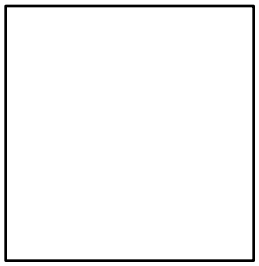

MANASH PRATIM BORTHAKUR, PhD

Professional profile

'A PhD holder in Mechanical Engineering with a passion for teaching and research.'

Highly motivated, resourceful and methodical individual with a versatile skillset for exploring a wide range of fluid flow phenomenon. Proven expertise in computational fluid dynamics and molecular modelling techniques. Ability to absorb and apply new concepts with minimal oversight and a high level of professional integrity. Enjoys contributing meaningfully to collaborative environments. Possesses excellent interpersonal and communication skills. Extensively published in leading scientific journals and presented in international conferences.

Core competencies

- Computational fluid dynamics
- Respiratory and biological flows
- Multi-phase flows
- Molecular dynamics
- Nanoscale flow and transport
- Carbon nanotubes and graphene

Technical skills

- Proficient in programming languages – **C, FORTRAN, PYTHON.**
- Experience of in-house code development/usage – **CLSVOF** for multiphase flows.
- Working experience of open source CFD packages **– GERRIS, BASILISK, OPENFOAM.**
- Experience in commercial software packages for designing - **AUTOCAD and CATIA**.
- Experience in commercial CFD package – **ICEM-CFD, FLUENT, COMSOL.**
- Proficient in molecular simulation and visualization packages – **LAMMPS** and **VMD.**

Professional research

20/08/2020 – 19/08/2021 **NATIONAL RESEARCH COUNCIL, Rome, Italy**

Designation: **Postdoctoral Researcher** Manager: Dr. Simone Melchionna

- Development and evaluation of an 'in-house' computational framework for investigating human respiratory flows.
- Investigate the airflow dynamics and particle transport during respiration through an averaged human nasal cavity, in the context of Covid-19 pandemic.

- Explore the airflow characteristics inside CT scan based lung models and the human airway tree.
- Analyze the effect of Covid induced physiological changes on the airflow inside human lungs and airway tree.

Collaborators: Dr. Cecilia Voena (National Institute for Nuclear Physics, Italy), Dr. Fabio Sterpone (CNRS, France), Dr. Anna Carobene (San Raffaele Hospital, Italy).

07/06/2019 – 06/06/2020 **KTH ROYAL INSTITUTE OF TECHNOLOGY, Sweden**

Designation: **Postdoctoral Researcher** Manager: Prof. Shervin Bagheri

- Development of a computational framework for simulating moving contact lines (MCL) using the volume-of-fluid approach.
- Open source solver 'Paris Simulator' employed for the simulations.
- Evaluate the suitability and performance of different dynamic contact line models.
- Implement the Generalized Navier Boundary condition (GNBC) for modelling the motion of the MCL.
- Perform detailed validation of the framework with analytical and experimental data.
- Conduct proof-of-concept simulations of interfacial flows in porous scaffold structures using the developed framework.

Collaborators: Prof. Stephane Zaleski (Sorbonne Université, France), Prof. Gustav Amberg (KTH Royal Institute of Technology, Sweden).

Industrial experience

- 01/04/2022 – Present **MEDLEA S.R.L.S.**

  Designation : **Consultant Engineer** Rome, Italy (Remote mode)

  Role : Working as a CFD consultant for development, simulation and testing of proprietary solution applied for real world fluid flow and heat transfer applications.

- 01/04/2011 – 13/04/2012 **NUMALIGARH REFINERY LIMITED**

  Designation : **Graduate Engineer Trainee (GET)** Guwahati, India

  Role : Handling of the entire technical and operational aspects of retail dispensers (Petrol and Diesel) in and around the Guwahati region, Assam, India.

- 29/03/2010 – 02/09/2010 **TATA CONSULTANCY SERVICES**

  Designation : **Assistant System Engineer (Trainee)** Mumbai, India

  Role : Development of software products for commercial applications employing a plethora of technologies including C, C++ and Python.

Education

- 2014 - 2019 **DOCTOR OF PHILOSOPHY**

  Ph.D. (Mechanical Engineering)

  Indian Institute of Technology, Guwahati, India

  Thesis title – Dynamics of two immiscible and miscible fluids in two-component flows

- 2012 - 2014 **POST GRADUATION**

  M. Tech (Thermal Engineering)

  National Institute of Technology, Silchar, India

  CGPA : 9.94 (out of 10 scale)

- 2005 - 2009 **GRADUATION**

  B. E. (Mechanical Engineering)

  Jorhat Engineering College, Jorhat, India

  Percentage : 81.9 (Hons.)

Journal publications

1. M. P. Borthakur, S. Succi, F. Sterpone, F. Pérot, A. Diko and S. Melchionna, In-silico analysis of airflow dynamics and particle transport within a human nasal cavity, *Journal of Computational Science* 54, 101411, 2021.
2. M. P. Borthakur, B. Nath and G. Biswas, Dynamics of a compound droplet under the combined influence of electric field and shear flow, *Physical Review Fluids* 6, 023603, 2021.
3. B. Nath, M. P. Borthakur and G. Biswas, Electric field induced dynamics of viscoplastic droplets in shear flow, *Physics of Fluids* 32, 092110, 2020.
4. M. P. Borthakur, G. Biswas, D. Bandyopadhyay and K. C. Sahu, Dynamics of an arched liquid jet under the influence of gravity, *European Journal of Mechanics - B/Fluids* 74, 1-9, 2019.
5. M. P. Borthakur, G. Biswas and D. Bandyopadhyay, Dynamics of drop formation from submerged orifices under the influence of electric field, *Physics of Fluids* 30, 122104, 2018.
6. M. P. Borthakur, D. Bandyopadhyay and G. Biswas, Electric field mediated separation of water-ethanol mixture in carbon-nanotubes integrated to nanoporous graphene membrane, *Faraday Discussions* 209, 259-271, 2018.

7. M. P. Borthakur, G. Biswas and D. Bandyopadhyay, Dynamics of deformation and pinch-off of a migrating compound droplet in a tube, *Physical Review E* 97, 043112, 2018.
8. M. P. Borthakur, G. Biswas and D. Bandyopadhyay, Formation of liquid drops at an orifice and dynamics of pinch-off in liquid jets, *Physical Review E* 96, 013115, 2017.
9. S. Timung, J. Chaudhuri, M. P. Borthakur, T.K. Mandal, G. Biswas and D. Bandyopadhyay, Electric field mediated spraying of miniaturized droplets inside microchannel, *Electrophoresis* 38, 1450-1457, 2017.
10. M. P. Borthakur and A. Biswas, A novel Hermite Taylor Least Square based meshfree framework with adaptive upwind scheme for two dimensional incompressible flows, *Computers & Fluids* 130, 37-48, 2016.

Conference publications

1. M. P. Borthakur and S. Chakravarthy, Electric field modulated drop formation from orifices, *2nd International Conference on Recent Advancements in Mechanical Engineering (ICRAME)*, NIT Silchar, 7th – 9th February, 2021.
2. M. P. Borthakur, Deformation of droplets in shear flow with viscoplastic rheology, *32nd International Conference on Science and Technology of Complex Fluids*, University of Guanajuato, Guanajuato, Mexico, 9th -12th November, 2020.
3. M. P. Borthakur, G. Biswas and D. Bandyopadhyay, Tuning electroosmotic flow of aqueous electrolytes in nanochannels with implanted wall electrodes, *71st Annual Meeting of the APS Division of Fluid Dynamics*, Atlanta, Georgia, 18th-20th November 2018.
4. M. P. Borthakur, B. Nath, G. Biswas and D. Bandyopadhyay, Numerical Simulation of Break-Up of Liquid Jets Curved by Gravity, *The Asian symposium on computational heat transfer and fluid flow (ASCHT)*, IIT Madras, 10th-13th December, 2017.
5. M. P. Borthakur, B. Nath, G. Biswas and D. Bandyopadhyay, Formation and Breakup of Liquid Jets Curved by Gravity, *ASME 2017 International Mechanical Engineering Congress and Exposition*, Tampa, Florida, 3rd - 9th November, 2017.
6. M. P. Borthakur and A. Biswas, Performance Analysis of Least Square Based Finite Difference method with variations in operating parameters, *Innovation in Design, Manufacturing and Concurrent Engineering (IDMC)*, NIT Rourkela, 1st -3rd March, 2014.

Projects and training

1. Completed a four week training on “Computational Fluid Dynamics using Fluent” from IFS Academy, Pune in 2013.
2. Completed 100 hours training in “CAE using ANSYS” from Central Institute of Plastics Engineering & Technology (CIPET), Chennai in 2008.
3. Completed 200 hours training in “CAD/CAM using CATIA” from Central Institute of Plastics Engineering & Technology (CIPET), Chennai in 2007.

Achievements and awards

1. Awarded Merit Scholarship by Government of Assam, India during B.E.
2. GATE 2011- Was ranked among the top 1% in the country (out of nearly 81175 students).
3. Awarded merit scholarship by ONGC under Industry Academic Interface during M. Tech for securing 1st rank.
4. Awarded Science & Engineering Research Board (SERB) International Travel Grant for presenting research during the event Artificial Water Channels: Faraday Discussion 2018, United Kingdom.
5. Awarded American Physical Society Enabling Travel Grant for presenting research during APS DFD 2018 at Atlanta, USA.

Personal details

Father's Name:	Late Dulal Borthakur
Mother's Name:	Mrs. Shanti Borthakur
Date of Birth:	29-01-1988
Nationality:	Indian
Gender:	Male
Marital status:	Married
Languages known:	English, Hindi, Assamese and Bengali

References

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Head of Center, Center for Nanotechnology &
Professor of Chemical Engineering
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