# Vikram Shree


CONTACT

Pasadena, CA 91101, USA

vikramshree037@gmail.com
+1 (607) 319-9357


RESEARCH INTERESTS

**Robot perception, Computer vision, State estimation, and Machine learning.**

EDUCATION

PhD, **Cornell University, USA** *Aug' 17 - Jul' 22*
**Major:** Mechanical Engineering, **GPA**: 4/4
**Minor1:** Artificial Intelligence, **Minor2:** Entrepreneurship

B.Tech., **Indian Institute of Technology Kanpur, India** *Jul' 13 - May' 17*
**Major:** Aerospace Engineering, **Minor:** Electrical Engineering (Controls), **GPA**: 9.3/10

PUBLICATIONS

- **V Shree**, H Danakian, L Nguyen, R Gokidi, and P Nercessian, **"Two-Stage Extrinsic Calibration of a Static Line-Scanning Lidar with a Rotary Platform."** *accepted in IROS, 2026.*
- A Mishra, A Ramaswami*, **V Shree***, M Ilman, K Ly, M Pritts, and R Shepherd, **"Sensor Fusion of Touch Vision in Soft Manipulators for Fruit Picking."** *in Nature Communications, 2026.* [paper]
- **V Shree**, S Allen, B Asfora, J Banfi, and M Campbell, **"Multi-modal Perception for Cooperative Escape Planning in Hazardous Environments."** *in IROS, 2022.* [paper]
- **V Shree***, B Asfora*, R Zheng, S. Hong, J Banfi, and M Campbell, **"Exploiting Natural Language for Efficient Risk-Aware Multi-robot SaR Planning."** *in ICRA and RA-L, 2021.* [paper]
- A Bhaskar*, S Rangarajan*, **V Shree***, M Campbell, F Parise, **"Accelerated consensus in multi-agent networks via memory of local averages."** *in CDC, 2021.* [paper]
- J Banfi, **V Shree**, and M Campbell, **"Planning High-Level Paths in Hostile, Dynamic, and Uncertain Environments."** *in JAIR, 2020.* [paper]
- **V Shree**, WL Chao, and M Campbell, **"Interactive Natural Language-based Person Search."** *in ICRA and RA-L, 2020.* [paper]
- **V Shree**, WL Chao, and M Campbell, **"An Empirical Study of Person Re-Identification with Attributes."** *in RO-MAN, 2019.* [paper]
- S Agarwal, **V Shree**, and S Chakravorty, **"RFM-SLAM: Exploiting Relative Feature Measurements to Separate Orientation and Position Estimation in SLAM."** *in ICRA, 2017.* [paper]

PATENTS

- **V Shree**, LA Jiang, and P Swierczynski, **"Stereo vision system and method for small-object detection and tracking in real time."** U.S. Patent No. 12125215, 2024.
- **V Shree**, P Swierczynski, and LA Jiang, **"Real-time confidence-based image hole-filling for depth maps."** U.S. Patent No. 12094144, 2024.

TECHNICAL SKILLS

- **Programming**: Python, C++, C, Matlab, Java.
- **Software**: PyTorch, TensorFlow, OpenCV, ROS, AutoCAD, SolidWorks, Git, ANSYS.
- **Sensors**: RGB cameras, Stereo-camera, LiDAR, UWB Radar, IMU, and GPS.
- **Compute Platforms**: Nvidia Jetson, Raspberry Pi.

INDUSTRY EXPERIENCE

**Senior Perception Engineer** **SiLC, Monrovia CA**
Supervisor: Patrick Nercessian *Aug '25 - Present*

- Developing advanced perception algorithms for a line-scanning FMCW lidar system, covering extrinsic calibration, geometric object characterization, and multi-lidar point cloud fusion.
- Leading simulation efforts to create high-fidelity replica of FMCW lidar in physics-based engines like IsaacSim, enabling high volume synthetic data collection for perception tasks.

**Senior Perception Engineer** — **NODAR, Boston MA**
Supervisor: Dr. Piotr Swierczynski — *Mar '24 - Jun '25*

- Developed 3D object detection benchmarking pipeline to evaluate key performance metrics like signal-to-noise ratio, false positives (FP), and false negatives (FN). The pipeline enabled extensive study of sensor configurations, like baseline and resolution, needed for various driving conditions.
- Co-developed system architecture for NODAR's GuardView product and implemented algorithmic enhancements to meet key customer requirements like detecting a 10 cm tall object, at 50 m range.

**Perception Engineer** — **NODAR, Boston MA**
Supervisor: Dr. Piotr Swierczynski — *Sep '22 - Feb '24*

- Architected algorithm for object detection and tracking in 3D at long range (>150 meters), operating on dense stereo-camera point cloud (>1 million points per frame).
- Leveraged CUDA library to deliver a production-grade system capable of real-time operation on Jetson AGX Orin, culminating in launch of NODAR's GridDetect product.

**Research Intern** — **Samsung Research America, Plano TX**
Supervisor: Dr. Yuming Zhu — *Jun '21 - Aug '21*

- Enhanced cell phone position estimation in indoor environments by addressing the limitations of UWB-based Indoor Positioning Systems (IPS), which often experience accuracy issues due to communication loss. Developed a fusion architecture that integrates IPS position estimates with camera data, resulting in improved localization and mapping accuracy.

## Research Experience

**Extrinsic Calibration for line-scanning LiDAR** — **SiLC, Monrovia CA**
*Sr. Perception Engineer,* Supervisor: Patrick Nercessian — *Aug '25 - Feb '26*

- Proposed an optimization framework for extrinsic calibration of line-scanning FMCW lidar operating on dynamic platforms. Formulated calibration as a geometric consistency optimization problem and achieved robust convergence with dimensioning errors below 0.3%.

**Long-range 3D Object Detection and Tracking** — **NODAR, Boston MA**
*Perception Engineer,* Supervisor: Dr. Piotr Swierczynski — *Sep '22 - Feb '24*

- Investigated long-range 3D object perception using stereo-vision by developing a bird's-eye-view sensor model for robust detection of small distant objects. Integrated the perception output with a particle filter for real-time tracking, demonstrating reliable tracking from a moving ego vehicle.

**Sensor Fusion for Robotics in Agriculture** — **Cornell University, Ithaca NY**
*Independent Collaboration,* Collaborator: Prof. Anand Mishra — *Sep '21 - May '25*

- Developed a multi-sensor perception framework for fruit picking by integrating RGB and time-of-flight sensing on a soft robotic manipulator. Identified hue as a robust indicator of fruit ripeness through multi-day observations and fused color and depth measurements to estimate fruit size.

**Multi-modal Perception in Search-and-Rescue Missions** — **Cornell University, Ithaca NY**
*Graduate Research Assistant,* Advisor: Prof. Mark Campbell — *Aug '20 - Jul '22*

- Explored multi-modal scene understanding for human–robot teaming in search-and-rescue missions by developing a Bayesian framework that fuses visual danger perception with human-provided language descriptors. Leveraged the resulting danger estimates for risk-aware victim search planning and curated a dataset of annotated search-and-rescue scenes.

**Human Attribute Identification and Tracking** — **Cornell University, Ithaca NY**
*Graduate Research Assistant,* Advisor: Prof. Mark Campbell — *Aug '18 - Jul '20*

- Investigated attribute-based person identification by studying the memorability of appearance attributes and leveraging them as semantic representations for zero-shot learning. Developed entropy-based uncertainty quantification framework that interactively queries users for additional attributes when the available evidence is insufficient.

**Simultaneous Localization and Mapping** **Texas A&M University, College Station TX**
*Research Intern,* Advisor: Prof. Suman Chakravorty *Jun '16 - Jul '16*

– Studied role of orientation uncertainty in localization and mapping algorithms through simulations. Proposed using a global heading sensor like compass to avoid deterioration in orientation estimate and performed comparative analysis of a novel SLAM approach with standard GTSAM.

**Suboptimal Path Planning Under Uncertainty** **IIT Kanpur, Kanpur UP**
*Undergraduate Research Fellow,* Advisor: Prof. Mangal Kothari *May '15 - Jul '15*

– Performed path planning for UAV with RRT algorithm, while including probabilistic collision-avoidance constraints. Evaluated throughput rate via simulation in crowded environments.

## Selected Projects

**Accelerating Consensus in Multi-agent Networks** [paper] *Aug '20 - Dec '21*

– Introduced a model for network evolution where agents use the weighted linear combination of current and past states, to update their current state. We proved that our model guarantees faster convergence than existing linear models and established the rate of convergence.

**Social Navigation for Tour-guide Robot** [report] *Jan '20 - May '20*

– Proposed a modification to the classic social force model for a tour-guide robot that takes into account the field of view of the user. Developed a virtual experimental platform with ROS to assess impact on constructs such as: follow-ability, perceived safety, and perceived intelligence.

**Vehicle Orientation Estimation from Monocular Images** [report] *Aug '18 - Dec '18*

– Proposed a two staged CNN framework for vehicle orientation estimation from monocular images. Compared performance of SOTA models for estimating orientation on widely used KITTI dataset.

**Multiple Robot SLAM with Particle-Filtering** [report] *Jan '16 - Apr '16*

– Simulated Fast-SLAM for two ground robots and created occupancy grid map of surrounding. Obtained relative pose of robots and fused the individual maps to estimate the global map.

**Design of Autonomous Underwater Vehicle (AUV)** [report] *May '14 - Jun '14*

– Designed and built the hull for university's AUV team and equipped it with 4 self-made thrusters. Designed and fabricated a miniaturized torpedo with passive, pneumatic-based propulsion system.

## Advanced Coursework

– **Robotics and Control:** Autonomous Mobile Robots, Human-Robot Interaction, Multivariable Control Theory, Robot Motion Planning, Convex Optimization, Network Systems and Games.

– **Machine Learning:** ML for Intelligent Systems, Computer Vision, Advanced ML.

– **Statistics:** Engineering Probability & Statistics, Bayesian Estimation, Information Theory.

– **Business (Management Certificate):** Managing & Leading in Organizations, Managing Operations, Marketing Management, Designing New Ventures.

## Teaching

**System Dynamics (MAE3260)** **Cornell University, Ithaca NY**
*Teaching Assistant* *Spring '21*

– Developed content for group work sessions, designed virtual lab experiments, and held office hours.

**Mechatronics (MAE3780)** **Cornell University, Ithaca NY**
*Teaching Assistant* *Fall '20*

– Led weekly discussions, created assignments, supervised student projects, and held office hours.

## Academic Service

– **Journals:** Served as reviewer for Robotics and Automation Letters, Journal of Intelligent & Robotic Sys, Transactions on Neural Networks and Learning Systems, Journal of Supercomputing, and Journal of Big Data.

– **Conferences:** Reviewed articles submitted to IROS, CDC, and AAMAS.