

## EDUCATION

---

University of California, Berkeley *Fall 2018 - present*  
Pursuing Ph.D. in Computer Science  
Advisors: Prof. Jitendra Malik and Prof. Angjoo Kanazawa

Indian Institute of Technology, Bombay *2014-2018*  
Bachelor of Technology (with Honors) in Computer Science and Engineering

## RESEARCH INTERESTS

---

3D Computer Vision. I'm interested in using images and videos for building a better 3D understanding of the world. In the past, I've worked on Formal Methods and Program Verification also!

## SCHOLASTIC ACHIEVEMENTS

---

- Secured All India Rank 6 in JEE Advanced 2014 among 150 thousand candidates
- Secured All India Rank 50 in JEE Mains 2014 among over 1.3 million candidates
- Received the Institute Academic Award, IIT Bombay for exceptional academic performance in 2014-15

### Olympiads & Scholarships

- Silver Medalist at the 46<sup>th</sup> International Chemistry Olympiad, Hanoi, Vietnam held in 2014
- Recipient of the KVPY (Kishore Vaigyanik Protsahan Yojana Fellowship) in 2013 by Govt. of India
- Awarded the NTSE (National Talent Search Examination) Scholarship in 2010 by N.C.E.R.T. New Delhi

## PUBLICATIONS

---

- [4] **Shape and Viewpoint without Keypoints**  
*Shubham Goel, Angjoo Kanazawa, Jitendra Malik*  
ECCV 2020
- [3] **Boolean Functional Synthesis: Hardness and Practical Algorithms\***  
*S. Akshay, Supratik Chakraborty, Shubham Goel, Sumith Kulal, Shetal Shah*  
FMSD 2020
- [2] **What's hard about Boolean Functional Synthesis?\***  
*S. Akshay, Supratik Chakraborty, Shubham Goel, Sumith Kulal, Shetal Shah*  
CAV 2018
- [1] **Computing Scores of Forwarding Schemes in Switched Networks with Probabilistic Faults\***  
*Guy Avni, Shubham Goel, Thomas A. Henzinger, Guillermo Rodriguez-Navas*  
TACAS 2017

\* Names of authors sorted alphabetically by last name.

## TEACHING & MENTORING

---

### Graduate Student Instructor, UC Berkeley

- CS 280 : Graduate Computer Vision under Prof. Jitendra Malik and Prof. Stella Yu *Spring 2020*

### Teaching Assistant, IIT Bombay

- MA 105 : Advanced Calculus under Prof. I.K.Rana *Fall 2015*
- CS 226 : Digital Logic Design under Prof. Supratik Chakraborty (awarded TA of the Month) *Spring 2017, 2018*

### Mentoring, IIT Bombay

- Institute Student Mentorship Programme (mentored 12 freshmen) *2017-18*
- Department Academic Mentorship Programme (mentored 6 sophomores) *2017-18*

## OTHER RESEARCH EXPERIENCE

---

### **Abstract Interpretation for Graphics Renderers**

*Spring 2019*

*Guide: Prof. Sanjit Seshia, UC Berkeley*

- Designed an abstract domain for (over- and under-) approximating the graphics rendering pipeline for a tri-mesh.
- It enables pushing properties over the semantic space (in the 3D world) through a graphics renderer to pixel space.
- Could potentially be used for proving robustness of a downstream ML-based vision component to  $\epsilon$ -ball perturbations in the (semantic) space of vertex positions

### **Estimating Dense Correspondences on Wide Baseline Images**

*2017 - 18*

*Guide: Prof. Arjun Jain, IIT Bombay*

- Worked on finding coarse-to-fine dense correspondences between wide-baseline images in a fully supervised setting.
- We used a correlation volume that encoded descriptor similarity between points and coarse regions in the first and second image respectively
- Achieved promising results on relatively planar surfaces but didn't perform very well in the typical case with high occlusions and disocclusions.

### **Restoration of Manifold-Valued Images**

*Summer 2017*

*Guide: Prof. Stefan Roth, TU Darmstadt*

- Worked on restoration (denoising and inpainting) of images that take values in Riemannian manifolds
- Explored the use of higher order differences and arbitrary filters in modeling the loss objective.
- Came up with a family of frameworks for applying arbitrary zero-sum filters to manifold valued patches; Provided flexibility and generalized previously defined first and second order differences over manifolds

## EXTRACURRICULARS

---

- Attended the Second Indian SAT+SMT School held at Infosys, Mysore in 2017
- Secured 2<sup>nd</sup> place in the Computer Vision track for IIT Bombay in the Inter-IIT Tech meet 2018 in Madras, India.
- Ranked 14<sup>th</sup> in ACM ICPC Chennai onsite contest and 20<sup>th</sup> in the online regionals in 2016
- Qualified for the onsite finals of Microsoft's Build The Shield, a network security competition