

## SUNDARA TEJASWI DIGUMARTI

Visual SLAM R&D Engineer, Arrival, UK

**Website:** <https://tejaswid.github.io>

**Email:** [sundaratejaswi@gmail.com](mailto:sundaratejaswi@gmail.com), [tejaswid@oxfordrobotics.institute](mailto:tejaswid@oxfordrobotics.institute)

### Research Areas

Scene Understanding – panoptic segmentation, depth estimation

Field robotics – robotics in natural environments, forestry, underwater

Localization and mapping – SLAM, 3D reconstruction, LiDAR mapping

### Education

#### PhD. in Robotics (2020)

Semantic Segmentation and Mapping in Natural Environments

Supervisors: Prof. Roland Siegwart, Dr. Paul Beardsley

ETH Zürich, Switzerland

Disney Research

#### MSc. in Robotics, Systems and Control (2012 -2014)

Re-acquisition of People using Clothing Characterization

Supervisors: Prof. Roland Siegwart, Dr. Paul Beardsley

ETH Zürich, Switzerland

Disney Research

#### B.Tech in Electrical Engineering (2008 - 2012)

Development of a Smart Wheelchair

Supervisor: Dr. Swagat Kumar

IIT Jodhpur, India

### Work Experience

#### Visual SLAM R&D Engineer – November 2022 – Present

Developing visual SLAM algorithms for autonomous operation of mobile robots in a factory environment.

Arrival UK, London, UK

#### Postdoctoral Researcher – September 2021 – September 2022

Developed a method for one-shot lidar localization in indoor environments through instance learning.

Developed a technique to use semantics to extract meaning in 3D navigation maps and enable long term scene understanding.

Realtime LiDAR mapping and inventory generation in forests.

Supervisor: Dr. Maurice Fallon

Oxford Robotics Institute,  
University of Oxford, UK

#### Postdoctoral Research Associate – August 2019 – August 2021

Developed learning-based techniques for understanding imagery from novel cameras; semantics of natural structures; VR for forestry applications. Supervisor: Prof. Ian Manchester

ACFR, University of Sydney,  
Australia

#### Research Intern - Winter 2013

Developed and implemented gesture-based control for a service robot. Supervisor: Dr. Swagat Kumar

TCS Innovation Labs, India

#### Semester Thesis – Fall 2013

Developed and implemented a rendezvous algorithm for the Distributed Flight Array. Supervisor: Prof. Raffaello d'Andrea

IDSC, ETH Zürich, Switzerland

#### Research Intern - Summer 2011

Benchmarked classification techniques on the Opportunity - Human Activity dataset. Supervisor: Prof. José del R. Millán

CNBI, EPFL, Switzerland

## Skills

Programming	C/C++, Python, ROS, Matlab, CUDA, AVR, Arduino
Deep Learning	Tensorflow, PyTorch, Keras, TensorRT
Creative Design	Blender, Illustrator, Photoshop, Krita, Kdenlive, Unreal Engine, Unity
CAD	OnShape, Autodesk Fusion 360
Circuit Design	KiCAD
Workshop Skills	3D Printing, Laser Cutting, Soldering, Welding, Casting, Turning

## Publications

### Journals

1. Y. Wang, M. Ramezani, M. Mattamala, **S. T. Digumarti** and M. Fallon, *Strategies for large scale elastic and semantic LiDAR reconstruction*. Robotics and Autonomous Systems, Volume 155, 2022
2. A. Proudman, M. Ramezani, **S. T. Digumarti**, N. Chebrolu and M. Fallon, *Towards Real-Time Forest Inventory using Handheld LiDAR*. Robotics and Autonomous Systems, 2022
3. **S. T. Digumarti**, J. Nieto, C. Cadena, R. Siegwart and P. Beardsley, *Automatic segmentation of tree structure from point cloud data*. IEEE Robotics and Automation Letters (RAL), 2018
4. R. Chavarriaga, H. Sagha, A. Calatroni, **S. T. Digumarti**, G. Tröster, J. D. R. Millán and D. Roggen, *The Opportunity challenge: A benchmark database for on-body sensor-based activity recognition*. Pattern Recognition Letters, 34(15), 2013

### Conferences

1. L. Zhang, **S. T. Digumarti**, G. Tinchev, M. Fallon, *InstaLoc: One-shot Global Lidar Localisation in Indoor Environments through Instance Learning*. Robotics: Science and Systems (RSS), 2023.
2. Y. Tao, M. Popovic, Y. Wang, **S. T. Digumarti**, N. Chebrolu and M. Fallon, *3D Lidar Reconstruction with Probabilistic Depth Completion for Robotic Navigation*. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2022
3. N. Chebrolu, **S. T. Digumarti** and M. Fallon, *A Portable LiDAR System for Online Forestry Mapping*. ForestSAT, 2022
4. **S. T. Digumarti**, J. Daniel, A. Ravendran and D. G. Dansereau, *Unsupervised Learning of Depth Estimation and Visual Odometry for Sparse Light Field Cameras*. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2021
5. D. Ren, X. Ren, X. Wang, **S. T. Digumarti** and G. Shi, *Fast-learning Grasping and Pre-grasping via Clutter Quantization and Q-map Masking*. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2021
6. **S. T. Digumarti**, L. M. Schmid, G. M. Rizzi, J. Nieto, R. Siegwart, P. Beardsley and C. Cadena, *An approach for semantic segmentation of tree-like vegetation*. IEEE International Conference on Robotics and Automation (ICRA), 2019
7. **S. T. Digumarti**, G. Chaurasia, A. Taneja, R. Siegwart, A. Thomas and P. Beardsley, *Underwater 3D capture using a low-cost commercial depth camera*. IEEE Winter Conference on Applications of Computer Vision (WACV), 2016

8. **S.T. Digumarti**, J. Alonso-Mora, R. Siegwart, and P. Beardsley, *Pixelbots 2014*. Association for Computing Machinery (ACM) SIGGRAPH '16 Art Gallery, 2016.
9. M. Kriegleder, **S. T. Digumarti**, R. Oung and R. d'Andrea, *Rendezvous with bearing-only information and limited sensing range*. IEEE International Conference on Robotics and Automation (ICRA), 2015
10. A. Trivedi, A. Singh, **S. T. Digumarti**, D. Fulwani and S. Kumar, *Design and implementation of a smart wheelchair*. Advances in Robotics, International Conference of Robotics Society of India, 2013
11. H. Sagha, **S. T. Digumarti**, J. D. R. Millán, R. Chavarriaga, A. Calatroni, D. Roggen and G. Tröster *Benchmarking classification techniques using the Opportunity human activity dataset*. IEEE International Conference on Systems, Man, and Cybernetics, 2011

### Workshops

1. A. Proudman, M. Ramezani, **S. T. Digumarti**, N. Chebrolu and M. Fallon, *Online Forest Mapping and Inventory Generation using Handheld LiDAR*. Workshop on Innovation in Forestry Robotics: Research and Industry Adoption, IEEE International Conference on Robotics and Automation (ICRA), 2022
2. H. Sagha, **S. T. Digumarti**, J. D. R. Millán, A. Calatroni, D. Roggen, G. Tröster, D. Bannach, P. Lukowicz, A. Ferscha and R. Chavarriaga, *Workshop on robust machine learning techniques for human activity recognition: Activity recognition challenge*. IEEE International Conference on Systems, Man, and Cybernetics (SMC), 2011

### Awards and Achievements

1. Best Paper Award at Advances in Robotics, Pune, India, 2013
2. Cleared the 1st round of University of Bristol New Enterprise competition, 2018-19
3. ETH Scholarship for Masters' Students, 2013-2014
4. Won gold at national level Shotokan Karate competition, 2005

### Teaching

2023	Instructor, Oxford Study Abroad Programme Designed and delivered lectures on robotics, computer vision and deep learning.
2021, 2022	Instructor, Oxford Prospects and Global Development Institute: AI and Robotics Designed and delivered lectures on robotics, computer vision and deep learning.
2022, 2023	Guest Lecturer, Experimental Robotics (USyd MTRX8700) Delivered lectures on topics in deep learning
2021	Co-coordinator and lecturer, Experimental Robotics (USyd MTRX8700) Organized the course, designed curriculum, lectured on topics in deep learning.
2020, 2021	Co-Lecturer, Experimental Robotics (USyd MTRX5700) Delivered lectures on computer vision and deep learning for robotics. Developed a ROS based simulation framework to facilitate online learning. Designed assignments and final exam questions. Evaluated projects and exams.
2020	Co-organizer and lecturer, SIRIS PhD course: Foundations of Robotics Research Developed content and lectured on deep learning for robotics.

2019, 2020 Co-Lecturer, Introduction to Mechatronics (USyd MTRX1702)  
Delivered lectures on programming concepts in C.  
Designed and evaluated final exams.

### Invited Talks and Demos

1. Presented a live demo of a Visual-inertial Lidar mapping system at  
The Ministry of Transport, London, UK, 2022  
UKAEA Culham Science Centre, UK, 2022
2. Invited Panelist for UG Orientation Day, IIT Jodhpur, India, 2020, 2021
3. Co-presented the Pixelbots robot system at  
Data Materialities, ACM SIGGRAPH, Anaheim, USA, 2016  
ETH Scientifica, Zürich, Switzerland, 2015  
El Hormiguero, Madrid, Spain, 2015  
Royal Institution's Christmas Lectures, London, UK, 2014

### Mentorship

1. Team captain and academic mentor, USyd team for IROS OCRTOC, 2020
2. Mentor, USyd team for the Heineken zero-contact robot bar project, 2020
3. Co-supervisor for Bachelors' summer internship at Oxford University (1 project), 2022
4. Co-supervisor for Bachelors' theses and summer internships at USyd (5 projects), 2019-2021
5. Co-supervisor for Masters' and Bachelors' theses at ETH (10 projects), 2016-2019
6. Mentor and co-supervisor, ETH Fokus Project, *Scubo*, an undergraduate project for the development of an omnidirectional underwater robot (8 students), 2015-2016
7. Co-founder and Mentor, amateur robotics and electronics clubs of IIT Jodhpur, 2008-2012
8. Coordinator, student counselling services of IIT Jodhpur, 2009-2012

### Community and Outreach

1. Co-organized ICRA Workshop on Sensing, Estimating and Understanding the Dynamic World, 2020
2. Co-organized IEEE RAS Winter School on SLAM in Deformable Environments, 2021
3. Organized conference-based paper discussion sessions at SIRIS/ACFR, 2020
4. Helped organize talks for a seminar series at SIRIS/ACFR, 2020
5. Associate Editor for TAROS, 2023
6. Paper reviewer:
  - a. IEEE Transactions on Robotics (T-RO), 2021 - 2023
  - b. IEEE International Conference on Robotics and Automation (ICRA), 2019 - 2023
  - c. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2018 – 2023
  - d. IEEE Robotics and Automation Letters (RAL), 2018 - 2022
7. Volunteer, Conference on Robot Learning (CoRL), 2018 and Eurographics, 2015
8. Member IEEE, Robotics and Automation Society (RAS)

### Languages

Fluent in English, Telugu and Hindi. German (B1), French (A1), Sanskrit (Pravesa)

### Hobbies

Painting      Sculpting      Table-tennis      Hiking      Cooking      Video games