

Ankit Jain

MICROFLUIDIC ENGINEER · ELECTRICAL ENGINEER

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Summary

A doctoral candidate at ETH Zurich with over 5 years of practical experience in microfluidics 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 electrical and optical components with microfluidic devices
- Automated workflow using LabVIEW, Python and MATLAB
- Prototyped novel 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 of control path FPGA
- Designed and tested of 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 costumer-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: July, 2022)

- Thesis title: «Microfluidic droplet sorting for directed evolution applications»
 - High throughput genotype and phenotype screening and fluorescence-activated sorting in microfluidic droplets
 - Conception and development of novel absorbance-based droplet sorting and deformability-based cell sorting platform

ETH Zurich

Zurich, Switzerland

MSc IN MICRO- AND NANOSYSTEMS

Sept, 2015 - Dec, 2017

- Final grade 5.55/6
- Master Thesis title: «Ondemand 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

Droplet microfluidics, Droplet sorting, Continuous-flow microfluidics, Quake-Valves, On-chip electrodes, Impedance detection, Imaging flow cytometry, Cell sorting

Optics

Fluorescence detection, Photothermal detection, Fluorescence Imaging, Laser-optics

Devices

CAD Designs, Photolithography, Mask Alignment, Soft Lithography, 3D Printing

Tools

AutoCAD, Solidworks, COMSOL Multiphysics

Programming

MATLAB, LabVIEW, Python, Verilog, C/C++, Bash scripting

Systems

System architecture, Board design, FPGA development, Microcontrollers, Firmware

Biology

Cell culture and preparation, Enzyme kinetics

Languages

English, German (B1), Hindi

Publications and Conferences

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

GERASSIMOS KOLAITIS*, **ANKIT JAIN*** (EQUAL CONTRIBUTION), DENNIS ROMEIS, TOMAS BURYSKA, MATTHIAS STEIGER, LENA WUERSTL, MANUEL DOERING, BARBARA BEER, STAVROS STAVRAKIS, ANDREW DEMELLO AND VOLKER SIEBER

Manuscript Submitted in ACS Catalysis; 10.26434/chemrxiv-2022-jvg5j

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

PIETRO BINEL, **ANKIT JAIN**, ANNA JAEGER, DANIEL BIRI, ASHWIN KUMAR RAJAGOPALAN, ANDREW J. DEMELLO AND MARCO MAZZOTTI

2021 AIChE Annual Meeting (Manuscript submitted in PNAS)

Programmable Control on Multiscale volume Droplets using V-valves Integrated Microfluidic Platform

TIAN XUE*, **ANKIT JAIN*** (EQUAL CONTRIBUTION), XIAOBAO CAO, DAVID HESS, STAVROS STAVRAKIS AND ANDREW DEMELLO

Manuscript In Preparation; Targeted Journal: Lab on a Chip

An Ultra-fast Absorbance-Activated Droplet Sorting Platform for Directed Evolution Applications

ANKIT JAIN ET AL.

Manuscript In Preparation

Honors & Awards

- Finalist, ETH Pioneer Fellowship, 2022
- ETH Scholarship, 2017
- Juniper Networks Hardware Engineering Spot Award, 2015
- IIT-Allahabad Academic Excellence Award (2nd highest GPA), 2010
- President's Scout (by the President of India), 2007

Extracurricular Activity

SKY Campus at ETH COFOUNDER, PRESIDENT

Present *Zurich, Switzerland*

- Launched and lead fun meditation and yoga sessions for students
- Designed and managed Sky Campus website
- Coordinated the core team and the members

Indian Student Association Zurich VICE PRESIDENT

Present *Zurich, Switzerland*

- Coorganized events for students (with around 200 participants)
- Coordinated communication with the students, official student body of ETH (VSETH) and Indian Embassy
- Designed and housekept the organization website

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

PROF. ANDREW DEMELLO, ETH ZURICH

ETH Zurich, Switzerland

Jan 2019 – Present

Screening of Haloalkane dehalogenase and alcohol dehydrogenase enzyme libraries for directed evolution experiments in droplet microfluidics using a fluorescence-activated droplet sorting platform.

Development of a novel Absorbance-activated droplet sorting (AADS) platform

PROF. ANDREW DEMELLO, ETH ZURICH

ETH Zurich, Switzerland

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

PROF. ANDREW DEMELLO, ETH ZURICH

ETH Zurich, Switzerland

Aug 2021 – Present

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

On-demand digital barcodes in droplets

PROF. ANDREW DEMELLO, ETH ZURICH

ETH Zurich, Switzerland

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*

PROF. ANDREW DEMELLO, ETH ZURICH

ETH Zurich, Switzerland

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

PROF. CHRISTOFER HIEROLD, ETH ZURICH

ETH Zurich, Switzerland

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

EMBEDDED MEMS LAB PRACTICAL COURSE, ETH ZURICH

ETH Zurich, Switzerland

Oct, 2015 – Nov, 2015

BOARD AND FPGA DESIGN

Design of 4X100GE CXP optics based physical interface card

JUNIPER NETWORKS, BANGALORE

Bangalore, India

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

JUNIPER NETWORKS, BANGALORE

Bangalore, India

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

PROF. DR. NETEESH PUROHIT, IIITA

Prayagraj, India

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).