Ankit Rana

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Professional Experience

- **Illumina, Inc.** — San Diego, CA
  Scientist 2 — *Oct 2020 - Present*
  - **Research**: Single molecule experimentation aimed at a novel sequencing platform development.
  - **System development**: Development of recipes to govern the application of electrical waveforms and control fluidic valves and pumps in the sequencing platform. Writing python scripts to perform a variety of data analysis operations.
  - **Biochemistry**: Sample preparation encompassing reagent dilutions, DNA construct annealing and Agarose gel based quality control.
- **Ontera, Inc.** ***(formerly Two Pore Guys, Inc.)*** — Santa Cruz, CA
  R&D Engineer — *Mar 2018 - Sep 2020*
  - **Nanofabrication**: Photolithography, plasma bonding & wet-etching in the fabrication of the dual nanopore chip.
  - **Experimentation**: Assembly of the microfluidic dual nanopore device; design of Experiments (DOE) and data analysis using MATLAB around the two-pore control (Epigenetics application).
  - **Controller Design**: Development of LabVIEW FPGA control for DNA linearization and bidirectional 'flossing' and re-capture of detected single molecules.
  - **Inventory and Quality Control**: Conducting optical QC of the fabricated nanopore chips, dicing of the wafer post-fab, electrical failure detection of pores, microfluidic-strip fault analysis, Agarose gel electrophoresis and imaging
- **Aricent Inc. (Now Altran Group)** — Gurugram, HY
  Software Engineer — *Dec 2013 - Jul 2015*
  - **BluWAN EMS - Ethernet Switch Configuration Solution**: Formulated the front-end UI design with HTML, CSS, and AngularJS and back-end servlets in Java for an EMS solution (SNMP configuration).
  - **Mantu - Secure Enterprise Chat Application**: Part of a 2 member server-team. Engineered modules for UI Interface at the Ejabberd XMPP server, OTP generation, SSL verification and file storage in Erlang.

Education

- **The University of Texas at Austin** — Austin, TX
  Master of Science in Computer Science — *Aug 2020 - May 2023*
  Courses: *Machine Learning, Deep Learning, Natural Language Processing, Online Learning and Optimization, Algorithms, Advanced Operating Systems, Virtualization, Android Programming, Quantum Information Science.*
- **College of Engineering and Applied Science, University of Cincinnati** — Cincinnati, OH
  Master of Science in Electrical Engineering — *Aug 2015 - Dec 2018*
  Thesis: *A study of electrokinetics in glass nanopores for biomolecular applications.* **Adviser:***Dr. Leyla Esfandiari*
  Courses: *Biomedical Microsystems, Microfabrication of Semiconductor Devices, Microelectromechanical Systems, Biochip/Lab-on-a-Chip, Bio-microfluidics.*
- **Guru Gobind Singh Indraprastha University** — New Delhi, DL
  Bachelor of Technology in Electronics and Communication Engineering; GPA: 80.1 — *Aug 2009 - May 2013*
  Courses: *Operating Systems, Data Structures, Programming in C, Database Management Systems (SQLite), Embedded Systems, Circuits & Systems, Analog and Digital Electronics, VLSI Design.*
- **Massive Online Open Courses (MooC) certifications** — Online
  edX & Coursera
  Key Courses: *Python for Everybody (UMich)-Coursera, Data Structures in Python(Coursera), Linux – edX (Linux Foundation), Descriptive Statistics – edX (UC Berkeley), Introduction to Computing technology inside your smartphone – edX (Cornell University),Embedded Systems – edX (UT Austin) & Fundamentals of Nano-electronics – edX (Purdue University)*

Skills Summary

- **Platforms**: Linux, Windows, 8051µC, Arduino, Raspberry Pi.
- **Programming languages**: Python, Java, Kotlin, C, C++, Erlang, JavaScript, SQLite, AngularJS, HTML, CSS.
- **Fabrication and metrology**: Mask design, Photolithography, Wet etching, Reactive Ion etching (RIE), Soft Lithography, Fluorescent and confocal microscopy, CO_2 laser pulling, Plasma bonding, Spectroscopy (Ellipsometry), SEM.
- **Molecular biology**: Protein tagging of DNA molecules, Agarose Gel Electrophoresis, Polymerase Chain Reaction (qPCR), Dynamic light scattering (DLS), Microparticles conjugation (Surface chemistry), Nanodrop, Spectrophotometry.
- **Design tools**: MATLAB, COMSOL Multiphysics, CFD-GEOM & Ace+, SolidWorks, AutoCAD, ANSYS Fluent, LabVIEW, Adobe Design Suite.

Academic Experience

- **Research Assistant, Integrative Biosensing Laboratory, U of Cincinnati**: Jan 2016 - Feb 2018

  Design and optimization of a Nanopore-based biosensor for sequence-specific nucleic acid detection.

  - Developed a 97% efficient binary biosensor for quantitative estimation of the impact of electro-osmotic force.
  - Impact of buffer concentration, field strength & surface charges on the electrokinetics was studied with FEA.
  - Successfully detected microRNA (miR-204 AND miR-210) related to clear cell renal cell carcinoma.

  A Dielectrophoresis based Microfluidic device for Exosome isolation.

  - Fabricated a particle isolator device in PDMS with a borosilicate pore as the collection zone using soft-lithography.
  - Size selective trapping of exosomes from a matrix was demonstrated.

  Microfabrication and characterization of a Piezo-resistive Pressure Sensor (MEMS).

  - Microfabricated a pressure sensor prototype based on Wheatstone bridge arrangement on a 6" Silicon-wafer using photolithography and wet-etching techniques.
  - Efficiency, hysteresis analysis, and linearity of the device were studied.

- **Teaching Assistant, Electrical Engg. & Computer Science, U of Cincinnati**: Aug 2016 - May 2017
  - Designed and taught the class, 'Biomicrofluidic Systems (laboratory) - EECE6078C' encompassing COMSOL Multiphysics based FEA analysis and clean-room fabrication of active and passive microfluidic devices.
  - Assisted students with review sessions in the class, 'Biomedical Microsystems - EECE6007', graded assignments.

Recent Publications & Presentations

- Liu, X., Zimny, P., Zhang, Y., Rana, A., Nagel, R., Reisner, W., & Dunbar, W. B. (2019). ***Flossing DNA in a Dual Nanopore Device.*** Small, 1905379.
- Rana, A., Zhang, Y. and Esfandiari, L., 2018. ***Advancements in microfluidic technologies for isolation and early detection of circulating cancer-related biomarkers***, Analyst.
- Shi, L., Rana, A. and Esfandiari, L., 2018. ***A low voltage nanopipette dielectrophoretic device for rapid entrapment of nanoparticles and exosomes extracted from plasma of healthy donors***, Scientific reports (Nature).
- Zhang, Y., Rana, A., Stratton, Y., Czyzyk-Krzeska, M.F. and Esfandiari, L., 2017. ***Sequence-Specific Detection of MicroRNAs Related to Clear Cell Renal Cell Carcinoma at fM Concentration by an Electroosmotically Driven Nanopore-Based Device***, Analytical chemistry, 89(17), pp.9201-9208.
- Poster: ***A dielectrophoretic nanopore device with spatiotemporal resolution for microvesicles entrapment and quantification near living cells***, The International Society for Extracellular Vesicles conf., May 2017, Toronto, ON.
- Poster: ***Impact of Electro-osmotic force in governing the motion of a charged species in a microfluidics based nanopore sensor***, presented at Center for Advanced Design and Manufacturing of Integrated Microfluidics (CADMIM) – Industrial Advisory Board meeting, September 7, 2016, University of Cincinnati, OH.
- Ghobadi, M., Zhang, Y., Rana, A., Esfahani, E.T. and Esfandiari, L., 2016, August. ***Quantitative estimation of electro-osmosis force on charged particles inside a borosilicate resistive-pulse sensor***, Engineering in Medicine and Biology Society (EMBC), 2016 IEEE 38th Annual International Conference of the (pp. 4228-4231). IEEE.

Leadership Roles, Community Activities & Awards

- **Save Our Shores - Beach Cleanup Drives** — Santa Cruz, CA
  Supporting the foundations of a thriving Monterey Bay: clean shores & healthy habitats. — *Summer and Fall 2019*
- **Clean Up Cincy** — Cincinnati, OH
  Cincinnati's largest student-led clean up program. — *Spring and Fall 2016*
- **University Graduate Scholarship (UGS) recipient** — Cincinnati, OH
  Partial tuition waiver awarded based on academic performance. — *Aug 2015 – Feb 2018*
- **VP (Communications), The Techno-mentorship Establishment at UC** — Cincinnati, OH
  A platform to help students accomplish their entrepreneurial goals. — *May 2016 - May 2017*