

ADITYA BANDOPADHYAY

Curriculum Vitæ

Assistant Professor
Indian Institute of Technology Kharagpur
Kharagpur – 721302, West Bengal
Phone: +91 - 9932990007
Email: adityabandopadhyay@gmail.com
aditya@mech.iitkgp.ernet.in

Personal Information

Date of birth:	26 August, 1989	Nationality:	Indian
Place of birth:	Nagpur, Maharashtra, India	Hometown:	Nagpur, Maharashtra, India
Present residence:	Kharagpur, West Bengal, India		

Employment

Aug 2017 – Present	Assistant Professor Indian Institute of Technology Kharagpur, India Department of Mechanical Engineering
Jan 2017- Aug 2017	Alexander von Humboldt fellow Institute for Nano- and Microfluidics, TU Darmstadt, Darmstadt, Germany Project: "Flows over liquid impregnated surfaces" Advisors: Professor Steffen Hardt
Nov. 2015 - Dec 2016	Postdoctoral researcher CNRS, Geosciences Rennes UMR-6118, University of Rennes 1, France Project: "Mixing and reaction in porous media" Advisors: Professor Tanguy Le Borgne & Professor Yves Méheust

Education

May 2015 Defended Oct. 2015	Ph.D. Indian Institute of Technology Kharagpur, India Advanced Technology Development Center (ATDC) Title of thesis: 'Consistent Predictions of Streaming Potential in Micro- and Nano-channels' Advisor: Professor Suman Chakraborty
May 2012	Dual Degree (Integrated Bachelor and Master of Technology) Indian Institute of Technology Kharagpur, India Major: Mechanical Engineering Masters specialization: Thermal Science and Engineering CGPA: 9.38/10 Department rank: 1 (Institute Silver Medal)
June 2007	Higher Secondary School Certificate (HSSC) MP Deo Memorial Dharampeth Science College, Nagpur, India Maharashtra State Board Percentage: 90.17 %
June 2005	Secondary School Certificate (SSC) St. Xavier's High School, Nagpur, India Maharashtra State Board Percentage: 88.26 %

Academic Awards and Achievements

- 2018, 2019 Invited Professor (University of Rennes 1, France)
- 2018 Associate member of Indian Academy of Sciences
- 2016 Humboldt fellowship (Alexander von Humboldt foundation)
- 2012 Institute Silver Medal (Rank 1: Mechanical Engineering) - IIT Kharagpur
- 2012 Proficiency Award (Best Project Award) - IIT Kharagpur
- 2012 Dwarka Nath Singh Memorial Prize (Best outgoing student from Mechanical Engg.)-IIT Kharagpur
- 2011 MITACS globalink scholar - Univ. of Alberta, Canada
- 2010 H.P. Bhadury Award (Highest CGPA in Mechanical Engg. at the end of 3rd year) - IIT Kharagpur
- 2010 J.C. Ghosh Award (Highest CGPA in Mechanical Engg. among all 3rd year students) - IIT Kharagpur
- 2010 Todai Scholarship - Univ. of Tokyo and Mori Seiki Ltd, Japan
- 2009 Kumund Monorama Prize (Highest CGPA in Mechanical Engg at the end of 2nd year)- IIT Kharagpur

Publications

Journal

1. Chakravorty, A., Maitra, A., **Bandopadhyay A.**, (2020) Enhanced mass transfer by superimposed flow pulsation on continuous flow, Canadian Journal of Chemical Engineering, In press
2. Mahapatra B, & **A Bandopadhyay**, (2020) Electroosmosis of a viscoelastic fluid over non-uniformly charged surfaces: Effect of fluid relaxation and retardation time, Physics of Fluids, 32(3), 032005
3. Hartmann, S Hardt, S Zhao, **A Bandopadhyay**, (2020) Electric-Field-Induced Pattern Formation in Layers of DNA Molecules at the Interface between Two Immiscible Liquids, Physical Review Letters, 124(6), 064501
4. Lester, D., **Bandopadhyay, A.**, Dentz, M., & Le Borgne T., (2019) Hydrodynamic Dispersion and Lamb Surfaces in Darcy Flow. Transport in Porous Media 130(3), 903
5. Chakravorty, A., Maitra, A., **Bandopadhyay A.**, (2019) Liquid-liquid mass transfer enhancement due to T-junction modified with an air damper. Industrial and Engineering Chemistry Research, 58(40), 18810
6. Das, SS., Pedireddi, VM, **Bandopadhyay, A.**, Saha, P., and Chakraborty, S. (2019) Electrical power generation from wet textile mediated by spontaneous nano scale evaporation. Nano letters, 19(10), 7191
7. Poddar, A., Mandal S, **Bandopadhyay, A.**, and Chakraborty, S. (2019) Electrorheology of a dilute emulsion of surfactant-covered drops, Journal of Fluid Mechanics, 881, 524-550
8. Poddar, A., Mandal S, **Bandopadhyay, A.**, and Chakraborty, S. (2019) Electrical switching of a surfactant coated droplet in Poiseuille flow, Journal of Fluid Mechanics, 870, 27
9. Poddar, A., **Bandopadhyay, A.**, & Chakraborty, S. (2019). Activated micromotor propulsion by enzyme catalysis in a biofluid medium, Applied Physics Letters, 114 (5), 053701
10. **Bandopadhyay, A.**, Davy, P., & Le Borgne, T. (2018). Shear flows accelerate mixing dynamics in hyporheic zones and hillslopes. Geophysical Research Letters, 45(21), 11-659.

11. **Bandopadhyay, A.**, and Ghosh, U. (2018) Electrohydrodynamic Phenomena, Journal of the Indian Institute of Science, Vol. 98(2) pp. 201-225
12. Poddar, A., Mandal S, **Bandopadhyay, A.**, and Chakraborty, S. (2018) Sedimentation of a surfactant-laden drop under the influence of an electric field, Journal of Fluid Mechanics, Vol. 849, pp. 277-311
13. Mandal, S., Sinha, S., **Bandopadhyay, A.**, and Chakraborty, S. (2018) Drop deformation and emulsion rheology under the combined influence of uniform electric field and linear flow, Journal of Fluid Mechanics Vol. 841, pp. 408-433
14. **Bandopadhyay, A.**, and Hardt, S. (2017) Stability of horizontal viscous fluid layers in a vertical arbitrary time periodic electric field, Physics of Fluids Vol. 29(12), p. 124101
15. **Bandopadhyay, A.**, Le Borgne T., Meheust Y., and Dentz, M. (2017) Enhanced reaction kinetics and reactive mixing scale dynamics in mixing fronts under shear flow for arbitrary Damkohler numbers, Advances in Water Resources Vol. 100 pp. 78-95
16. Mandal, S., **Bandopadhyay, A.**, and Chakraborty, S. (2017) The effect of surface charge convection and shape deformation on the settling velocity of drops in nonuniform electric field, Physics of Fluids Vol. 29(1), p. 012101
17. **Bandopadhyay, A.**, Mandal, S., and Chakraborty, S., (2017) Capillary transport of two immiscible fluids in presence of electroviscous retardation, Electrophoresis Vol.. 38(5) pp. 747-754
18. Mandal, S., **Bandopadhyay, A.**, and Chakraborty, S. (2016) The effect of uniform electric field on the cross-stream migration of a drop in plane Poiseuille flow, Journal of Fluid Mechanics Vol. 809, pp. 726-774
19. Maity, D., **Bandopadhyay, A.**, and Chakraborty, S. (2016) Rheology modulated non-equilibrium fluctuations in time-dependent diffusion processes Physica A Vol. 462, pp. 654-666
20. Mandal, S., **Bandopadhyay, A.**, and Chakraborty, S. (2016) Dielectrophoresis of a surfactant-laden viscous drop, Physics of Fluids Vol. 28 (6), p. 062006
21. Poddar, A., Maity, D., **Bandopadhyay, A.**, and Chakraborty, S. (2016) Electrokinetics in polyelectrolyte grafted nanofluidic channels modulated by ion partitioning effect, Soft Matter Vol. 12, pp. 5968-5978
22. **Bandopadhyay, A.**, Tripathi, D., and Chakraborty, S. (2016) Electroosmosis-modulated peristaltic transport in microfluidic channels, Physics of Fluids Vol. 28(5), p. 052002
23. Mandal, S., **Bandopadhyay, A.**, and Chakraborty, S., (2016) Effect of surface charge convection and shape deformation on the dielectrophoretic motion of a liquid drop, Physical Review E Vol. 93, p. 043127
24. **Bandopadhyay, A.**, Mandal, S., Kishore, N. K., and Chakraborty, S., (2016) Uniform electric-field-induced lateral migration of a sedimenting drop, Journal of Fluid Mechanics Vol. 792, pp. 553-589
25. **Bandopadhyay, A.**, Mandal, S., and Chakraborty, S., (2016) Streaming potential-modulated capillary filling dynamics of immiscible fluids, Soft Matter Vol. 12, pp. 2056-2065
26. Goswami, P., Chakraborty, J., **Bandopadhyay, A.**, and Chakraborty, S., (2016) Electrokinetically modulated peristaltic transport of power-law fluids. Microvascular research Vol. 103, pp. 41-54
27. Mandal, S., **Bandopadhyay, A.**, and Chakraborty, S., (2015) Effect of interfacial slip on the cross-stream migration of a drop in an unbounded Poiseuille flow. Physical Review E Vol. 92, pp. 023002-0230017

28. Dhar, J., **Bandopadhyay, A.**, and Chakraborty, S., (2015) Taylor-Couette Flow of Electrorheological Fluids under Electrical Double Layer Phenomenon. *Journal of Non-Newtonian Fluid Mechanics* Vol. 223, pp. 165-175
29. **Bandopadhyay, A.**, DasGupta, D., Mitra, S. K., and Chakraborty, S., (2015) Computation of Streaming Potential in Porous Media: Modified Permeability Tensor. *Journal of Computational Physics* Vol. 300, pp. 53-69
30. Mandal, S., Ghosh, U., **Bandopadhyay, A.**, and Chakraborty, S., (2015) Electro-osmosis of superimposed fluids in presence of modulated charged surfaces in narrow confinements. *Journal of Fluid Mechanics* Vol. 776, pp. 390-429
31. Veerubhotla, R., **Bandopadhyay, A.**, Das, D., and Chakraborty, S., (2015) Instant power generation from an air-breathing paper and pencil based bacterial bio-fuel cell. *Lab Chip* Vol. 15, pp. 2580-2583.
32. **Bandopadhyay, A.**, Shaik, V.A., and Chakraborty, S., (2015). Effects of finite ionic size and solvent polarization on the dynamics of electrolytes probed through harmonic disturbances. *Physical Review E* Vol. 91, pp. 042307–042315.
33. Mondal, P.K., DasGupta, D., **Bandopadhyay, A.**, Ghosh, U., and Chakraborty, S., (2015). Contact line dynamics of electroosmotic flows of incompressible binary fluid system with density and viscosity contrasts. *Phys. Fluids* Vol. 27, pp. 032109–032128.
34. **Bandopadhyay, A.**, and Chakraborty, S., (2015). Consistent prediction of streaming potential in non-Newtonian fluids: the effect of solvent rheology and confinement on ionic conductivity. *Phys. Chem. Chem. Phys.* Vol. 17, pp. 7282-7290.
35. **Bandopadhyay, A.**, Goswami, P., and Chakraborty, S., (2014). Effect of streaming current on helical flows of power law fluids. *Phys. Fluids* Vol. 26, pp. 122003–122017.
36. Goswami, P., **Bandopadhyay, A.**, and Chakraborty, S., (2014). Streaming Potential in Narrow Fluidic Confinements - A Theoretical Perspective. *Int. J. Micro-Nano Scale Transp.* Vol. 5, pp. 109–130.
37. Mondal, P.K., DasGupta, D., **Bandopadhyay, A.**, and Chakraborty, S., (2014). Pulsating flow driven alteration in moving contact-line dynamics on surfaces with patterned wettability gradients. *J. Appl. Phys.* Vol. 116, pp. 084302–084313.
38. **Bandopadhyay, A.**, Hossain, S.S., and Chakraborty, S., (2014). Ionic size dependent electroviscous effects in ion-selective nanopores. *Langmuir* Vol. 30, pp. 7251–7258.
39. **Bandopadhyay, A.**, Ghosh, U., and Chakraborty, S., (2014). Capillary filling dynamics of viscoelastic fluids. *Physical Review E* Vol. 89, pp. 053024–053033.
40. **Bandopadhyay, A.**, Ghosh, U., Pal, D., Chaudhury, K., and Chakraborty, S., (2014). Electrokinetic Maneuvering of Bubble-Driven Inertial Micro-Pumping Systems. *Int. J. Micro-Nano Scale Transp.* Vol. 5, pp. 13–22.
41. Mondal, P.K., Ghosh, U., **Bandopadhyay, A.**, DasGupta, D., and Chakraborty, S., (2014). Pulsating electric field modulated contact line dynamics of immiscible binary systems in narrow confinements under an electrical double layer phenomenon. *Soft Matter* Vol. 10, pp. 8512–8523.
42. **Bandopadhyay, A.**, Ghosh, U., and Chakraborty, S., (2013). Time periodic electroosmosis of linear viscoelastic liquids over patterned charged surfaces in microfluidic channels. *J. Non-Newton. Fluid Mech.* Vol. 202, pp. 1–11.

43. **Bandopadhyay, A.**, Goswami, P., and Chakraborty, S., (2013). Regimes of streaming potential in cylindrical nano-pores in presence of finite sized ions and charge induced thickening: An analytical approach. *J. Chem. Phys.* Vol. 139, pp. 224503–224515.
44. Dhar, J., **Bandopadhyay, A.**, and Chakraborty, S., (2013). Electro-osmosis of electrorheological fluids. *Physical Review E* Vol. 88, pp. 053001–053009.
45. **Bandopadhyay, A.**, Dhar, J., and Chakraborty, S., (2013). Effects of solvent-mediated nonelectrostatic ion-ion interactions on a streaming potential in microchannels and nanochannels. *Physical Review E* Vol. 88, pp. 033014–033023.
46. Mondal, P.K., Ghosh, U., **Bandopadhyay, A.**, Dasgupta, D., and Chakraborty, S., (2013). Electric-field-driven contact-line dynamics of two immiscible fluids over chemically patterned surfaces in narrow confinements. *Physical Review E* Vol. 88, pp. 023022–023034.
47. **Bandopadhyay, A.**, and Chakraborty, S., (2013). Ionic size dependent electroosmosis in ion-selective microchannels and nanochannels. *Electrophoresis* Vol. 34, pp. 2193–2198.
48. **Bandopadhyay, A.**, Dasgupta, D., Mitra, S.K., and Chakraborty, S., (2013). Electro-osmotic flows through topographically complicated porous media: Role of electropermeability tensor. *Physical Review E* Vol. 87, pp. 033006–033017.
49. **Bandopadhyay, A.**, and Chakraborty, S., (2012). Combined effects of interfacial permittivity variations and finite ionic sizes on streaming potentials in nanochannels. *Langmuir* Vol. 28, pp. 17552–17563.
50. **Bandopadhyay, A.**, and Chakraborty, S., (2012). Giant augmentations in electro-hydro-dynamic energy conversion efficiencies of nanofluidic devices using viscoelastic fluids. *Applied Physics Letters* Vol. 101, pp. 043905–043908.
51. **Bandopadhyay, A.**, and Chakraborty, S., (2012). Electrokinetically induced alterations in dynamic response of viscoelastic fluids in narrow confinements. *Physical Review E* Vol. 85, pp. 056302–056312.
52. **Bandopadhyay, A.**, and Chakraborty, S., (2011). Steric-effect induced alterations in streaming potential and energy transfer efficiency of non-newtonian fluids in narrow confinements. *Langmuir* Vol. 27, pp. 12243–12252.

Conferences/Posters/Invited talks

1. Sen, S., Singh, P., Heyman, J., Le Borgne, T., & **Bandopadhyay, A.** (2020, April). Signature of coalescence during scalar mixing in heterogeneous flow fields. In *European Geosciences Union General Assembly* (pp. EGU2020-11019).
2. J Hartmann, S Hardt, S Zhao, A Bandopadhyay Electric-Field Induced Pattern Formation in Layers of DNA Molecules at the Interface between Two Immiscible Liquids. *Bulletin of the APS*, 2019
3. Daniel Robert Lester, Marco Dentz, Aditya Bandopadhyay, Tanguy Le Borgne, 2019, Does Asymptotic Transverse Macrodispersion Exist In Steady Darcy Flow? *AGU Fall meeting* 2019
4. Bandopadhyay, A. Invited Talk, IISF 2019 Kolkata, Mixing with the flow.
5. Das, S. **Bandopadhyay, A.**, Saha P., and Chakraborty, S., Capillary driven electrokinetic power generator, *APS DFD, USA*, Nov 2018
6. Le Borgne, T., **Bandopadhyay, A.**, Bochet, O., Dufresne, A., Farasin, J., Bethencourt, L., ... & Davy, P. (2018, December). Dynamics of reactive mixing hot spots from hyporheic zones to fractured media. In *American Geophysical Union 2018, Fall Meeting* (H13E-01).
7. **Bandopadhyay, A.**, Le Borgne, T., Davy, P., Reaction and dilution due to topography driven flows, *Computational Methods in Water Resources*, St. Malo France, May 2018

8. Bandopadhyay, A., Shear enhanced mixing, Invited talk, IISc Bangalore, April 2018
9. Bandopadhyay, A., Dentz, M., Lester D., and Le Borgne, T., Kinematic metric to quantify fast reactions in transport through heterogeneous media (2018) CMWR, St. Malo, France, May, 2018
10. Le Traon, C., Bandopadhyay, A., Gaillardet, J., Lin, M., Davy, P., and Le Borgne, T., Effect of streamline distribution and mixing on reactive processes at the hillslope scale (2018) CMWR, St. Malo, France, May, 2018
11. Dentz, M., **Bandopadhyay, A.**, Lester D., Le Borgne, T., and De Barros, FPJ., (2018) The dynamics of fluid deformation in Darcy scale porous media and impact on mixing, Interpore Conference, New Orleans.
12. **Bandopadhyay, A.**, Le Borgne, T., and Davy, P., (2017) Linking Surface Topography Variations To Subsurface Mixing And Reaction Patterns, AGU Dall Meeting, December 2017
13. Veerubhotla, R., Bandopadhyay, A., Chakraborty, S., and Das, D. (2017) Bioelectricity generation using a miniature biophotovoltaic device, ISMET 6, Lisbon, Portugal, October, 2017
14. **Bandopadhyay, A.**, Le Borgne, T., and Davy, P., (2017) Topography driven reactive mixing, **Mixing Day**, Rennes, France, May 2017
15. Dentz, M., **Bandopadhyay, A.**, Lester D., Le Borgne, T., and De Barros, FPJ., (2017) Fluid Stretching in heterogeneous porous media as a coupled continuous time random walk, **Interpore Conference**, Rotterdam, Netherlands, April, 2017
16. Ghosh, U., **Bandopadhyay, A.**, Jougnot, D., Le Borgne, T., & Meheust, Y., (2017), Coupled charge migration and fluid mixing in reactive fronts, **Interpore Conference**, Rotterdam, Netherlands, April, 2017
17. **Bandopadhyay, A.**, Le Borgne, T., and Davy, P., (2017) Control of topography gradients on residence time distributions, mixing dynamics, and reactive hotspots development, **EGU General Assembly Conference, Vienna**, Austria, April 2017
18. Ghosh, U., **Bandopadhyay, A.**, Jougnot, D., Le Borgne, T., & Meheust, Y., (2017), Coupled charge migration and fluid mixing in reactive fronts, **EGU General Assembly Conference**, Vienna, Austria, April 2017
19. **Bandopadhyay, A.**, Méheust, Y., Le Borgne, T. & Dentz, M., (2016) Reaction Kinetics and Mixing Fronts for Arbitrary Damkohler Numbers. **AGU Fall Meeting**, San Francisco, USA, Dec. 12, 2016.
20. Lester, D., **Bandopadhyay, A.**, Dentz, M. & Le Borgne, T., (2016) Mode Reduction and Upscaling of Reactive Transport Under Incomplete Mixing. **AGU Fall Meeting**, San Francisco, USA, Dec. 12, 2016.
21. **Bandopadhyay, A.**, Méheust, Y., Le Borgne, T. & Dentz, M., (2016) Reaction fronts for arbitrary Damköhler numbers. **JMC15**, Bordeaux, France, August 22, 2016.
22. **Bandopadhyay, A.**, (2016) Reaction kinetics of stretched mixing fronts for arbitrary Damköhler numbers (Invited talk). **Mixing day in Marseille - IRPHE & Federation Fabri de Peiresc**, Marseille, France, May 18, 2016.
23. **Bandopadhyay, A.**, Méheust, Y., & Le Borgne, T., (2016) Reaction front dynamics under shear flow for arbitrary Damköhler numbers. **EGU Conference**, Vienna, Austria, April 22, 2016.
24. Mondal, P. K., **Bandopadhyay, A.**, DasGupta, D., Ghosh, U. & Chakraborty, S., (2014). Contact-line-motion of immiscible fluids over asymmetrically placed chemical patches in narrow confinement. **5th International and 41st National Conference on Fluid Mechanics and Fluid Power**, IIT Kanpur, India, December 12-14, 2014.
25. **Bandopadhyay, A.**, Ghosh, U., Choudhury, K., and Chakraborty, S., (2013). Electrokinetic maneuvering of bubble-driven inertial micro-pumping systems. **22nd national and 11th international ISHMT-ASME Heat and Mass Transfer Conference**, IIT Kharagpur, India, December 28-31, 2013.
26. Mitra, D., Patel, H., **Bandopadhyay, A.** and Lee, L. P., (2010). Integrated Molecular Diagnostic Systems (iMDs) : A Breast Cancer Theranostic Platform. **LabAutomation 2010**, Palm Springs, CA, USA.

Patents:

1. Augmentation in liquid-liquid extraction with the aid of pulsatile flow with air-damper, Abir Chakravorty and Aditya Bandopadhyay patent filing under process: IIT/PAT/21551 2020
2. Development of System of Rice Intensification (SRI) nursery seeder, Akshay Chaudhary, EV Thomas, DK Swain, PBS Bhadoria, Aditya Bandopadhyay, 3889/ASA/PP-2928/IIT,KGP
3. Electrokinetic Power Harvesting from Wet Textile, Sankha Suvra Das, VM Pedireddy, Aditya Bandopadhyay, Suman Chakraborty PAA2879

4. Hematocrit measurement from a single drop of blood using a simple equipment free method, Sampad Laha, Aditya Bandopadhyay, Suman Chakraborty, 3871/ASA/PP-2913/IIT, Kgp