# Vikas Dhiman

+1 (716) 220 8719 dhiman@umich.edu vikasdhiman.com

## Research Interests

3D Computer Vision, Robotics, Localization, Mapping, Navigation

## Education

**University of Michigan** Ann Arbor, MI
Ph.D. in Electrical and Computer Engineering *Expected*: Summer 2018
*Advisor*: Jason J. Corso
*Dissertation title*: Towards better navigation

**State University of New York at Buffalo** Buffalo, NY
M.S. in Computer Science and Engineering 2012-2014

**Indian Institute of Technology Roorkee, India** Roorkee, India
B.S. in Electrical Engineering 2004-2008

## Work experience

**Research Assistant** Ann Arbor, MI
EECS, University of Michigan Aug 2014-Present
*Advisor*: Jason J. Corso
*Primary Focus*: Improving algorithms for localization, mapping and navigation in mobile robots.

**Research Intern** Cupertino, CA
NEC Lab America, INC. May 2014-Aug 2014
*Mentor*: Manmohan Chandraker
*Project*: Investigating occlusion aware models for localization

**Research Assistant** Buffalo, NY
Dept. of CSE, State University of New York at Buffalo Jan 2012-May 2014
*Advisor*: Jason J. Corso
*Primary Focus*: Improving algorithms for localization, mapping and navigation in mobile robots.

**Senior IT Engineer** Hyderabad, India
D.E. Shaw Software India Private Ltd. 2008-2012
*Responsibilities*: Automation of data collection, scraping, parsing and visualization jobs.

## Publications [1]

- **V. Dhiman**, S. Banerjee, B. Griffin, Siskind J, and J. Corso. Do deep reinforcement learning algorithms really learn to navigate? In *Proceedings of International Conference on Learning Representations (Under Review)*, 2018
- S. Kumar, **V. Dhiman**, P. A. Koch, and J. J. Corso. Learning compositional sparse bimodal models. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2017. (*h5: 114*)
- **V. Dhiman**, Q. Tran, J. Corso, and M. Chandraker. A continuous occlusion model for road scene understanding. In *2016 IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pages 4331–4339, June 2016. (*h5: 158*)[2]
- **V. Dhiman**, A. Kundu, F. Dellaert, and J. J. Corso. Modern MAP inference methods for accurate and faster occupancy grid mapping on higher order factor graphs. In *IEEE International Conference on Robotics and Automation*, 2014. (*h5: 71*)

[1] Impact Factor (IF), h5-Index (h5) provided by Google Scholar.

[1] CVPR, IROS and ICRA are premier conferences in computer vision and Robotics. For each, typical number of submissions is around 2000 and the overall acceptance rate is around 30-40%.

[2] CVPR is the highest rated publication venue for computer vision and eighth-highest across all engineering and computer science, according to Google Scholar metrics.

- S. Kumar, **V. Dhiman**, and J. J. Corso. Learning compositional sparse models of bimodal percepts. In *Proceedings of AAAI Conference on Artificial Intelligence*, 2014. (*h5: 56*)
- J. Ryde, **V. Dhiman**, and R. Platt. Voxel planes: Rapid visualization and meshification of point cloud ensembles. In *Proceedings of Intelligent Robots and Systems*, 2013. (*h5: 50*)
- **V. Dhiman**, J. Ryde, and J. J. Corso. Mutual localization: Two camera relative 6-dof pose estimation from reciprocal fiducial observation. In *Proceedings of International Conference on Intelligent Robots and Systems*, 2013. (*h5: 50*)

## Software & Data Sets

**Occupancy grid mapping using forward sensor modeling** May–Sept 2013
`github.com/wecacuee/modern-occupancy-grid`
Proposes a probabilistic graphical model based framework to estimate 3D localization of traffic participants in road scenes. Also introduces a novel perspective to the soft occlusion models where a region in space is viewed in terms of reflection and transmission probability.

**Voxel Planes** Feb–May 2013
`bitbucket.org/wecacuee/voxelplanes`
Contributed to a mapping, localization and surface reconstruction algorithm based on fitting planar surfaces to voxels. Worked on the visualization module using VTK, add Plane-to-point ICP for mapping, added ROS wrapper and conducted the comparative experiments for the paper.

**Mutual Localization** Jun-Sep 2012
`github.com/wecacuee/mutual_localization`
Developed an algorithm for determining 6-DOF relative pose between two robots using bearing only sensors and fiducial markers[2]. I was responsible for developing algorithm, its implementation and testing against other algorithms

## Teaching

**Lecture on Probabilistic graphical models** Nov, 2017
`vikasdhiman.com/eecs442/20171109.html`
Taught the basics of probabilistic graphical models in class on introduction to computer vision. The students had limited background in machine learning and probability.

**Lecture on OpenGM2: Library for Probabilistic graphical models** Jan 2015
`github.com/wecacuee/opengmdemo`
Taught the usage of the library OpenGM2 with an in class demo of OpenGM2 library applied to a simple problem. This gave the students a quick start on their projects in the course on Probabilistic Graphical Models.

**Xplore Engineering: Computer Vision and Pinhole cameras** Jun 2015, 2016
`vikasdhiman.com/xplore-workshop/pinhole.pdf`
Organized a workshop for middle school students to create interest in sciences and the field of computer vision and explain modern cameras through pinhole cameras.

## Reference List

**Jason J. Corso** (Ph.D. Advisor), Associate Professor, Department of Electrical Engineering and Computer Science, University of Michigan, Phone: (734) 647-8833, Email: jjcorso@eecs.umich.edu

**Jeffrey M. Siskind**, Associate Professor, Electrical and Computer Engineering, Purdue University. Phone: (765) 496-3197, Email: qobi@purdue.edu

**Manmohan Chandrakar**, Assistant Professor, Computer Science and Engineering, University of California, San Diego, Phone: (858) 401-0407, Email: mkchandraker@eng.ucsd.edu