Shivam Duggal

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Research Interest

My research interests lie at the intersection of computer vision, computer graphics and robotics. I am particularly interested in topics such as *self-supervised learning, 3D perception, 3D reconstruction, 2D/ 3D simulation, with applications relating to augmented/ virtual reality and robot learning.*

Education

Carnegie Mellon University — Aug 2021 - Present
Masters of Science in Robotics (MSR) — Pittsburgh, USA

- Advisor: Prof. Deepak Pathak
- **CGPA: 4.16/4** (till 2nd semester*)
- **Awards:** Siebel Scholar (1/5 CMU students, only masters student)

Delhi Technological University (DTU, formerly DCE) — Aug 2013 - Aug 2017
Bachelor in Technology, Computer Science (B.Tech) — Delhi, India

- Aggregate: 83.7% , **CGPA: 9.12/10**

Research Experience

Carnegie Mellon University — Aug 2021 - Present
Graduate Student Researcher — Pittsburgh, USA

- Advisors: Prof. Deepak Pathak, Prof. Ioannis Gkioulekas

Brown University — May 2021 - Aug 2021
Research Intern — Remote

- Advisor: Prof. Srinath Sridhar

Uber Advanced Technology Group — Nov 2019 - Feb 2021
Research Scientist I — Toronto, Canada

- Advisors: Prof. Raquel Urtasun, Prof. Shenlong Wang

Uber Advanced Technology Group — Aug 2018 - Nov 2019
AI Resident **(3 AI residents selected world-wide)** — Toronto, Canada

- Advisors: Prof. Raquel Urtasun, Prof. Shenlong Wang

Awards & Honors

[* Denotes All India National rank]

	Siebel Scholarship ($35000 USD)	2023
Top 4.2%	Outstanding Reviewer ECCV	2022
Top 0.2%	**GeoSim nominated as Best Paper Candidate CVPR**	2021
Rank **1/70**	Marketplace Hackathon, Amazon	2017
Rank **20/7937***	Codechef June Long Challenge	2017
Rank **10/1885***	Hackerearth Collegiate Programming Contest	2016
Rank **28***	**ACM ICPC India Finals**	2016

Rank **29**/**2609***	ACM ICPC Amritapuri Regionals	2016
Rank **29**/**867***	ACM ICPC Chennai Preliminary Round	2016
Rank **12**/**5693***	Codechef October Long Challenge	2016
Rank **1**/**130** Interns	Flipkart Hackathon JUGAAD	2016
Rank **6***	IEEEXtreme Programming Competition	2015
Rank **8***	IEEEXtreme Programming Competition	2014

Selected Publications & Preprints

[* Denotes equal contribution]

[1] ***Shivam Duggal***, *Deepak Pathak. "Topologically-Aware Deformation Fields for Single-View 3D Reconstruction."* **(CVPR 2022)** [Link]

[2] *Trevor Houchens, Cheng-You Lu,* ***Shivam Duggal***, *Rao Fu, Srinath Sridhar. "NeuralODF: Learning Omnidirectional Distance Fields for 3D Shape Representation."* [Link]

[3] ***Shivam Duggal****, *Zihao Wang*, Wei-Chiu Ma, Sivabalan Manivasagam, Justin Liang, Shenlong Wang, Raquel Urtasun. "Mending Neural Implicit Modeling for 3D Reconstruction in the Wild."* **(WACV 2022)** [Link]

[4] *Yun Chen*, Frieda Rong*,* ***Shivam Duggal****, *Shenlong Wang, Xinchen Yan, Sivabalan Manivasagam, Shangjie Xue, Ersin Yumer, Raquel Urtasun. "GeoSim: Realistic Video Simulation via Geometry-Aware Composition for Self-Driving."* **(CVPR 2021)** [Link]
Nominated for Best Paper Award!

[5] ***Shivam Duggal***, *Shenlong Wang, Wei-Chiu Ma, Rui Hu, Raquel Urtasun. "Deeppruner: Learning efficient stereo matching via differentiable patchmatch."* **(ICCV 2019)** [Link]

[6] *Shamit Lal*,* ***Shivam Duggal****, *Indu Sreedevi. "Online video summarization: Predicting future to better summarize present."* **(WACV 2019)** [Link]

Industry Experience

Amazon, Hyderabad, India	(Software Eng.)	Aug 2017 - Jul 2018
Flipkart, Bangalore, India	(Software Eng. Intern)	Jun 2016 - Aug 2016
Parallel Dots, Delhi, India	(Machine Learning Intern)	Dec 2015 - Jan 2016

Conference Reviewing

CVPR 2023 / WACV 2023 / 3DV 2022 / ECCV 2022 / CVPR 2022 / WACV 2022 / IJCV
WACV 2021 / ICRA 2021 / IROS 2021 / SIGGRAPH Asia 2021

Course Work

Computational Photography / Physics-Based Rendering (A+) / Computer Vision (A+)
Convex Optimization (A) / Math for Robotics (A)

Skills

Languages/ Tools & Frameworks: Python, C/C++, LaTeX, Pytorch, Git, AWS

Patents

[1] ***Shivam Duggal***, *Shenlong Wang, Wei-Chiu Ma, Raquel Urtasun."Depth Estimation for Autonomous Devices."* US Patent App. 16/826,924

[2] *Frieda Rong, Yun Chen,* ***Shivam Duggal****, Shenlong Wang, Xinchen Yan, Sivabalan Manivasagam, Ersin Yumer, Raquel Urtasun. "Photorealistic Image Simulation with Geometry-Aware Composition."* US Patent App. 17/150,989

Other Projects

Non-Exponential Radiative Transfer for Light Transport CMU, Pittsburgh

- Studied the **Radiative Transfer Framework (RTE)** which governs the physics of light transport through a participating medium.
- Classical RTE models light transmittance (as an exponential function) only through spatially-uncorrelated participating mediums. We explored **the affect of spatially-correlated participating mediums on RTE**, by modeling light transmittance as non-exponential functions.

Poisson Solver for Depth Completion Uber ATG, Toronto

- Casted the problem of monocular depth completion using single camera image and sparse Lidar points, **to a boundary value problem.**
- Instead of directly predicting depth value per pixel, we developed an approach to first predict relative-depth estimates per pixel and then integrate them to predict the final depth value.

Emotion Recognition on speech signals DTU, India

- Implemented ensemble approaches and compared various algorithms for emotion recognition in speech signals using MFCC and energy as features.
- Publication: Emotion recognition on speech signals using machine learning, **ICBDACI (2017)** [Link]