Ankit **Jain**

Optofluidic Engineer · Electrical Engineer

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Summary

A doctoral candidate at ETH Zurich with over 5 years of practical experience in optofluidics and device development. My expertise is in building automated systems with electrical, optical and microfluidic components to carry out research in biology and biochemistry.

Work Experience

ETH Zurich, Institute of Chemical and Bioengineering

Zurich, Switzerland

Research Assistant

Jan, 2018 - PRESENT

- Successfully integrated optical and electrical components with microfluidic devices
- Automated workflow using LabVIEW, Python and MATLAB
- Prototyped novel microfluidic devices using 3D printing and microfabrication
- Supervised several students on 3D printed droplet-microfluidic devices, phenotyping and cell/gene-recovery from microfluidic droplets
- Successfully collaborated with biochemists, biologists and engineers for directed evolution and cell phenotyping applications

Juniper Networks

Bangalore, India

Hardware Engineer

Jan, 2013 - Aug, 2015

- Successfully delivered a high-speed board with a retiming functionality
- Took ownership of high quality hardware from concept to pre-production
- Designed and verified control path FPGA
- Designed and tested high speed PCBs
- Collaborated with PCB layout, Mechanical, Software, Testing and Manufacturing teams

National Instruments

Bangalore, India

Summer Intern

Jun, 2009 - Jul, 2009

- Worked on a customer-project on real-time signal processing using LabVIEW
- Designed and verified FPGA on National Instrument system

Education

ETH Zurich

Zurich, Switzerland

Dr. sc. Institute of chemical and bioengineering

Jan, 2018 - Present (Tentative Graduation: Feb, 2023)

- Thesis title: «Microfluidic droplet sorting for directed evolution applications»
  - High throughput enzyme-library screening and fluorescence-activated sorting in microfluidic droplets(FADS)
  - Development of generalized assays that obviate the need of surrogate substrates in enzyme evolution in microfluidics
  - Conception and development of novel absorbance-based droplet sorting platform with the highest throughput observed till date

ETH Zurich

Zurich, Switzerland

MSc in Micro- and Nanosystems

Sept, 2015 - Dec, 2017

- Final grade 5.55/6
- Master Thesis title: «On-demand digital barcodes in microfluidic droplets»

IIIT Allahabad

Prayagraj, India

Btech in Electronics and Communication Engineering

Aug, 2009 - Jul, 2013

- Final grade 9.35/10
- Bachelor Thesis title: «Qualification of 48 port 10 GE Interface Test module»

Skills

Microfluidics	Droplets, Continuous-flow, Droplet sorting, Quake-Valves, On-chip electrodes, Impedance detection, Flow cytometry, Cell sorting
Optics	Fluorescence, Absorption and Photothermal detection, Spectroscopy, Laser-optics
Devices	CAD Design (Autocad, Solidworks), Photolithography, Mask Alignment, 3D Printing, PDMS, PMMA, Paper, Surface functionalization
Elec. Systems	System architecture, Board design, FPGA development, Microcontrollers, Firmware
Biology	Cell culture and preparation, Enzyme kinetics
Programming	MATLAB, LabVIEW, Python
Languages	English, German (B1), Hindi

Publications

Estimating the Three Characteristic Lengths of Plate-like Particles in Suspension

P. Binel, **A. Jain**, A. Jaeggi, D. Biri, A. K. Rajagopalan, A. J. deMello, M. Mazzotti; *Small Methods (In press)*

Programmable Control of Multiscale Droplets using V-Valves

T. Xue*, **A. Jain*** (equal contribution), X. Cao, D. Hess, S. Stavrakis, A. J. deMello; *Advanced Material Technologies (In press)*

Development of a Universal NADH Detection Assay for High Throughput Enzyme Evolution Using Fluorescence Activated Droplet Sorting

G. Kolaitis*, **A. Jain*** (equal contribution), D. Romeis, T. Buryska, M. Steiger, L. Wuerstli, M. Doering, B. Beer, S. Stavrakis, A. J. deMello, V. Sieber; *ChemRxiv; 10.26434/chemrxiv-2022-jvg5j* Target Journal: *ACS Catalysis*

An improved Absorbance Activated Droplet Sorter and its application in the evolution of Aldehyde Dehydrogenase enzyme

A. Jain*, M. Teshika* (equal contribution), T. Buryska, D. Romeis, S. Stavrakis, V. Sieber, A. J. deMello; Manuscript in Preparation; Target Journal: *Small*

Honors & Awards

- ETH Scholarship, 2017
- IIIT-Allahabad Academic Excellence Award (2nd highest GPA), 2010
- President's Scout (by the President of India), 2007

Extracurricular Activity

Indian Student Association Zurich President (Vice-President Aug, 2018 - Aug, 2022) *Present Zurich, Switzerland*

- Managed core team and oversaw organization of events for students (from 15 to 200 participants)
- Coordinated communication with the students, official student body of ETH (VSETH) and Indian Embassy
- Designed and maintained the organization website

Art of Living Sri Sri Yoga Teacher/Volunteer *Present Zurich, Switzerland*

- Lead many yoga and meditation sessions in Zurich
- Reached out to public for publicizing workshops

Microfluidics and Microtechnology Summer School Organizer *2018 Zurich, Switzerland*

- Scouted speakers for the summer school and coordinated communication with them
- Secured additional sponsorship for the school organization
- Managed daily events during the school

Science Slam Zurich Slammer *2019 Zurich, Switzerland*

- Participated in numerous Science Slam competitions in venues ranging from Scientific auditoriums to clubs in Zurich

Selected Projects

Microfluidics

High-throughput screening of enzyme libraries using Fluorescence-activated droplet sorter (FADS) — *ETH Zurich, Switzerland*

Prof. Andrew deMello, ETH Zurich — *Jan 2019 – Present*

Screening of Haloalkane dehalogenase and alcohol dehydrogenase enzyme libraries for directed evolution experiments in droplet microfluidics using a FADS.

Development of a novel Absorbance-activated droplet sorting (AADS) platform — *ETH Zurich, Switzerland*

Prof. Andrew deMello, ETH Zurich — *Oct 2020 – Present*

Developing the fastest AADS platform published to date for directed evolution applications.

Development of a high-throughput cell-deformability-based sorting platform — *ETH Zurich, Switzerland*

Prof. Andrew deMello, ETH Zurich — *Aug 2021 – Present*

Electrically actuated cell-sorting platform based on cell-deformability in a non-newtonian viscoelastic fluid.

On-demand digital barcodes in droplets — *ETH Zurich, Switzerland*

Prof. Andrew deMello, ETH Zurich — *Mar 2017 – Dec 2017*

Generation of on-demand monomer droplets, photo-polymerization and subsequent loading into an encapsulating droplet for barcoding applications.

Microfluidic platform for the large-scale screening of C. *elegans* — *ETH Zurich, Switzerland*

Prof. Andrew deMello, ETH Zurich — *Apr, 2016 – Jul, 2016*

Developed an image-based automated platform for worm loading, trapping using on-chip pneumatic valves and worm release.

MEMS and microfabrication

Fabrication and characterization of MEMS acoustic sensors — *ETH Zurich, Switzerland*

Prof. Christofer Hierold, ETH Zurich — *Feb, 2016 – Aug, 2016*

Aided in the development of coupled mass-based MEMS acoustic sensors. The tasks included design of test structures, etching (RIE) of devices, imaging using SEM, and characterization via Laser Doppler Vibrometer.

Fabrication and characterization of a MEMS accelerometer — *ETH Zurich, Switzerland*

Embedded MEMS Lab Practical Course, ETH Zurich — *Oct, 2015 – Nov, 2015*

Board and FPGA design

Design of 4X100GE CXP optics based physical interface card — *Bangalore, India*

Juniper Networks, Bangalore — *Sep, 2013 – Jul, 2015*

Designed and tested a high-speed PCB that housed four 100GE CXP optical interfaces, Regenerative repeaters (retimers), a control path FPGA, and associated clocking, power and miscellaneous control devices.

Qualification of 48 port 10 GE interface test module — *Bangalore, India*

Juniper Networks, Bangalore — *Apr, 2013 – Jun, 2013*

Tested PCB which was used for validating various types of interfaces such as 10GE, I2C, SGMII, PCIe and MDIO. The board housed regenerative repeaters for looping back 10GE traffic, control path CPLD, and various power loads.

Implementation of a JPEG encoder on FPGA — *Prayagraj, India*

Prof. Dr. Neteesh Purohit, IIITA — *Jan, 2012 – May, 2012*

Developed and implemented an efficient architecture for JPEG image compression encoder with a 2-stage pipeline without using any hardware multipliers (just for fun).