

ABHISHEK RAJ

raj.091603.bme@gmail.com
me13d020@smail.iitm.ac.in

Present Address:

Room no 172,
Krishna Hostel,
IIT Madras,
PIN: 600036
Tamilnadu, India
Contact No : +919962878731

Permanent Address

S/O- Shri. Vihangesh Bhatt
Vill & Post- Jayantipur,
Via- Benipur,
Dist- Darbhanga
PIN-847103
Bihar, India
Contact No:+919430638169

Educational Background

Examinations passed	Year	Institution/University	% of marks obtained/CGPA
Doctor of Philosophy (Mechanical Engineering)	2013- Present	Indian Institute of Technology Madras, Tamilnadu.	8.66/10
B. Tech (Mechanical Engineering)	2009-2013	Jaypee University of Engineering & Technology Guna (M.P), India	8.3/10.0
10+2	2008	Central Board of Secondary Education	67.4%
10	2006	Bihar School Examination board	63.7 %

Projects/ Trainings

➤ Research in Doctor of Philosophy:

Research Advisor: Dr. Ashis Kumar Sen,
Ashis Research Group, Department of Mechanical Engineering, Indian Institute of Technology Madras, India

Research topic: Dynamics of Fluid Flow and Soft Objects in Rigid and Compliant Microchannels

Description:

- The interaction of cells with compliant boundaries such as blood vessels is a key phenomenon in the in-vitro investigation of various diseases. Diseases like cancer and malaria effects the mechanical property of the cells, whereas atherosclerosis and stenosis results into a stiffening of blood vessels. Thus an optimal level of mechanical property of cells as well as arterial walls are crucial for healthy functioning of body. In the current thesis work, firstly single phase flow through compliant microchannel is investigated. Then, the dynamics of droplets through compliant microchannel is investigated. Further, the migration behavior of biological cells through rigid and flexible micro-constrictions are studied in detail. The effect of mechanical property of cells and arterial walls over the migration behavior of the cells are also investigated.

Publications/Conferences

Journals:

- **A. Raj**, M. Dixit, M. Doble, A. K. Sen, **A combined experimental and theoretical approach towards mechano-phenotyping of biological cells**, *Lab on Chip*, 17, 3704–3716, (2017)
- **A. Raj**, A. K. Sen, **Flow induced deformation of compliant microchannel and its effect on pressure-flow characteristics**, *Microfluidics and Nanofluidics*, 20:31, 1-13, DOI 10.1007/s10404-016-1702-9, (2016)
- P. Sajeesh, **A. Raj**, M. Doble, A. K. Sen, **Characterization and sorting of cells based on stiffness contrast in a microfluidic channel**, *RSC Advances*, 6, 74704, (2016)
- V. Iyer, **A. Raj**, R. K. Annabatula, A. K. Sen, **Experimental and numerical studies of a microfluidic device with compliant chambers for flow stabilization**, *J. Micromechanics and Microengineering*, 25, 075003, (2015).
- **A. Raj**, R. Halder, P. Sajeesh, A. K. Sen, **Droplet generation in a microchannel with a controllable deformable wall**, *Microfluidics and Nanofluidics*, 20:102, (2016)
- **A. Raj** and A. K. Sen, **Entry and migration behavior of biological cells in constricted flexible microchannel**, *Biomicrofluidics*, 2017 (Under Review)

Conference proceedings:

- **A. Raj**, A. K. Sen, **Cell Migration through flexible microconstriction**, 21st International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS 2017), Savannah, USA, October 22-26, 2017.
- **A. Raj**, M. Dixit, A.K. Sen, **Constriction based microfluidic device for the cell phenotyping**, 20th International Conference on Miniaturized Systems for Chemistry and Life Sciences (μ TAS 2016), October 9-13, 2016, Dublin, Ireland.
- **A. Raj**, V.S.D Dhanush and A.K. Sen, **A study of pressure driven flow through flexible PDMS microchannels**, International Conference on MEMS and Sensors (ICMEMSS 2014), December 2014, IIT Madras.
- **A. Raj**, A.K. Sen, **A Theoretical model for prediction of Young's modulus of Biological Cells**, 24th National and 2nd International ISHMT-ASTFE Heat and Mass Transfer Conference (IHMTTC 2017), December 27-30, 2017, BITS-Pilani, Hyderabad Campus, (Accepted)

Book Chapters:

- **A. Raj**, A. K. Sen, “**Microfluidic Sensors for Mechanophenotyping of Biological Cells**” (Book entitled “Environmental, Chemical and Biological Sensors”) Springer, 1st ed. 2018 edition (January 26, 2018), ISBN-10: 9811077509
- A. K. Sen, M. Sneha Maria, **A. Raj**, U. Banerjee, Sk. R. Iqbal, “**Soft lithography, molding and micromachining techniques for polymer micro devices** (Book entitled ”Microfluidic Electrophoresis”) ” Springer Nature, 2017 (Under Review)

Patent

- Indian Patent at IIT Madras, ICSR IDF No. 1517, A. K. Sen, A. Srivastava, R. Gaikwad, Karthick S, Jayaprakash K S, **A. Raj**, Sneha Maria M, P. Shivahare, “**MICROFACS FOR DETECTION AND ISOLATION OF TARGET CELLS**”, Application number: 201741012180, Filed on: 5th April 2017.

Instrument proficiency and Software exposure

Hands on Experience	: Biological Cell culture facility, Photolithography and soft lithography fabrication technique.
Instruments Handled	: MA/BA6 Mask aligner, OAI Mask Aligner, Optical and fluorescence Microscope, Co ₂ Incubator, Deep Freezer (-80° C), High Speed Camera, Spin Coater, etc.
Software	: MATLAB, AutoCAD, ANSYS.
Programming Languages	: Basics of C

Awards and Achievements

- Won Second prize in the “Rajbhasha Technical Conference” for the oral presentations held on 29th September at ICSR, IIT Madras.
- Received full funding scholarship from government of India for pursuing PhD at “Indian Institute of Technology, Madras”.
- Scored among top 3 % in Graduate Aptitude Test of Engineering (GATE 2013) in Mechanical Engineering stream, conducted as an entrance examination for Postgraduate studies in India.

Position of Responsibility

- **Student Representative (Mechanical Engineering):** Official Language Implementation Committee, Indian Institute of Technology Madras, during Nov 2015- Sept 2017
- **Youth Club President and the Founder:** “Art of Living Youth Club, Indian Institute of Technology Madras”, during Nov 2015 – Oct 2017.

Extra-Curricular/Co-curricular Activities

- Organized a short term course on “Microfluidics based healthcare and interfacial phenomena” at IIT Madras during Nov 6-11, 2017.
- Organized eight “Youth Empowerment Skills Workshop” from “Art of Living Foundation” on various occasions at “Indian Institute of Technology Madras”.
- Achieved Red belt (7th grade out of 11 in the grading system) in Hayashi Ha Shitoryu style of Karate.
- Art: Singing.

Personal Details

Father’s Name	:	Shri.Vihangesh Bhatt
Sex	:	Male
Date of Birth	:	15 th October, 1991
Nationality	:	Indian
Language Known	:	English, Maithili, Hindi.

Declaration

I hereby declare that the above written particulars are true to the best of my knowledge and belief.

Abhishek Raj

Abhishek Raj