

Ankit Rana

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PROFESSIONAL EXPERIENCE

- **Ontera, Inc.** Santa Cruz, CA
R&D Engineer Mar 2018 - Present
 - **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.
- **Evalueserve, Inc.** Gurugram, HY
Research Associate Intern Jun 2013 - Aug 2013
 - Conducted patentability search, designed claim-charts, inspected patent litigation, and drafted new patents for a Fortune 100 consumer electronics manufacturer.

EDUCATION

- **College of Engineering and Applied Science, University of Cincinnati** Cincinnati, OH
Master of Science in Electrical Engineering; GPA: 3.95 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, C, C++, Erlang, JavaScript, Git, SQLite, AngularJS, HTML, CSS.
- **Fabrication and metrology:** Mask design, Photolithography, Wet etching, Reactive Ion etching (RIE), Soft Lithography, Fluorescent and confocal microscopy, CO₂ 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