

# Chinmay Talegaonkar

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## EDUCATION

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<b>University of California, San Diego</b> <i>Ph.D. in Electrical and Computer Engineering</i> Advisor: Prof. Nicholas Antipa	San Diego, CA Sept 2022 – Present GPA: 4.0/4.0
<b>University of California, Los Angeles</b> <i>M.S. in Electrical and Computer Engineering</i> Advisor: Prof. Achuta Kadambi	Los Angeles, CA 2019 – 2021 GPA: 4.0/4.0
<b>Indian Institute of Technology, Bombay</b> <i>B.Tech. in Electrical Engineering</i> <i>Minor in Computer Science</i> Advisor: Prof. Ajit Rajwade	Mumbai, India 2015 – 2019 GPA: 9.07/10.0

## PUBLICATIONS

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### Pose Estimation of Buried Deep-Sea Objects using 3D Deep Learning Models

**Chinmay Talegaonkar\***, Jerry Yan\*, Nicholas Antipa, Eric Terrill, Sophia Merrifield  
OCEANS Conference and Expositions, 2024. [Paper](#) [Code](#)

### Visual Physics: Discovering Physical Laws from Videos

**Chinmay Talegaonkar\***, Pradyumna Chari\*, Yunhao Ba\*, Achuta Kadambi  
ICCP 2020 Poster, CVPR 2020 Tutorial. [arXiv PrePrint](#)  
Journal Version: *On learning mechanical laws of motion from video using neural networks.*  
IEEE Access, 2023. [Paper](#)

### Compressive Phase Retrieval Under Poisson Noise

**Chinmay Talegaonkar\***, Parthasarathi Khirwadkar, Ajit Rajwade  
IEEE International Conference on Image Processing (ICIP) 2019. [Paper](#)

### Performance Bounds For Tractable Poisson Denoisers With Principled Parameter Tuning

**Chinmay Talegaonkar\***, Ajit Rajwade  
IEEE Global Conference on Signal and Information Processing (GlobalSIP) 2018. [Paper](#)

## WORK EXPERIENCE

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### Research Intern

Qualcomm AI

San Diego, CA  
June 2023 – Sept 2023

- Developed a memory-efficient generalizable NeRF-like method to create human avatars from monocular videos. Achieved comparable accuracy to existing methods. *Patent Pending*
- Invented a point-based 3D scene representation for human modeling that reduces memory usage by 10x and training time by 100x respectively.
- Engineered an end-to-end pipeline to estimate SMPL mesh, and segmentation masks from videos.

### Senior Deep Learning Engineer

Intrinsic.ai

Mountain View, CA  
May 2022 – Sept 2022

- Led the development of a novel HDR fusion algorithm, resulting in higher pose estimation accuracy for difficult lighting scenarios.
- Implemented a deep learning-based feature extractor to improve stereo matching and point cloud generation from a multi-view camera setup.

### Senior Deep Learning Engineer

Akasha Imaging - **acquired** by Intrinsic.ai (an Alphabet company) in May 2022.

Palo Alto, CA  
May 2021 – May 2022

- Developed an end-to-end deep learning based multi-view pose estimation pipeline with more than 99% reliability and sub-millimeter accuracy. This led to the company's first product order.

- Engineered a synthetic data generation pipeline to generate training data for segmentation and keypoint estimation algorithms.
- Contributed to tools for ML Ops, CI/CD testing, pose evaluation frameworks, and data collection setups.

### Deep Learning Software Intern

NVIDIA

Santa Clara, CA

June 2020 – Sept 2020

- Implemented a linearized thread launching algorithm to optimize CUDA kernels for backpropagation in 2D and 3D convolution layers in popular CNN architectures, resulting in 30% speedup.
- Enabled complex valued convolution kernels in *CUTLASS* achieving more than 90% compute resource utilization.

### AI/ML Compute DevTech Intern

NVIDIA

Bengaluru, India

May 2018 – July 2018

- Developed CUDA kernels for optimizing routing layer and back-propagation in capsule networks resulting in a 2x speedup
- Parallelized end-to-end implementation of *DBscan* using *CUTLASS* and *thrust* libraries for **NVIDIA Rapids** [🔗](#) platform

## RESEARCH PROJECTS

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### Exact Volume Rendering of 3D Gaussians

Aug 2024 - Present

Guide: Prof. Nicholas Antipa and Prof. Ravi Ramamoorthi

Developed a method for fast, exact volume rendering of 3D Gaussians. Demonstrated improvements over 3D Gaussian Splatting for modeling flat top surfaces, and volume rendering 3D Gaussian densities. Currently exploring potential applications in Computed Tomography.

### Defocus Blur Rendering with 3D Gaussian Splatting

Jan 2024 - Present

Guide: Prof. Nicholas Antipa and Prof. Ravi Ramamoorthi

Devised an approach for accurately rendering 3D Gaussians with defocus blur by incorporating lens blur in the splatting process. Achieved higher fidelity blur rendering compared to 3D Gaussian Splatting for large aperture sizes. Demonstrated applications in focal stack rendering.

### Monocular Depth Diffusion Models with Defocus Cues

Jan 2024 - Present

Guide: Prof. Nicholas Antipa

Identified depth ambiguities in monocular depth diffusion models caused by biases in training data. Developed a test-time optimization method utilizing defocus blur and coded aperture masks to resolve depth ambiguities. The proposed approach also enables metric depth estimation through these models.

### Novel View Synthesis in the Presence of Phase Optics

Sept 2022 - Dec 2022

Guide: Prof. Ravi Ramamoorthi

Explored NeRF-based view synthesis for sparse views captured with a microlens array. Simulated multi-view data through a microlens array in Mitsuba3. Achieved improved detail recovery with microlens array data compared to pinhole cameras in ultra-sparse configurations. [Code](#) [🔗](#) [Report](#) [🔗](#)

## KEY SKILLS

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**Programming Languages:** C & C++, CUDA, Bash, Python, MATLAB

**Frameworks:** Pytorch, OpenCV, scikit-learn, numpy, scipy, pandas, blender, mitsuba3, Slang.D

**Development Tools:** Github, Jenkins, Google Cloud, Docker

## TEACHING ASSISTANT

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- Introduction to Quantum Physics IIT Bombay, Fall 2016
- Software Systems Lab UCLA, Winter 2020
- Reinforcement Learning UCLA, Spring 2020
- Introduction to Computer Vision UCLA, Winter 2021
- Computational Imaging UCSD, Spring 2024