/2019
23. Case Western Reserve University, Chemical Engineering, 03/25/2019
24. Michigan State University, Chemical Engineering, 03/05/2019
25. University of Colorado Boulder, Chemical Engineering, 02/28/2019
26. Colorado School of Mines, Chemical Engineering, 02/21/2019
27. University of Oklahoma, Chemical Engineering, 02/15/2019
28. Indian Institute of Technology (IIT) Delhi, Chemical Engineering, 02/05/2019
29. Indian Institute of Science (IISc) Bangalore, Chemical Engineering, 01/30/2019
30. University of California Davis, Chemical Engineering, 01/10/2019
31. University of Wisconsin Madison, Chemical Engineering, 12/05/2018
32. University of Waterloo, Chemical Engineering, 08/31/2018
33. Ryerson University, Mechanical and Industrial Engineering, 08/29/2018
34. Ryerson University, Chemical Engineering, 08/29/2018
35. McMaster University, Chemical Engineering, 08/28/2018
36. McGill University, Chemical Engineering, 08/24/2018
37. University of Toronto, Chemical Engineering, 08/08/2018
38. University of British Columbia, Mechanical Engineering, 08/02/2018
39. Air Products, Allentown Pennsylvania, 03/03/2017
40. Complex Fluids Group, Princeton University, 12/19/2016
41. The Dow Chemical Company, Midland, Michigan, 10/25/2016
42. Indian Institute of Technology (IIT) Delhi, Chemical Engineering, 03/18/2016

CONTRIBUTED PRESENTATIONS

Presentations from University of Colorado Boulder

Dates listed as start dates of the conference

1. A. Ganguly, S. Roychowdhury, A. Gupta, *Unified mobility expressions for externally driven and self-phoretic propulsion of particles*, 77th APS-Division of Fluid Dynamics, Salt Lake City, UT, 11/24/24

2. R. R. Raj, A. Gupta, C. W. Shields, *Frequency-dependent streaming flows from acoustically actuated bubbles and sharp edges*, 77th APS-Division of Fluid Dynamics, Salt Lake City, UT, 11/24/24
3. P. Romero, W. A. Smith, A. Gupta, *Reduced-Order Model of Multicomponent Electrolyte Transport in Bipolar Membranes*, 77th APS-Division of Fluid Dynamics, Salt Lake City, UT, 11/24/24
4. B. Rives, F. Henrique, A. Gupta, *Charging dynamics of electrical double layers in a pore with an axially varying radius: Impact of pore shape and roughness*, 77th APS-Division of Fluid Dynamics, Salt Lake City, UT, 11/24/24
5. S. Mirfendereski, E. Coleman, A. Gupta, *Particle-Level simulations using diffusiophoresis and cellular automata to create dynamic Turing patterns*, 77th APS-Division of Fluid Dynamics, Salt Lake City, UT, 11/24/24
6. A. A. Harraq, M. Feng, H. Gauri, A. Gupta, Q. Sun, B. Bharti, *Magnetic Manipulation of Living Organisms without Hybridization*, 2024 AIChE Annual Meeting, San Diego, CA, 10/27/2024
7. F. Henrique, A. Gupta, *Kirchhoff's Laws Get an Upgrade: Double-Layer Dynamics in Pore Networks Described By a De Levie Circuit for an Effective Electrochemical Potential of Charge*, 2024 AIChE Annual Meeting, San Diego, CA, 10/27/2024
8. S. Mirfendereski, A. Gupta, *Merging Turing Patterns and Cellular Automata: Simultaneously Assembling and Evolving Structures Via Diffusiophoresis*, 2024 AIChE Annual Meeting, San Diego, CA, 10/27/2024
9. F. Henrique, P. J. Zuk, A. Gupta, *A Network Model for Ionic Transport in Charged Porous Materials*, ELKIN 2024, Seville, Spain, 09/18/2024
10. F. Henrique, A. Gupta, *Charging dynamics of asymmetric electrolytes in porous media can be represented by magnetically coupled transmission lines*, ACS Fall 2024, Denver, CO, 08/19/2024
11. A. Ganguly, S. Roychowdhury, A. Gupta, *Unified mobility expressions for externally driven and self-phoretic propulsion of particles*, ACS Fall 2024, Denver, CO, 08/19/2024
12. R. R. Raj, A. Gupta, C. W. Shields IV, *Design-driven motion of microrobots powered by acoustic streaming flows*, ACS Fall 2024, Denver, CO, 08/19/2024
13. S. Mirfendereski, B. M. Alessio, E. Coleman, A. Gupta, *Merging Turing patterns and cellular automata: Simultaneously assembling and evolving structures via diffusiophoresis*, ACS Fall 2024, Denver, CO, 08/19/2024
14. N. Jarvey, A. Gupta, *Decomposing total current into capacitive and Faradaic contributions: A theoretical model based on Poisson-Nernst-Planck Equations with Frumkin-Butler-Volmer kinetics*, ACS Fall 2024, Denver, CO, 08/19/2024
15. P. Romero, P. Brimley, W. A. Smith, A. Gupta, *Reduced-order modeling of ion transport in bipolar membranes for electrochemical CO2 capture and conversion*, ACS Fall 2024, Denver, CO, 08/19/2024
16. A. Ganguly, R. R. Raj, C. W. Shields IV, A. Gupta,*Beyond the scallop theorem: Exploring combined mechanical and chemical propulsion mechanisms of a bent rod actuator*, ACS Fall 2024, Denver, CO, 08/19/2024

17. F. Henrique, P. J. Zuk, A. Gupta, *Kirchhoff's laws get an upgrade: Double-layer dynamics in pore networks described by a de Levie circuit for an effective electrochemical potential of charge*, ACS Fall 2024, Denver, CO, 08/19/2024
18. R. R. Raj, N. Day, N. Loomis, E. Cutting, A. Gupta, C. W. Shields IV, *Macrophage transport with helical microrobots: Cell attachment, locomotion, and delivery through mucus*, ACS Fall 2024, Denver, CO, 08/19/2024
19. A. Gupta, *Electrolyte transport in electrochemical capacitors: Impact of porous geometry and EDL-redox coupling*, ACS Fall 2024, Denver, CO, 08/19/2024
20. B. Rives, F. Henrique, A. Gupta, *Effects of pore shape and roughness on charging dynamics of electrical double layers*, ACS Fall 2024, Denver, CO, 08/19/2024
21. A. A. Harraq, M. Feng. H. Gauri, R. Devireddy, A. Gupta, Q. Sun, B. Bharti, *Magnetic fields to manipulate non-magnetic living organisms*, 98th American Chemical Society, Colloids and Interface Science, Seattle, WA, 06/23/2024
22. A. Ganguly, S. Roychowdhury, A. Gupta, *A unified mobility expressions for externally driven and self-phoretic propulsion of particles*, 98th American Chemical Society, Colloids and Interface Science, Seattle, WA, 06/23/2024
23. A. Ganguly, R. R. Raj, C. Becker, A. Gupta, *Motion of catalytically active bent rods with an articulating hinge*, 98th American Chemical Society, Colloids and Interface Science, Seattle, WA, 06/23/2024
24. S. Mirfenderski, B. M. Alessio, E. Coleman, A. Gupta, *Diffusiophoresis-Enhanced Turing Patterns: Continuum and Particle-level Simulations*, 98th American Chemical Society, Colloids and Interface Science, Seattle, WA, 06/23/2024
25. N. Jarvey, F. Henrique, A. Gupta, *Asymmetric rectified electric and concentration fields in multicomponent electrolytes with surface reactions*, 98th American Chemical Society, Colloids and Interface Science, Seattle, WA, 06/23/2024
26. F. Henrique, A. Gupta, *Optimization of Pore Shapes for Electrokinetic Flows Produced by Double-Layer Charging*, 98th American Chemical Society, Colloids and Interface Science, Seattle, WA, 06/23/2024
27. F. Henrique, A. Gupta, *Magnetically Coupled Transmission Lines for Double-Layer Charging of Asymmetric Electrolytes in Confinement*, 98th American Chemical Society, Colloids and Interface Science, Seattle, WA, 06/23/2024
28. N. Jarvey, A. Gupta, *A theoretical model to decompose total current into its capacitive and Faradaic contributions for pseudcoapacitors*, 98th American Chemical Society, Colloids and Interface Science, Seattle, WA, 06/23/2024
29. B. M. Alessio, A. Gupta, *Diffusiophoresis as a mechanism to study human population migration patterns*, 76th APS- Division of Fluid Dynamics, Washington DC, 11/19/2023
30. B. M. Alessio, A. Gupta, *Diffusiophoresis-enhanced Turing patterns*, 76th APS- Division of Fluid Dynamics, Washington DC, 11/19/2023
31. F. Henrique, P. J. Zuk, A. Gupta, *Kirchhoff's Laws Based on Electrochemical Potential of Charge Dictate Double-Layer Charging in Porous Media*, 76th APS- Division of Fluid Dynamics, Washington DC, 11/19/2023

32. N. Jarvey, F. Henrique, A. Gupta, *Asymmetric rectified electric and concentration fields in multicomponent electrolytes with surface reactions*, 76th APS- Division of Fluid Dynamics, Washington DC, 11/19/2023
33. A. Ganguly, S. Roychowdhury, A. Gupta, *Impact of interaction potential lengthscale and surface heterogeneity on phoretic and autophoretic mobilities: Moving beyond the slip velocity approach*, 76th APS- Division of Fluid Dynamics, Washington DC, 11/19/2023
34. R. R. Raj, J. G. Lee, A. Gupta, C. W. Shields, *Effect of geometric design on the motion of microrobots due to acoustic streaming flows*, 76th APS- Division of Fluid Dynamics, Washington DC, 11/19/2023
35. B. M. Alessio, R. R. Raj, and A. Gupta, *Diffusiophoresis-enhanced Turing patterns*, 2023 AIChE Annual Meeting, Orlando, FL, 11/06/2023
36. A. Ganguly, R. R. Raj, C. Baker and A. Gupta, *Self-propelling bent rods: Exploring chemical and mechanical modes of swimming*, 2023 AIChE Annual Meeting, Orlando, FL, 11/06/2023
37. F. Henrique, N. Jarvey, P. J. Zuk and A. Gupta, *Modified Kirchhoff's law for electrical-double-layer charging in porous media*, 2023 AIChE Annual Meeting, Orlando, FL, 11/06/2023
38. A. Ganguly, S. Roychowdhury, and A. Gupta, *Phoretic and Self-Phoretic Motion of Microparticles With Arbitrary Interaction Potentials*, 97th American Chemical Society, Colloids and Interface Science, Raleigh, NC, 06/04/2023
39. A. Ganguly and A. Gupta, *Slender body analysis of a self-propelling bent rod*, 97th American Chemical Society, Colloids and Interface Science, Raleigh, NC, 06/04/2023
40. R. R. Raj, J. G. Lee, A. Gupta, and C. W. Shields, *Impact of geometry on the frequency-dependent response of acoustic microrobots*, 97th American Chemical Society, Colloids and Interface Science, Raleigh, NC, 06/04/2023
41. F. Henrique, P. J. Zuk, and A. Gupta, *Effective Kirchoff's Laws for Double-Layer Charging in Porous Media*, 97th American Chemical Society, Colloids and Interface Science, Raleigh, NC, 06/04/2023
42. B. M. Alessio and A. Gupta, *Programmable colloidal assembly: Turing patterns induced via diffusiophoresis*, 97th American Chemical Society, Colloids and Interface Science, Raleigh, NC, 06/04/2023
43. N. Jarvey, F. Henrique and A. Gupta, *AREFs in multicomponent electrolytes with electrochemical reactions due to imbalance in ionic strength*, 97th American Chemical Society, Colloids and Interface Science, Raleigh, NC, 06/04/2023
44. 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*, 97th American Chemical Society, Colloids and Interface Science, Raleigh, NC, 06/04/2023
45. R. R. Raj, C. W. Shields and A. Gupta, *Diffusiophoretic colloidal highways: Optimizing the colloidal banding induced by two-dimensional solute gradients*, 97th American Chemical Society, Colloids and Interface Science, Raleigh, NC, 06/04/2023
46. A. Ganguly, A. Gupta, *To turn or not to turn: Slender body analysis for a self-propelling axially asymmetric bent rod*, 75th APS- Division of Fluid Dynamics, Indianapolis, IN, 11/20/2022

47. R. Raj, C. Wyatt Shields, A. Gupta, *Rational Design of Two-Dimensional Colloidal Banding*, 75th APS- Division of Fluid Dynamics, Indianapolis, IN, 11/20/2022
48. N. Jarvey, F. Henrique, A. Gupta, *Dynamics of Multicomponent Electrolyte Transport Including the Effects of Electrical Double Layers and Redox Reactions*, 75th APS- Division of Fluid Dynamics, Indianapolis, IN, 11/20/2022
49. F. Henrique, P. J. Zuk, A. Gupta, *Electrical-Double-Layer Charging in a Complex Network of Pores*, 75th APS- Division of Fluid Dynamics, Indianapolis, IN, 11/20/2022
50. A. Christensen, A. Gupta, G. Chen, W. Peters, M. Knoblauch, H. Stone, K. Jensen, *Optimal geometry for surface-enhanced diffusion*, 75th APS- Division of Fluid Dynamics, Indianapolis, IN, 11/20/2022
51. R. Raj, C. Wyatt Shields A. Gupta, *Two-Dimensional Diffusiophoretic Banding of Colloidal Particles*, 2022 Annual AIChE Meeting, Phoenix, AZ, 11/15/2022
52. 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, 11/15/2022
53. 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, 11/15/2022
54. A. Ganguly, R. Raj, A. Gupta
    Impact of Surface Heterogeneity on Diffusiophoresis of Colloids in a Mixture of Electrolytes and Non-electrolytes, 96th American Chemical Society, Colloids and Interface Science, Golden, CO, 07/10/2022
55. R. Raj, C. W. Shields IV, A. Gupta *Programmable Two-dimensional Diffusiophoretic Banding of Colloidal Particles*, 96th American Chemical Society, Colloids and Interface Science, Golden, CO, 07/10/2022
56. A. Ganguly, A. Gupta, *Control of Phoretic Self-Propulsion through Particle Geometry: Slender-body Analysis of an Asymmetric Bent Rod*, 96th American Chemical Society, Colloids and Interface Science, Golden, CO, 07/10/2022
57. 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*, 96th American Chemical Society, Colloids and Interface Science, Golden, CO, 07/10/2022
58. 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*, 96th American Chemical Society, Colloids and Interface Science, Golden, CO, 07/10/2022
59. J. G. Lee, R. R. Raj, C. Thome, A. Gupta, C. W. Shields, *Bubble-based Acoustic Propellers for Sustained Corticosteroid Delivery in the Bladder*, 96th American Chemical Society, Colloids and Interface Science, Golden, CO, 07/10/2022
60. 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, 07/10/2022

61. 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*, 19th U.S. National Congress on Theoretical and Applied Mechanics, Austin, TX, 06/19/2022
62. F. Henrique, P. J. Zuk, A. Gupta, *Charging Dynamics of Electrochemical Capacitors*, 19th U.S. National Congress on Theoretical and Applied Mechanics, Austin, TX, 06/19/2022
63. N. Jarvey, F. Henrique, A. Gupta, *Impact of Faradaic Reactions on the Charging Dynamics of the Electrical Double Layers*, 74th APS - Division of Fluid Dynamics, Phoenix, AZ, 11/21/2021
64. F. Henrique, P. J. Zuk, A. Gupta, *Influence of Relative Debye Length on Electric-Double-Layer Charging Inside a Nanopore*, 74th APS - Division of Fluid Dynamics, Phoenix, AZ, 11/21/2021
65. 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, 11/07/2021

Presentations prior to University of Colorado Boulder

66. 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
67. A. Gupta, P. J. Zuk, S. Shim, H. A. Stone, Thick Double Layers: From Energy Storage to Diffusiophoresis, 73rd APS - Division of Fluid Dynamics, Chicago, IL
68. 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, WA
69. 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
70. 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
71. 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
72. A. Gupta, T. A. Hatton, P. S. Doyle, Nanoemulsion Formation: Controlling and Predicting Droplet Size, 2017 Annual AIChE Meeting, Minneapolis, MN
73. 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
74. A. Gupta, T. A. Hatton, P. S. Doyle, Nanoemulsion Formation: Controlling and Predicting Droplet Size, 2016 Annual AIChE Meeting, San Francisco, CA
75. A. Gupta, H. Lee, T. A. Hatton, P. S. Doyle, Controlled Oil Entrapment through Photo-Patterned Obstacles, 2016 Annual AIChE Meeting, San Francisco, CA

76. A. Gupta, T. A. Hatton, P. S. Doyle, Nanoemulsion Formation: Controlling and Predicting Droplet Size, 90th ACS Colloids Meeting, Cambridge, MA
77. A. Gupta, T. A. Hatton, P. S. Doyle, Nanoemulsion Formation: Controlling and Predicting Droplet Size, 90th ACS Colloids Meeting, Cambridge, MA
78. 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
79. 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 Student Advisees**
   Bryce Rives, University of Colorado Boulder, 2023 - present
   Peter Romero (co-advised), University of Colorado Boulder, 2023 - present
   Arkava Ganguly, University of Colorado Boulder, 2021 - present
   Ritu Raj (co-advised), University of Colorado Boulder, 2021 - present
   Nathan Jarvey, University of Colorado Boulder, 2020 - 2024 (defend PhD in August 2024)
   Filipe Henrique, University of Colorado Boulder, 2020 - 2024 (defend PhD in August 2024)
2. **Postdoctoral Mentee**
   Siamak Mirfendereski, University of Colorado Boulder, 2024-present
3. **Undergraduate Student Advisees**
   Lucas Bayer, University of Colorado Boulder, 2023-present
   Cora Becker, University of Colorado Boulder, 2023-present
   Grace Origer, University of Colorado Boulder, 2023-present
   Paloma Suarez, University of Colorado Boulder, 2024-present
   Zoe Cruse, University of Colorado Boulder, 2022 - 2024
   Sajan Williams, University of Colorado Boulder, 2022 -2024
   Ben Alessio, University of Colorado Boulder, 2023
   Eliot Rusley, University of Colorado Boulder, 2022 - 2023
   Rosby Robinson, University of Colorado Boulder, 2023
   William Steinfort, University of Colorado Boulder, 2022
   Alex Jimenez, University of Colorado Boulder, 2021
   Jackson Shropshire, University of Colorado Boulder, 2020
   Ben Alessio, Princeton University, 2020 - 2021
   Azmaine Iqtidar, Princeton University, 2020
   Comsin Andrei, Princeton University, 2019
   Cameron McKensize, Princeton University, 2018-19
   Connor H. Matthews, Princeton University, 2018-19
   Lisa E. Archibald, MIT, 2016-17
   Mohammad Alsobay, MIT, 2015
   Galym Saparbaiuly, MIT, 2015
   Elezhan Zhakiya, MIT, 2015
   Robbie Shaw, MIT, 2014-15

4. **Awards/Honors to Advisees**
   November 2024: Paloma Suarez, Poster Award in Material Science, AIChE August 2024: Grace Origer, Student Poster Award in Colloid & Surface Chemistry, ACS Fall
   August 2024: Ritu Raj, Presenter at the CU Boulder Innovation in Materials Symposium
   August 2024: Paloma Suarez, Second Prize in Materials Category, YSSRP Poster
   April 2024: Filipe Henrique, Max Peters Outstanding Graduate Student Award
   April 2024: Ritu Raj, Outstanding Department Teaching Award
   April 2024: Julia Callejon, Outstanding Department Teaching Award
   April 2024: Zoe Cruse, NSF Graduate Research Fellowship
   December 2023: Arkava Ganguly, Teets Family Endowed Doctoral Fellowship
   November 2023: Zoe Cruse, Poster Award in Material Science, AIChE
   October 2023: Zoe Cruse, Gulf Coast Undergraduate Research Symposium
   September 2023: Nathan Jarvey, GAANN Fellowship
   June 2023: Filipe Henrique, Outstanding Department Teaching Award
   June 2023: Nathan Jarvey, Link Energy Fellowship Honorable Mention
   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
   August 2022: Nathan Jarvey, ARCS Scholar
   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), 3 credits**
   University of Colorado Boulder, Spring 2024
   Course level: undegraduate, enrollment: 77
2. **Instructor, Transport Phenomena (CHEN5210), 4 credits**
   University of Colorado Boulder, Spring 2024
   Course level: graduate, enrollment: 28
3. **Instructor, Fluid Mechanics (CHEN3200), 3 credits**
   University of Colorado Boulder, Spring 2023
   Course level: undegraduate, class strength: 67
4. **Instructor, Transport Phenomena (CHEN5210), 3 credits**
   University of Colorado Boulder, Fall 2022
   Course level: graduate, enrollment: 29
5. **Instructor, Transport Phenomena (CHEN5210), 3 credits**
   University of Colorado Boulder, Fall 2021
   Course level: graduate, enrollment: 18

6. **Instructor, Transport Phenomena (CHEN5210), 3 credits**
   University of Colorado Boulder, Spring 2021
   Course level: graduate, enrollment: 34
7. **Guest Lecturer, Advanced Heat and Mass Transfer (CBE505)**
   Princeton University, Spring 2020
   Course level: graduate, enrollment: 25
   Responsibility: developed and delivered 3 lectures on electrokinetics (*delivered remotely due to COVID-19*)
8. **Instructor, Electrokinetics for Energy and the Environment (MAE 559)**
   Princeton University, Fall 2018
   Course level: graduate, enrollment: 20 (including audit, listeners)
   Responsibility: developed and delivered 75% of lectures
9. **Graduate Instructor, Fluid Mechanics (10.301)**
   MIT, Spring 2017 Course level: undegraduate, enrollment: 58
   Responsibility: 40% lectures, 50% recitations
10. **Teaching Assistant, Transport Processes (10.302)**
    MIT, Fall 2014
    Course level: undegraduate, enrollment: 71
11. **Teaching Assistant, Junior Design Course (CHL471)**
    IIT Delhi, Spring 2012
    Course level: undegraduate, enrollment: 120
12. **Instructor of Mathematics and Physics, Vidyamandir Classes**
    Delhi, 2009-11
    Course level: high school, enrollment: 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**
   Fluids Programming Committee, AIChE, 2024-2034
   Organizer, Interfacial Phenomena & Dynamics in Electrochemical Systems, 4-session minisymposia, ACS Fall, 2024
   Chair, Electrokinetics and Microfluidics, ACS Colloids, 2024
   Chair, Electrokinetic Transport III, APS DFD, 2023
   Chair, Micro/Nano scale Flows: Electrokinetics, APS DFD, 2023
   Chair, Interfacial and Nonlienar Flows: Multiphase and Fields, AIChE Annual Meeting, 2023
   Chair, Microfluidic and Microscale Flows, AIChE Annual Meeting, 2022
   Organizer, Electrokinetics for Nano- and Microfluidics, 2-day minisymposia, USNCTAM, 2022
   Chair, General Aspects for Colloids and Interface, ACS Colloids, 2022
   Chair, Interfacial and Nonlinear Flows: Multiphase and Fields, AIChE Annual Meeting, 2021

SERVICE AT UNIVERSITY OF COLORADO BOULDER

1. **Departmental committees and service**
   Graduate Committee 2021-present
   Teaching Quality Framework Committee, 2021-2023
   New Chair Search Committee, 2023
   Graduate Student Award Committee, 2021-2023
   Outstanding Doctoral Dissertation Committee, 2023
   Preliminary Exam Committee, 2021-present

2. **Thesis committees**
   Gesse Roure, 2021 - 2023
   Yifeng Mao, 2022 - 2024
   Paige Brimley, 2021 - 2024
   Laura Herrera, 2021 - 2024
   Cooper Thome, 2021 - present
   Nate Schwindt, 2022 - present
   Katarina Odak, 2022 - present
   Talaial Alina, 2022 - present
   Luis Kitsu, 2022 - present
   Benjamin Rich, 2023 - present
   Owen Asaro Lee, 2023 - present
   Julie Nguyen, 2023 - present
   Trisha Nickerson, 2023 - present
   Brandon Oliphant, 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)
   Archimedes principle (link)
   When to open parachute while skydiving (link)
   Flow visualization and continuity equation (link)
   Bernoulli's pipe flow network (link)

2. **Digital simulations for research oureach** Charging into a porous sphere (link)