

SHRUTI SONI

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Research Scholar | Indian Institute of Science, Bangalore, India

Area of Interest

Global healthcare, point-of-care diagnostics, sample preparation, TB diagnostics, microfluidics

Education

Year	Degree/Examination	Institution/Board	CGPA/Percentage
2017-	Ph.D. (Chemical Engineering)	Indian Institute of Science, Bangalore	7.8/10
2017	M.Tech. (Chemical Engineering)	Indian Institute of Technology, Roorkee	9.294/10
2015	B.Tech (Chemical Engineering)	DCR University of Science & Technology, Murthal, Sonapat, Haryana	8.92/10 (Gold medalist)
2011	12 th	Jankidas Kapur Public School, Sonapat, Haryana (CBSE)	88.0 %
2009	10 th	Jankidas Kapur Public School, Sonapat, Haryana (CBSE)	97.2 %

PhD Research Projects

- **Low-cost, disposable paper-based non-invasive glucose testing from human saliva**

The research work focusses on an essential aspect of diabetes management that includes regular monitoring of blood glucose levels. The current diagnosis method involves an invasive and painful way of monitoring blood glucose level. We have developed a non-invasive method that utilises disposable, paper-based glucose-sensing test strip based on bi-enzymatic colorimetric detection that is sensitive enough to detect even low glucose levels in saliva within 3 minutes. We also carried out accelerated aging studies to test the shelf-life of the test strips and performed clinical trials on real patients. This work was done in collaboration with Sensing Self, PTE. Ltd., Singapore.

- **Paper-based nucleic acid sample preparation for POC diagnostics**

This ongoing research work involves developing a portable, point-of-care compatible sample preparation device for viscous TB sputum sample, that could purify and concentrate the Mycobacteria *Tuberculosis* genomic DNA after undergoing the lysis step. The low-voltage paper-based purification and concentration module utilizes electro-kinetic separation technique, isotachopheresis to concentrate the nucleic acid and is compatible with downstream nucleic acid amplification tests, such as PCR, and LAMP. (Grand Challenges Explorations-India)

Publications

- Paper Stacks for Uniform Rehydration of Dried Reagents in Paper Microfluidic Devices. *Sci Rep* **9**, 15755 (2019). D.Das, A. Dsouza, N. Kaur, **Shruti Soni**, Bhushan J. Toley, DOI: <https://doi.org/10.1038/s41598-019-52202-9>.
- Multidimensional Paper Networks: A New Generation of Low-Cost Pump-Free Microfluidic Devices, Bhushan J. Toley, D. Das, K.A. Ganar, N. Kaur, M. Meena, D. Rath, N. Sathishkumar and **Shruti Soni** (30 May 2018)
DOI: <https://doi.org/10.1007/s41745-018-0077-1>
- Paper-based nucleic acid sample preparation for point-of-care diagnostic, review article, Shruti Soni, Bhushan J. Toley (In preparation)

Other Projects

Simulation of Nucleate Pool Boiling of Nanofluids | Indian Institute of Technology, Roorkee (June 2016 – August 2017)

- I had developed a CFD model for nucleate pool boiling of nano-fluids & solved the mathematical model in ANSYS Fluent along with the validation of the simulated results with the experimental results as a part of my Master thesis. I also investigated the effect of concentration of nano-particles in the liquid on heat transfer coefficient at atmospheric & sub-atmospheric pressure.

Internships

Indian Oil Corporation Limited, Panipat | Summer Trainee (16 June-28 July, 2014)

- The summer training included in-plant training at IOCL, Panipat. I studied about the Naphtha Cracker Unit & did project work where I was involved in calculating the "Efficiency of Liquid Cracking Heater 11-H-0200".

National Fertilizers Limited, Panipat | Summer Trainee (8 June- 22 July, 2013)

Course Work

Heat Transfer, Mass Transfer, Microfluidics, Transport Phenomenon, Numerical Methods, Thermodynamics, Modeling in Chemical Engineering, Chemical Reaction Engineering

Awards / Scholarships / Academic Achievements

- **DST-AWSAR award, 3rd edition, 2021, Department of Science and Technology (DST), Government of India (February, 2021)**
My science article based on my PhD research work (Non-invasive, low-cost paper-based glucose detection using saliva as the sample) titled “Pain-free way to manage your sugar rush” was selected as one of the best popular science stories (third position, under PhD category, National level).
- **Kumar-Gandhi Award, ChemE In-house Symposium 2019**, Chemical Engineering Department, Indian Institute of Science, Bangalore, India. Recognized for the best poster presentation. Topic for my research poster was "Disposable, paper-based strip for glucose testing from human saliva".
- Received Certificate of Merit for being among top 0.1% in the subjects: Mathematics, English Communications & Science in 10th CBSE Board.
- Received Certificate of Merit for being among top 0.1% in the subject: Mathematics in 12th CBSE Board.
- Secured 100% marks in Mathematics in both 10th & 12th CBSE Board.
- 6th National Science Olympiad (2004): Level I AIR 28; Level II AIR 215.
- GATE (2017: AIR 285)

Skills and Workshop attended

Additional Courses/Workshop/International Conferences attended:

- **MicroTAS 2021** (Will be presenting poster, October 10-14th, 2021) Title: Paper-based purification and concentration of M. Tuberculosis gDNA using Isotachopheresis. <https://microtas2021.org/>
- **NanoGE EIMC** (Emerging Investigators in Microfluidics) (poster presentation, July 20-21st, 2021)
- **Global Health 2021 Workshop** (Attended virtually, July 12-13th, 2021) <https://www.globalhealthworkshop.org/>
- **Global Health Diagnostics course, 2021** organized by McGill Summer Institute in Infectious Diseases and Global Health (Attended virtually, June 2nd-4th, 2021) <https://www.mcgill.ca/globalhealth/summer-institute>
- **MicroTAS 2020** attended virtually.
- Participated in the diagnostic workshop on “Manufacturing strategies for lateral flow devices” organized by GE Healthcare. (March, 2019)
- Participated in Level I of Science Administration and Management workshop at NCBS, Bangalore, conducted by Prof. Elena Gaura and Prof. James Brusey (Coventry University, UK) jointly organized by IISER, Pune and Newton Bhabha Fund of British Council. (November, 2018)
- Successfully completed the Dale Carnegie course: Campus to Corporate. (July, 2017)

Experimental Skills /techniques: Nucleic acid amplification test (NAAT) such as PCR, quantitative-PCR, Isothermal amplification methods (LAMP); UV-Vis spectroscopy, Gel electrophoresis, Laser cutter, 3D printing, Isotachopheresis,

Software Packages: COMSOL Multiphysics, MATLAB, AUTOCAD, ANSYS Fluent, Adobe illustrator, ImageJ, Microsoft Office

Languages: English (SRW), Hindi (SRW)

Positions of Responsibility/ Extra Curricular/ Volunteer Work

National Service Scheme (DCRUST, Murthal)

(2012-2015)

- Completed 'Special Adventure Course' conducted by Nehru Institute of Mountaineering, Uttarkashi, Uttarakhand, organized by National Service Scheme, Govt. of India & Ministry of Youth Affairs & Sports (June, 2012) & was awarded appreciation letter for representing Haryana at National Level Camp. (March, 2013). Participated as a volunteer in NSS Pre-Republic Day Parade Camp held in DCRUST, Murthal (November, 2012).
- Represented my University (DCRUST, Murthal) in multiple inter-engineering deemed university basketball tournament.
- I was part my IISc, Bangalore badminton team that won silver medal in Inter-IISER tournament.
- Have been an active donor and promoter for Blood donation.

References

Dr. Bhushan Toley
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Dr. Sanjeev Kumar Gupta
Chairman, and Professor
Department of Chemical Engineering
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