

# Curriculum Vitae

Akshay Shetty

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## Education

<b>Ph.D. Aerospace Engineering</b> <a href="#">[thesis]</a> University of Illinois at Urbana-Champaign	Champaign, Illinois <b>2017–2021</b>
<b>M.S. Aerospace Engineering</b> <a href="#">[thesis]</a> University of Illinois at Urbana-Champaign	Champaign, Illinois <b>2014–2017</b>
<b>B.Tech. Aerospace Engineering</b> Indian Institute of Technology Bombay	Mumbai, India <b>2010–2014</b>

## Research and Work Experience

<b>Postdoctoral Researcher</b> NAV Lab <a href="#">[webpage]</a> , Stanford University Advisor: Prof. Grace Gao	Stanford, California <b>2021–2022</b>
- Led and supervised multiple research projects related to safe navigation and robust state estimation for autonomous robotic systems	

<b>Research Intern</b> NASA Ames Research Center	Mountain View, California <b>Summer 2017</b>
- Developed software for vision-based autonomous indoor navigation for UAVs, including on-board object detection to detect, pick and drop daily household items <a href="#">[video]</a> <a href="#">[code]</a>	

<b>Research Intern</b> NASA Ames Research Center	Mountain View, California <b>Summer 2016</b>
- Led a team of 3 student interns to develop visual-tag-based autonomous UAV navigation while avoiding obstacles detected by proximity sensors <a href="#">[video]</a> <a href="#">[slides]</a> <a href="#">[code]</a>	

<b>Visiting Research Student</b> Cranfield University	Shrivenham, UK <b>Summer 2013</b>
- Improved ground vehicle dynamics in Virtual Battle Space (VBS) by importing high-fidelity models from IPG Carmaker, resulting in an improved training experience for VBS users	

<b>Research Intern</b> Indian Space Research Organization (ISRO)	Bangalore, India <b>Summer 2012</b>
- Evaluated the performance of various receiver localization algorithms for the Indian Regional Navigation Satellite System	

## Journal Papers

1. **Akshay Shetty**, Timmy Hussain and Grace Gao, “Decentralized Connectivity Maintenance for Multi-robot Systems Under Motion and Sensing Uncertainties,” *NAVIGATION: Journal of the Institute of Navigation*, Accepted. [\[pdf\]](#) [\[video\]](#)
2. Tara Mina, Ashwin V. Kanhere, **Akshay Shetty**, and Grace Gao, “GPS Spoofing-Resilient Filtering with Chimera and Self-Contained Odometry,” *NAVIGATION: Journal of the Institute of Navigation*, Submitted. [\[pdf\]](#)
3. Ashwin V. Kanhere\*, Shubh Gupta\*, **Akshay Shetty**, and Grace Gao, “Improving GNSS Positioning using Iterative Deep Corrections,” *NAVIGATION: Journal of the Institute of Navigation*, Accepted. [\[pdf\]](#) [\[video\]](#)

4. **Akshay Shetty** and Grace Gao, “Predicting State Uncertainty Bounds Using Non-linear Stochastic Reachability Analysis for Urban GNSS-based UAS Navigation,” *IEEE Intelligent Transportation Systems*, DOI: 10.1109/TITS.2020.3040517, November 2020. [[pdf](#)]
5. **Akshay Shetty** and Grace Gao, “Adaptive Covariance Estimation of LiDAR-based Positioning Errors for UAVs,” *NAVIGATION: Journal of the Institute of Navigation*, DOI: 10.1002/navi.307, May 2019. [[pdf](#)]

#### Magazine Articles

**Akshay Shetty** and Grace Gao, “GPS-LiDAR Fusion with 3D City Models,” *GPS World Magazine*, Cover Story, September 2017. [[pdf](#)]

#### Conference Papers

1. **Akshay Shetty**, Adam Dai, Alexandros Tzikas and Grace Gao, “Safeguarding Learning-Based Planners Under Motion and Sensing Uncertainties Using Reachability Analysis,” *International Conference on Robotics and Automation (ICRA) 2023*, Submitted. [[pdf](#)] [[video](#)]
2. Shubh Gupta\*, Ashwin V. Kanhere\*, **Akshay Shetty**, and Grace Gao, “Designing Deep Neural Networks for Sequential GNSS Positioning,” *Proceedings of the Institute of Navigation GNSS+ conference (ION GNSS+ 2022)*, Denver, CO, Sep. 2022. **Best Presentation of the Session Award**. [[pdf](#)][[slides](#)][[video](#)]
3. Tara Mina, Ashwin V. Kanhere, **Akshay Shetty**, and Grace Gao, “GPS Spoofing-Resilient Filtering with Chimera and Self-Contained Odometry,” *Proceedings of the Institute of Navigation GNSS+ conference (ION GNSS+ 2022)*, Denver, CO, Sep. 2022. [[pdf](#)][[slides](#)][[video](#)]
4. Ashwin V. Kanhere, Tara Mina, **Akshay Shetty**, and Grace Gao, “Factor Graph-based Spoofing Mitigation using the Chimera Signal Enhancement,” *Proceedings of the Institute of Navigation GNSS+ conference (ION GNSS+ 2022)*, Denver, CO, Sep. 2022. [[pdf](#)][[slides](#)][[video](#)]
5. **Akshay Shetty**, Timmy Hussain and Grace Gao, “Decentralized Connectivity Maintenance for Multi-robot Systems Under Motion and Sensing Uncertainties,” *Proceedings of the 34th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2021)*, St. Louis MO, Sep. 2021. **Best Presentation of the Session Award**. [[pdf](#)][[slides](#)][[video](#)]
6. Ashwin V. Kanhere\*, Shubh Gupta\*, **Akshay Shetty**, and Grace Gao, “Improving GNSS Positioning using Iterative Deep Corrections,” *Proceedings of the 34th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2021)*, St. Louis MO, Sep. 2021. [[pdf](#)][[slides](#)][[video](#)][[code](#)]
7. **Akshay Shetty** and Grace Gao, “Trajectory Planning Under Stochastic and Bounded Sensing Uncertainties Using Stochastic Reachability,” *Proceedings of the 33rd International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2020)*, St. Louis MO, Sep. 2020. [[pdf](#)][[slides](#)][[video](#)]
8. **Akshay Shetty** and Grace Gao, “Predicting State Uncertainty for GNSS-based UAV Path Planning Using Stochastic Reachability,” *Proceedings of the 32nd International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2019)*, Miami FL, Sep. 2019. [[pdf](#)][[slides](#)]
9. **Akshay Shetty** and Grace Gao, “UAV Pose Estimation using Cross-view Geolocalization with Satellite Imagery,” *International Conference on Robotics and Automation (ICRA)*, Montreal, Canada, May 2019. [[pdf](#)][[video](#)][[data](#)]
10. **Akshay Shetty** and Grace Gao, “Covariance Estimation for GPS-LiDAR Sensor Fusion for UAVs,” *Proceedings of the 30th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2017)*, Portland OR, Sep. 2017. [[pdf](#)]

11. **Akshay Shetty** and Grace Gao, "Vision-Aided Measurement Level Integration of Multiple GPS Receivers for UAVs," *Proceedings of the 28th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2015)*, Tampa FL, Sep. 2015. [[pdf](#)]
12. **Akshay Shetty** and Grace Gao, "Measurement Level Integration of Multiple Low-Cost GPS Receivers for UAVs," *Proceedings of the 2015 International Technical Meeting of the Institute of Navigation (ION ITM 2015)*, Dana Point, CA, Jan. 2015. [[pdf](#)]

## **Skills**

**Programming** Python, C++, MATLAB, C#  
**Learning and Robotics** PyTorch, ROS, AirSim, Unity, Gazebo, Pixhawk

## **Academic Community Service**

**Session Chair**, *ION ITM Conference* [[website](#)] **Jan 2022**

Session: Navigation of Unmanned Aerial Vehicles and other Autonomous Systems

**Student Moderator**, *3rd NorCal Controls Workshop* [[website](#)] **Jan 2021**

Virtual

## **Paper Reviewer**

*IEEE Transactions on Robotics (T-RO)*; *International Conference on Robotics and Automation (ICRA)*; *NAVIGATION: Journal of The Institute of Navigation*; *IEEE Transactions on Aerospace and Electronic Systems (T-AES)*; *AIAA Journal of Guidance, Control, and Dynamics (JGCD)*.

## **Honors and Awards**

- 2021 Best Presentation of the Session Award [[video](#)], *ION GNSS+ Conference 2021*
- 2019 Video of the Month [[video](#)], *Coordinated Science Lab, University of Illinois*
- 2016 Google Special Mention, *HackIllinois*
- 2015 Most Creative Team, *Smart Bar Hackathon*
- 2014 Institute Silver Medal, *Indian Institute of Technology Bombay*