

# Sudeep Pillai

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CONTACT INFORMATION	32-23x, 32 Vassar St, Cambridge, MA, USA Marine Robotics Group Computer Science and Artificial Intelligence Laboratory (CSAIL) Massachusetts Institute of Technology	
EDUCATION	<b>Massachusetts Institute of Technology</b> , Cambridge, MA Ph.D candidate, Electrical Engineering and Computer Science Thesis: Towards Richer, and Self-Supervised Perception in Robots Advisor: John J. Leonard	2014 – Present
	<b>Massachusetts Institute of Technology</b> , Cambridge, MA Master of Science, Electrical Engineering and Computer Science Thesis: Learning Articulated Motions from Visual Demonstration	2011 – 2014
	<b>University of Michigan</b> , Ann Arbor, MI Bachelor of Science in Engineering, Mechanical Engineering Advisor: Ryan Eustice	2005 – 2008
RESEARCH EXPERIENCE	<b>Massachusetts Institute of Technology</b> , Cambridge, MA <i>Research Assistant</i> , Marine Robotics Group, CSAIL My research focuses on developing perception and inference algorithms that enable <i>life-long visual experience learning from semantic and geometric scene understanding in robots</i> . I am particularly interested in understanding the capabilities at the intersection of scene understanding and spatial awareness (SLAM) that can potentially support self-supervised perceptual learning in mobile robots.	2014 – Present
	<i>Research Assistant</i> , Robotics, Vision & Sensor Networks, CSAIL Developed a supervised method to learn and predict the articulations in objects from user-provided visual demonstrations of object actuation in unstructured environments.	2011 – 2014
SELECTED PUBLICATIONS	Pillai et al. "Towards Visual Ego-motion Learning in Robots". <i>IROS '17</i> . Moll, O. et al. "Vroom: An Engine for Big Volume Robot Sensor Data". <i>VLDB Demo '17</i> . Fourie et al. "Centralized Graph Databases for Mobile Robotics", <i>ICRA '17</i> . Pillai et al. "High-Performance and Tunable Stereo Reconstruction", <i>ICRA '16</i> . Pillai et al. "Monocular SLAM Supported Object Recognition", <i>RSS '15</i> . Ramalingam et al. "Line-Sweep: Cross-Ratio for Wide-Baseline Matching & Recons.", <i>CVPR '15</i> . Pillai et al. "Learning Articulated Motions from Visual Demonstration", <i>RSS '14</i> .	
PATENTS (PROVISIONAL)	High-Speed and Tunable Scene Reconstruction Method Using Stereo Imagery	2016
PROFESSIONAL EXPERIENCE	<b>Mitsubishi Electric Research Laboratories</b> , Cambridge, MA <i>Research Intern - Spatial Analysis</i> Developed next-generation computer vision technologies for autonomous vehicles <i>Key Technologies</i> : Real-time applications for autonomous vehicles; Stereo Mapping and Reconstruction; Software stack for rapid-prototyping and evaluation of computer vision applications.	Summer 2014
	<b>PhaseSpace Motion Capture</b> , San Leandro, CA <i>Computer Vision &amp; Software Developer</i> Assist with the development of a state-of-the-art computer vision stack to support motion-capture technologies with real-time performance considerations <i>Key Technologies</i> : Sub-pixel accurate fiducial tracker for robust 6-DOF pose estimation; Real-time facial expression transfer and synthesis; n-View camera calibration and correspondence engine; SIMD/GPU optimization for high-throughput, real-time image processing.	2009 – 2011

## Segway Inc., Manchester, NH

*R & D Engineer Intern - Product Development and Future Technologies*

Summer 2008

Conceptualized upcoming prototypes amongst a highly skilled product design team

*Key Technologies:* Frequency stability analysis for low-cost MEMS IMUs; Time-critical control algorithms for stability low-cost automatic control on embedded systems.

INVITED TALKS	Mar '17: NVIDIA Research Feb '17: Microsoft Analog Research and Development Apr '16: CSAIL Advisory Board Meeting Jan '16: Boston Imaging and Vision Meetup Jan '16: Energy-Efficient Multimedia Systems Group, RLE, MIT EECS Jan '15: Association for the Advancement of Artificial Intelligence (AAAI '15)	<i>Santa Clara, CA</i> <i>Seattle, WA</i> <i>Cambridge, MA</i> <i>Cambridge, MA</i> <i>Cambridge, MA</i> <i>Austin, TX</i>
ACADEMIC DUTIES	Workshop/Tutorial Co-organizer: <ul style="list-style-type: none"><li>• Learning for Mapping Workshop, IEEE IROS 2017</li><li>• Geometric and Semantic 3D Reconstruction Tutorial, IEEE CVPR 2017</li></ul> Program Committee: <ul style="list-style-type: none"><li>• Robotics Science and Systems (RSS)</li></ul> Journals: <ul style="list-style-type: none"><li>• IEEE Robotics and Automation Letters (RA-L)</li><li>• Autonomous Robots (AURO)</li></ul> Conferences: <ul style="list-style-type: none"><li>• IEEE International Conference on Robotics and Automation (ICRA)</li><li>• IEEE International Conference on Intelligent Robots and Systems (IROS)</li><li>• Robotics Science and Systems (RSS)</li><li>• International Conference on Computer Vision (ICCV)</li></ul>	2017 2017 2016 2016-Present 2016-Present 2014 - Present 2015 - Present 2016 2017
MEDIA	"Object recognition for robots", <i>MIT News</i> 2015 "Robots that can recognize objects? A SLAM dunk", <i>MIT CSAIL News</i> 2015 "Terminator-like vision could help robots do our dishes", <i>Popular Science</i> 2015 "Soon, robots to get better at identifying objects", <i>The Hindu</i> 2015 "Attacking Bitcoin's anonymity with graph analytics", <i>Linkurious Blog</i> 2014	
PAST PROJECTS	<b>MIT DARPA Robotics Challenge Team</b> , <i>Member, Perception Sub-Team</i> Assisted in developing the perception framework to take on the visual challenges in the DARPA Robotics Challenge <b>UM::Autonomy</b> , <i>Perception Lead / Co-founder</i> Co-founded a team of multidisciplinary students to build an autonomous vehicle to compete in the ONR AUVSI ASV Competition, and developed machine vision architecture for vision-based SLAM and navigation using a synchronized multi-camera setup	2012 – 2013 2007 – 2008
PROGRAMMING	<b>Programming Languages:</b> C, C++, Python, CUDA, SIMD/SSE, MATLAB, Bash, Emacs Lisp, SQL. <b>Software / Libraries:</b> TensorFlow, Caffe, Ceres Solver, OpenCV, Eigen, PCL, LCM/ROS/Gazebo, ISAM/GTSAM, CGAL, OpenGL, Boost, OpenMP, GDB, Valgrind, Linux <b>Python:</b> Keras, Scikit-Learn, NumPy, Boost-Python, Cython, Pandas, SciPy, PyTables, NetworkX, graph-tool, Numba, Anaconda  <i>Keywords:</i> Machine Learning, Deep Learning, Semantic Scene Understanding, Computer Vision, Simultaneous Localization and Mapping (SLAM), Structure-from-Motion (SfM), Self-driving cars, Autonomous Robots, Robot Perception, Object Recognition, Localization, Mapping, Probabilistic Graphical Models, Self-supervised Learning, Semi-Supervised Learning, Learning from Demonstration, Sensor Fusion.	