

# Mohak Patel

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## EDUCATION

**Brown University**, Providence, RI, USA

Ph.D. Engineering, Mechanics of Solids and Structures GPA: 3.92/4

Estimated March'19

M.Sc. Computer Science – Focus in Machine learning, Computer Vision & Visualization. GPA: 4.00/4

2018

M.Sc. Engineering, Mechanics of Solids and Structures

2016

**Indian Institute of Technology (IIT) Gandhinagar**, India

B.Tech. with Honors in Mechanical Engineering Class rank: 2/40

2013

## TECHNICAL SKILLS

**Programming:** Python, MATLAB, SQL, Mathematica

**Libraries/Tools:** TensorFlow, PyTorch, scikit-learn, Pandas, Jupyter, Github. Introductory Spark, Hadoop and Hive.

**Techniques:** AI/ML models for classifications, NLP, CV, and recommendations, A/B Testing and Visualization.

## EXPERIENCE

**Research Assistant**, Ph.D., Brown University, RI, USA. Advisor: Prof. Christian Franck

Sept'13 – present

- Developed novel algorithms, combined with rigorous programming, for 3D motion tracking, quantitative analysis and visualization of large (~18 TBs) 3D image datasets to identify mechanical force signatures of cancer cells.
- Created a new particle tracking algorithm for high-resolution 3D motion reconstruction with 10x speed and 16x accuracy improvement over previous methods. Research won 2<sup>nd</sup> place in SEM student paper competition.
- Worked with diverse teams to incorporate motion tracking and image analysis in biology and mechanics research.
- Communicated research findings at conferences and through published journal articles. Google Scholar [link](#).

## Personal Data Science and Machine Learning Projects

2018 – present

- Best Vacation Planner (Python, Scikit-learn, Pandas, BeautifulSoup, Seaborn, SciPy)
  - Collected & analyzed data from various sources to plan the cheapest ski trip in Colorado thus saving \$222.
  - Predicted Airbnb listing prices using tree-based ensemble algorithms with a median absolute error of \$20.12.
- Stack Overflow Question Tags Recommendation (Python, TensorFlow, NLTK, Scikit-learn)
  - NLP on question title to recommend tags using deep convolutional multi-label sentence classification model.
- Image Cleaning (Python, TensorFlow, NumPy, SciPy, Scikit-learn, ipywidgets)
  - Developed a deep convolutional auto-encoder model to denoise and deconvolve microscope images.
  - Generated synthetic images to train the model using theoretical optical model for a confocal microscope.

**Computer Science Research & Course Projects**, M.Sc., Brown University, RI, USA

May'15 – Dec'18

- Research: Stress Tensor Visualization in Virtual Reality (Unity, Python, MATLAB, C#, Plotly, Scikit-Learn)
  - Created a new visualization for 3D stress tensor fields in Virtual Reality using Unity.
  - Designed and conducted experiments to evaluate the designs through hypothesis testing.
- Course Projects (Python, TensorFlow, Keras, PyTorch, MATLAB, NumPy, SciPy, Scikit-Learn)
  - (1) Developed deep learning model to count neurons in 3D images, (2) Machine translation using RNNs, (3) Image reconstruction from edges, (4) Implemented CNN to classify paintings by art styles.

**Teaching Roles**, Brown University, RI, USA

- Instructor: Taught Introduction to Engineering summer at Brown class for 20-30 high-school students. 2016, '17
- Teaching assistant for Mechanics of Solids. Designed labs, graded assignments, and TA hours 2015, '16

**Summer Undergraduate Research Fellow**, California Institute of Technology, CA, USA

May'12-July'12

- Designed experiments and studied vesicle adhesion using atomic force microscopy.

## AWARDS & LEADERSHIP ROLES

### Select Fellowship and Academic Awards

- 2<sup>nd</sup> place in student paper competition, Society of Engineering Mechanics 2017
- Open Graduate Education fellowship to support funding for Masters in CS, Brown University 2015-'17
- Director's Silver Medal for overall outstanding performance, IIT Gandhinagar 2013

### Leadership Roles

- Halla Bol: Led a team of 60 peer students to organize a 9-day sports festival for more than 700 participants.
- College Soccer Captain, IIT Gandhinagar: Team reached finals of ADFC League'12 and semifinals of Concors'11.