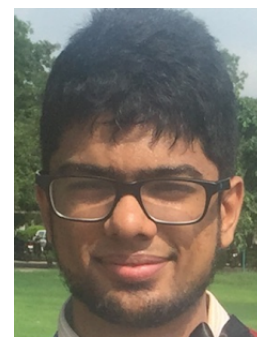


# Ritvik Vasan

Data and modeling scientist

rvasan@eng.ucsd.edu | ritvikvasan.github.io | github: @ritvikvasan



## PROFILE

I am a data scientist and computational physicist with expertise in applying theoretical and statistical algorithms to biophysical problems.

## EDUCATION

### UC SAN DIEGO

PH.D IN MECHANICAL

ENGINEERING

Expected 2020 | San Diego, CA

### UC SAN DIEGO

M.S IN MECHANICAL ENGINEERING

June 2017 | San Diego, CA

Cum. GPA: 3.97/4.00

### BITS PILANI

BE IN MECHANICAL ENGINEERING

Aug 2015 | Pilani, Rajasthan

Cum. GPA: 8.76/10.00

## SKILLS

### PROGRAMMING

Python • PyTorch • TensorFlow •  
MATLAB • Github • Git • C++ •  
OpenCV • R

### SOFTWARE PACKAGES

Solidworks • COMSOL • Inventor •  
Cadence • LabView • AutoCAD

### HARDWARE PLATFORMS

Raspberry Pi • Beaglebone Black •  
Arduino • Electronic sensors

## EXPERIENCE

### ALLEN INSTITUTE FOR CELL SCIENCE | TRAINEE

June 2019 - September 2019 | Seattle, WA

- Built a fully factorizable probabilistic model of cell structures using a conditional variational autoencoder.  
github.com/AllenCellModeling/CVAE\_testbed.
- Mentor. Dr. Gregory Johnson

### ALLEN INSTITUTE FOR CELL SCIENCE | TRAINEE

June 2018 - September 2018 | Seattle, WA

- Created an open source force-inference Python package named DLITE to estimate cell-cell forces from max projects of z-stacks in segmented images. github.com/AllenCellModeling/DLITE.
- Mentors: Dr. C. Dave. Williams, Dr. Molly M. Maleckar.

### LABORATORY FOR CELLULAR AND COMPUTATIONAL MECHANOBIOLOGY | PHD CANDIDATE

Dec 2015 - Present | UC San Diego, CA

- Developed theoretical frameworks adopting differential geometry techniques used in computer graphics to estimate forces from cell membrane shapes at the nanometer length scale.  
github.com/ritvikvasan/EMM
- Designed a pipeline that models the spatio-temporal distribution of actin filaments during mammalian clathrin-mediated endocytosis.  
github.com/DrubinBarnes/AkamatsuCMEmanuscript
- Validated a 3D membrane mechanics Iso-Geometric Analysis (IGA) framework using axisymmetric modeling to investigate constriction and scission of tubular membrane necks.  
github.com/ritvikvasan/Membrane-neck-formation
- Led collaborative teams of scientists across multiple universities.
- Mentor: Prof. Padmini Rangamani

### NANO-BIO IMAGING AND DEVICES LAB | RESEARCH ASSISTANT

Sep 2015 - Dec 2015 | UC San Diego, CA

- Implemented preliminary protocols to develop nano-bowls for targeted drug delivery.
- Mentor: Prof. Ratneshwar Lal

### APPLIED PHYSICS AND INSTRUMENTATION LAB | RESEARCH ASSISTANT

July 2014 - Sep 2015 | Indian Institute of Science, Bangalore

- 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.
- Mentors: Prof. Sai Siva Gorthi, Prof. Anil Gupta.

## LEADERSHIP

- Teaching assistant for MAE 209 (Continuum mechanics applied to medicine/ biology) , MAE 110A (Thermodynamics), Software Carpentry workshop (a 4 day workshop on UNIX, Git, Python and R)
- Graduate mentor for the Center for Talented Youth (CTY) and ENLACE - 2 summer outreach programs designed to guide talented high school students
- Graduate mentor to 3 CS undergraduate students working on ImageJ plugin extensions of DLITE (Dynamin Local Intercellular Tension Estimation) and EMM (Endocytic Membrane Modeling)
- Graduate mentor to an ME masters student working on a Python implementation of SPHARM-MECH

## AWARDS

- 2017 Outstanding Graduate Student  
2016 Frontiers of Innovation and Scholars Program (FISP)

## PUBLICATIONS

- 2019 Vasan\*, Rowan, Lee, Johnson, Rangamani, Holst . Applications and challenges of machine learning to enable realistic cellular simulations
- 2019 Vasan\*, Rudraraju, Akamatsu, Drubin, Garikipati, Rangamani . A mechanical model reveals that non axisymmetric buckling lowers the energy barrier associated with membrane neck constriction
- 2019 Akamatsu, Vasan\*, Serwas, Ferrin, Rangamani, Drubin . Branched actin filament self-organization and force generation during Clathrin-mediated endocytosis
- 2019 Vasan\*, Maleckar, Williams, Rangamani . DLITE uses cell-cell interface movement to better infer cell-cell forces.
- 2018 Vasan\*, Alimohamadi, Hassinger, Stachowiak, Rangamani . The role of traction in membrane curvature generation
- 2018 Vasan\*, Akamatsu, Schoeneberg, Rangamani . Intracellular membrane trafficking: modeling local movements in cells

## CONFERENCES

- 2019 Chair, Biophysical Society meeting  
Cell mechanics, mechanosensing and motility
- 2019 Talk, Biophysical Society meeting  
Self-organization and force production by the branched actin cytoskeleton during mammalian Clathrin-mediated endocytosis
- 2019 Talk, Biophysical Society meeting  
Inferring cell colony forces across time from tight junction intersections in human induced pluripotent stem cells
- 2019 Poster, American Society for Cell Biology .  
A new method for tracking cell-cell forces reveals that tension changes during colony rearrangement
- 2018 Poster, Biophysical Society meeting  
Actin generated forces during mammalian endocytosis
- 2017 Poster, Biophysical Society meeting  
Energetics of membrane necking: role of forces and protein induced curvature