112 School St.
Somerville, MA 02143
(301) 979 1118

NIKHIL B. LAL

Portfolio: nikhilblal.com **LinkedIn:** linkedin.com/in/nik-lal **Email:** nikhil.lal@gmail.com

RESEARCH AND WORK ACTIVITIES

Massachusetts Institute of Technology: Media Lab - Research Engineer

July 2022 - December 2025

- Tested biological protocols with custom built lab apparatuses to validate and enhance the rate of experimentation.
- Built 3 new machines to automate the biological protocols, including all programming, mechanical engineering, and PCB design.
- Identified primary path for the construction and design of a biologics manufacturing tool from first principles.

Massachusetts Institute of Technology and **Brigham and Women's Hospital, Cambridge MA -** *Visiting Engineer/Sr. Research Engineer*

July 2021 - July 2022

- Built tools for scientists and mentored researchers, and students in device fabrication.
- Responsible for the design and testing of devices for 12 separate concurrent projects with funding sources including the Bill and Melinda Gates Foundation and DARPA.
- Maintain and build out the lab, including identifying key capital acquisitions.

E25Bio, Cambridge MA — *Lead Engineer*

MARCH 2020 - July 2021

- Owned hardware technology roadmap and led all engineering activities for a seed round funded startup based out of the Engine, the MIT tough tech incubator.
- Developed a series of electromechanical systems to concentrate and purify proteins prior to testing.
- Designed, conducted, and evaluated biological experiments to confirm efficacy of device design in BioSafety Level 2 (BSL2) Lab.
- Managed software team on the creation of the e25bio software platform including front-end, back-end and UI dev.
- Led React Native apps from whitesheet design and ideation through development and launch
- Designed a multiplexed assay test that leverages existing 96-well systems. **Patent applied.**
- Invented cross polarization imaging system and accompanying hardware. **Patent applied.**

iSee AI, Cambridge MA — *Mechanical Engineer*

SEPTEMBER 2019 - MARCH 2020

- Designed human-computer interactive sensors for a seed round funded startup based out of the Engine, the MIT tough tech incubator.
- Engineered a Force Sensing Resistor (FSR) based pedal sensor for unique challenges faced by the air braking system, including Schmitt-Trigger design, PCB layout, and assembly manufacturing.
- Developing a steering sensor to ensure humans can regain control of the vehicle in the event of a high-risk failure.

Biobot Analytics, Somerville MA — *Hardware Design Engineer*

SEPTEMBER 2018 - JUNE 2019

- Led hardware development and owned technology roadmap for a seed round funded startup based out of Greentown Labs. **Patent applied.**
- Sourced and vetted external suppliers to ensure long term viability and short term cost, and took the device through alpha, beta, and gamma prototype stages.
- Built out fully functional hardware lab from 65 sq. ft. storage space to a 500 sq. ft with an R&D testing facility, refreshment space, and hardware development lab.

Sensata Technologies (former Texas Instruments), Attleboro MA — *Design Engineer*

AUGUST 2014 - JUNE 2018

- Led process development for emerging technologies in R&D, and developed novel manufacturing techniques. **Patent applied.**
- Created and developed a sensor design that I took from Concept through Launch, 1MM+ units/year. **Patent awarded.**
- Troubleshot factory and manufacturing issues in 5 different countries affecting 10M+ $/year
- Set record for fastest sensor cycling in company history using piezoelectric transducers.
- Presented at 4 technical poster conferences including a regional and global conference.

Cornell Rapid Prototyping Laboratory, Ithaca NY — *Co-Founder*

SEPTEMBER 2013 - JUNE 2014

- Led on-boarding of 8 printers, a laser cutter, and other prototyping tools; developed methodologies for efficient usage including scheduler.
- Advised and mentored engineering students on best practices for 3D printing design.
- Designed lab space and methodology for high throughput rapid prototyping.

Organic Robotics Lab (ORL), Ithaca NY— *Undergraduate Researcher*

JANUARY 2014 - MAY 2014

- Developed heated Field's Alloy pump to move low temperature metal into prototype hybrid actuators.
- Built soft airfoil with adjustable internal structure and novel actuation.

Leidos, Alexandria VA & Barstow, CA— *Systems Engineering Intern*

MAY 2013 - DECEMBER 2014

- Aggregated, transformed and managed raw and processed data of various advanced and complex FMV sensors on DARPA aerial sensor unification project.
- Developed a distributed back-end cluster for the storage and organization of sensor data output, including establishing Hadoop servers and writing MapReduce functions for efficient data management.
- Worked on-site in Ft. Irwin at Barstow CA building solar trailers to power off-grid distributed sensing systems.

Laboratory for Intelligent Machine Systems (LIMS), Ithaca, NY— *Undergraduate Researcher*

SEPTEMBER 2011 - DECEMBER 2013

- Built prototype "wingmill" for energy harvesting, including design and fabrication of 7ft wings
- Presented research at AIAA conference

EDUCATION

Cornell University, Systems Engineering, Ithaca NY— *Master of Engineering (M.Eng.)*

AUGUST 2014 - MAY 2015

Cornell University, Mechanical Engineering, Ithaca NY— *Bachelor of Science (B.S.)*

AUGUST 2010 - MAY 2014

PATENTS

#63/527,168, Systems and Methods of a Closed-Loop Drug Delivery System
Filed 2024

#63,512,787*, Polymer Printer: Perfect Parts*
Filed 2023

#63/508713, Polymer synthesis systems and methods
Filed 2023

#63/138412, *Analyte detection system and apparatuses.*
Filed 2020.

#63/049178, *High throughput screening system for monoclonal antibody pairs.*
Filed 2020.

#2020/0072709, *Modular system for upstream wastewater sampling.*
Filed 2019. Published 2020.

#2020/0072651, *Fluid level sensor apparatus with inter-digitated planr capacitors for directly inserting into a fluid.*
Filed 2018. Published 2020.

#10,288,513, *Integrated pressure and temperature sensor.*
Filed 2016. Published 2018. Granted 2019.

PAPERS

DeRidder, L., Hare, K. A., Lopes, A., Jenkins, J., Fitzgerald, N., MacPherson, E., Fabian, N., Morimoto, J., Chu, J. N., Kirtane, A. R., Madani, W., Ishida, K., Kuosmanen, J. L. P., Zecharias, N., Huang, H.-W., Chilekwa, M., **Lal, N**., Srinivasan, S., Hayward, A. M., Wolpin, B. M., Trumper, D., Quast, T., Rubinson, D. A., Langer, R., & Traverso, G. (2023). Closed-Loop Automated Drug Infusion Regulator (CLAUDIA): A rapidly clinically translatable, closed-loop drug delivery system. Nature Cancer.

Liu, G. W., Pickett, M. J., Kuosmanen, J. L. P., Ishida, K., Madani, W. A. M., White, G. N., Jenkins, J., Park, S., Feig, V. R., Jimenez, M., Karavasili, C., **Lal, N.**, Murphy, M., Lopes, A., Morimoto, J., Fitzgerald, N., Cheah, J. H., Soule, C. K., Fabian, N., Hayward, A., Langer, R., & Traverso, G. (2023). Drinkable in situ-forming tough hydrogels for gastrointestinal therapeutics. Nature Materials.

Feig, V. R., Remlova, E., Muller, B., Kuosmanen, J. L. P., **Lal, N.**, Ginzburg, A., Nan, K., Patel, A., Jebran, A. M., & Prabhu Bantwal, M. (2022). Actively Triggerable Metals via Liquid Metal Embrittlement for

Biomedical Applications. Advanced Materials, 202208227.
https://doi.org/10.1002/adma.202208227

VOLUNTEER EXPERIENCE

Osmocosm - Board of Directors

SEPTEMBER 2021 - PRESENT

- Co-Directed conference built around proselytizing the importance of olfaction and olfactory sensing, and creating an inter-disciplinary space for artists and technologists to collaborate.

Artisan's Asylum PPE Initiative, Somerville MA — *Reusable Face Shields Lead*

FEBRUARY 2020 - JUNE 2020

- Designed and lead reusable face shields for Personal Protective Equipment (PPE) crisis at the beginning of the SARS-Cov-2 pandemic
- Directed, scheduled, and guided 30 volunteers to build 3,300 shields out of reusable materials.

Sensata Technologies STEM Program, Attleboro MA — *Mentor*

SEPTEMBER 2017 - JUNE 2018

- Supported middle school outreach program and taught courses on thermodynamics.
- Mentored a student and guided him through the basics of engineering.