

# Ritvik Vasan

BIOPHYSICS · MACHINE LEARNING

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## Summary

I am a PhD candidate with significant experience in computational mechanobiology and entrepreneurship. I leverage interdisciplinary skills including theoretical modeling, machine learning, software engineering and quantitative biology to answer complex biophysical questions. Along the way, I develop usable tools for the community. I am seeking to expand my experience in technology, innovation and entrepreneurship to make a lasting impact.

## Education

### University of California, San Diego

9500 Gilman Drive, San Diego, CA

PHD IN MECHANICAL ENGINEERING (3.97/4.00)

2016 - 2020

M.S. IN MECHANICAL ENGINEERING (3.97/4.00)

2015 - 2016

### BITS Pilani

Pilani, Rajasthan, India

B.S. IN MECHANICAL ENGINEERING (8.76/10.00)

2011 - 2015

## Experience

### Laboratory for computational and cellular mechanobiology

University of California, San Diego

PHD CANDIDATE

Dec 2015 - Present

- Transitioned research from *bio-medical device prototyping* to *computational biophysics*.
- Published 3 *peer reviewed papers* in 3 years, before most peers, with 3 other papers in review.
- Participated as *chair and platform speaker* in international conferences like *Biophysical Society*.
- Awarded competitive *Frontiers of Innovation and Scholars Program (FISP)* fellowship and the *UCSD outstanding graduate student award*.
- Created open-source tools that have received press attention from websites like *phys.org*, *sciencedaily.com* and *jacobsschool.ucsd.edu*.
- Led collaborative teams of scientists across multiple universities.

### Allen Institute for Cell Science

Seattle, WA

SUMMER TRAINEE

June - Sept 2018 and 2019

- Initiated project leveraging *advanced machine learning models* to analyze the Allen Institute's cell feature data.
- Implemented and published a force-inference *Python package* named DLITE to estimate cell-cell forces from images.
- Worked in an *open-science* and *team-science* environment.
- Coordinated collaboration between the Allen Institute for Cell Science and UCSD.

### Nano-bio imaging and devices lab

University of California, San Diego

RESEARCH ASSISTANT

Sept - Dec 2015

- Implemented preliminary protocols to develop *nano-bowls* for targeted drug delivery.

### Applied physics and instrumentation lab

Indian Institute of Science

RESEARCH ASSISTANT

July 2014 - Aug 2015

- Designed a proof of concept of an *affordable* and *portable* cell-phone microscope for malaria diagnosis.
- Selected as one of the *top innovation projects in India* for the Gandhian award by SRISTI.
- Publicized work through national newspapers and networks.

### Mechanical engineering lab

Indian Institute of Science

RESEARCH ASSISTANT

May - July 2014

- Determined stiffness of MCF-7 breast cancer cells using cell aspiration techniques, atomic-force microscopy (AFM) and micro-grippers.

## Activities

- **Startup competitions:** Winner, 2019 IPHatch, Hong Kong. Pitched a business plan and technical details for a startup utilizing image processing IP made available through the competition.
- **Social innovation competitions:** Winner, 2014 SRISTI grant, India. Pitched a preliminary prototype of a cellphone microscope and received funding for executing a market-viable product.
- **Graduate mentor:** Directed 4 undergraduates and 1 junior graduate student on software engineering tasks and their research.
- **Teaching assistant:** Held discussion sessions and designed assignments for various biomechanics classes and a workshop on Git, Python and UNIX.
- **Outreach:** Designed and advised research projects for high school students through outreach programs like the Center for Talented Youth (CTY) and ENLACE.

## Selected Publications

(3 of 6)(\* denotes equal contribution)

2019	<b>Applications and challenges of machine learning to enable realistic cellular simulations</b> Vasan, Rowan, Lee, Johnson, Rangamani, Holst	In review
2019	<b>DLITE uses cell-cell interface movement to better infer cell-cell forces</b> Vasan, Maleckar, Williams, Rangamani	Biophysical Journal
2018	<b>The role of traction in membrane curvature generation</b> Alimohamadi*, Vasan*, Hassinger, Stachowiak, Rangamani	Molecular Biology of the Cell

## Skills

### Programming

Python, JAVA, LaTeX, PyTorch, Tensorflow, MATLAB, Jython, OpenCV, Git

### Software and hardware packages

COMSOL, Solidworks, Inventor, Cadence, LabView, AutoCAD, Raspberry Pi, Arduino, Beaglebone black