

# YULIN YANG

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## EDUCATION

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<b>University of Delaware</b> Ph.D. Candidate in Mechanical Engineering	July 2015 – Present
<b>University of Delaware</b> Master of Science in Mathematics	July 2015 – May 2020
<b>Xian Jiaotong University, Xi'an, China</b> Master of Engineering in Mechanical Engineering	Sept. 2009 – July 2012
<b>Shandong University, Shandong, China</b> Bachelor of Engineering in Mechanical Engineering	Sept. 2005 – July 2009

## RESEARCH EXPERIENCE

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<b>University of Delaware</b> <i>Research Assistant</i>	July 2015 - Present <i>Newark, DE</i>
<ul style="list-style-type: none"><li>• Aided inertial navigation with points, lines and planes.</li><li>• Multi-sensor fusion (IMUs, cameras, LiDAR, wheel and GPS).</li><li>• Analytic Combined IMU Integration (ACI<sup>2</sup>).</li><li>• Map-based localization under adversarial attacks.</li></ul>	
<b>Xi'an Jiaotong University</b> <i>Research Assistant</i>	July 2009 - July 2012 <i>Xi'an, China</i>
<ul style="list-style-type: none"><li>• Extrinsic and intrinsic calibration for a camera and total station.</li></ul>	

## INDUSTRY EXPERIENCE

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<b>Facebook Reality Lab</b> <i>Research Intern</i>	Jan. 2021 - Apr. 2021 <i>Redmond, WA</i>
<ul style="list-style-type: none"><li>• Visual-inertial navigation system (VINS).</li></ul>	
<b>Bosch Research Institute</b> <i>Visual Intern</i>	May 2019 - Aug. 2020 <i>Sunnyvale, CA</i>
<ul style="list-style-type: none"><li>• Analytic combined IMU integration (ACI<sup>2</sup>).</li></ul>	
<b>Siemens High-Voltage R&amp;D Center</b> <i>R&amp;D Engineer</i>	July 2012 - May 2015 <i>Shanghai, China</i>
<ul style="list-style-type: none"><li>• 110kv and 550kv gas insulated switchgear development and sensor testing.</li></ul>	

## ACADEMIC SCHOLARSHIPS AND AWARDS

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- **Fellowship:** 2019-2020 University Doctoral Fellowship Award (competitive)
- **Travel Award:** 2018 ICRA Travel Award
- **Travel Award:** 2017 IROS-NSF Doctoral Consortium / Travel Award

## TEACHING EXPERIENCE

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University of Delaware  
Teaching Assistant

Sept. 2015 - May 2016  
Newark, DE

- Fall 2015: MEEG 310 Vibration and control (Undergraduate Course).
- Spring 2016: MEEG 467 SEMINAR: Applied controls (Undergraduate Course).

## PUBLICATIONS

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### [A] Refereed Journal Publications

- [7] **Y. Yang** and G. Huang, “Multi-Visual-Inertial Sensor Calibration: Algorithm and Analysis” in *IEEE Transactions on Robotics (TRO)*(in preparation), 2021.
- [6] X. Zuo, W. Ye, **Y. Yang**, R. Zheng, T. Vidal-Calleja, G. Huang and Y. Liu, “Visual-Inertial Localization With Prior LiDAR Map Constraints” in *Journal of Field Robotics (JFR)*, 2020.
- [5] X. Zuo, P. Geneva, **Y. Yang**, W. Ye, Y. Liu and G. Huang, “Visual-Inertial Localization With Prior LiDAR Map Constraints” in *IEEE Robotics and Automation Letters (RAL)*, 2019.
- [4] **Y. Yang**, P. Geneva, K. Eickenhoff and G. Huang, “Degenerate Motion Analysis for Aided INS with Online Spatial and Temporal Sensor Calibration” in *IEEE Robotics and Automation Letters (RAL)*, 2019.
- [3] K. Eickenhoff, **Y. Yang**, P. Geneva and G. Huang, “Tightly-Coupled Visual-Inertial Localization and 3D Rigid-Body Target Tracking” in *IEEE Robotics and Automation Letters (RAL)*, 2019.
- [2] **Y. Yang** and G. Huang, “Observability Analysis of Aided INS with Heterogeneous Features of Points, Lines and Planes” in *IEEE Transactions on Robotics (TRO)*, 2019.
- [1] X. Yang, S. Fang and **Y. Yang**, “Accurate Template-based Correction Technology for Lens Distortions” in *Optical Engineering (OE)*, Vol. 51, October 2012.

### [B] Refereed Conference Proceedings (Peer Reviewed based on Their Entirety)

- [16] W. Lee, **Y. Yang** and G. Huang, “Efficient Multi-sensor Aided Inertial Navigation with Online Calibration” in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*(accepted), Xi’an, China, May 31 - Aug 31, 2021.
- [15] P. Zhu, **Y. Yang**, W. Ren and G. Huang, “Cooperative Visual-Inertial Odometry” in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*(accepted), Xi’an, China, May 31 - Aug 31, 2021.
- [14] W. Lee, K. Eickenhoff, **Y. Yang**, P. Geneva and G. Huang, “Visual-Inertial-Wheel Odometry with Online Calibration” in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Las Vegas, NV, USA, October 25 - 29, 2020.
- [13] X. Zuo, **Y. Yang**, P. Geneva, J. Lv, Y. Liu, G. Huang and M. Pollefeys, “LIC-Fusion 2.0: LiDAR-Inertial-Camera Odometry with Sliding-Window Plane-Feature Tracking” in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Las Vegas, NV, USA, October 25 - 29, 2020.
- [12] P. Geneva, N. Merrill, **Y. Yang**, C. Chen, W. Lee and G. Huang, “Versatile 3D Multi-Sensor Fusion for Lightweight 2D Localization” in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Las Vegas, NV, USA, October 25 - 29, 2020.
- [11] **Y. Yang**, P. Geneva, X. Zuo and G. Huang, “Online IMU Intrinsic Calibration: Is It Necessary?” in *Proceedings of the Robotics: Science and Systems (RSS)*, Corvallis, OR, USA, July 12 - 16, 2020.

- [10] **Y. Yang**, BPW. Babu, C. Chen, G. Huang and R. Liu, “Analytic Combined IMU Integration (ACI2) For Visual Inertial Navigation” in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Pairs, France, May 31 - Aug 31, 2020.
- [9] P. Geneva, K. Eickenhoff, W. Lee, **Y. Yang** and G. Huang, “Openvins: A research platform for visual-inertial estimation” in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Pairs, France, May 31 - Aug 31, 2020.
- [8] **Y. Yang**, P. Geneva, K. Eickenhoff and G. Huang, “Visual-Inertial Odometry with Point and Line Features” in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Macau, China, November 4 - 8, 2019.
- [7] **Y. Yang** and G. Huang, “Aided Inertial Navigation: Unified Feature Representations and Observability Analysis” in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Montreal, Canada, May 20 - May 24, 2019.
- [6] **Y. Yang**, P. Geneva, X. Zuo, K. Eickenhoff, Y. Liu and G. Huang, “Tightly-Coupled Aided Inertial Navigation with Point and Plane Features” in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Montreal, Canada, May 20 - May 24, 2019.
- [5] P. Geneva, K. Eickenhoff, **Y. Yang** and G. Huang, “LIPS: LiDAR-Inertial 3D Plane SLAM” in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Madrid, Spain, October 1 - October 5, 2018.
- [4] **Y. Yang** and G. Huang, “Aided Inertial Navigation with Geometric Features: Observability Analysis” in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Brisbane, Australia, May 21 - May 25, 2018.
- [3] **Y. Yang** and G. Huang, “Map-based Localization Under Adversarial Attacks” in *Proceedings of the International Symposium on Robotics Research (ISRR)*, Puerto Varas, Chile, December 11 - December 14, 2017.
- [2] **Y. Yang**, J. Maley and G. Huang, “Null-Space-based Marginalization: Analysis and Algorithm” in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, Canada, September 24 - September 28, 2017.
- [1] **Y. Yang** and G. Huang, “Acoustic-Inertial Underwater Navigation” in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Singapore, May 28 - June 3, 2017.

#### [C] Posters and Presentations

- [2] **Y. Yang** (Presenter), W. Lee, P. Osteen, P. Geneva, X. Zuo and G. Huang, “iCalib: Inertial Aided Multi-Sensor Calibration”, in *Workshop: VINS workshop at ICRA 2021*, Xi’an, China, June 01 - 05, 2021.
- [1] **Y. Yang** (Presenter) and G. Huang, “Attack-Resilient Map-based Localization”, in *Workshop: Challenges in Adversarial Robotics at Robotics: Science and Systems (RSS)*, Pittsburgh, Pennsylvania, June 26 - 30, 2018.

#### PATENTS

- **Y. Yang**, J. Wang, C. Wu, *A Direct Conductor Connection Mechanism and Conductor Connection Module for Gas Insulated Switchgear*, China patent CN201510463693.2. (Application)
- **Y. Yang**, B. Liu, Q. Liu and C. Wu, *A Direct Conductor Connection Module for Gas Insulated Switchgear*, China patent CN201510020903.0. (Application)
- **Y. Yang**, S. Fang, X. Yang, Y. Li and X. Zhu, *A Linking and Supporting Device for Camera and Total Station*, China patent CN201410184465.7.

## PROFESSIONAL ACTIVITIES

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### Membership

- Graduate student member of **IEEE**
- Graduate student member of **Robotics & Automation Society**

### Paper Reviewer

- **Journals**
  - IEEE Transactions On Robotics (TR-O)
  - IEEE Robotics and Automation Letters (RA-L)
  - IEEE Transactions on Systems, Man, and Cybernetics: Systems
  - IEEE Transactions on Intelligent Transportation Systems
  - IEEE Transactions on Mechatronics
  - Robotica
  - Automatica
- **Conferences**
  - IEEE International Conference on Robotics and Automation (ICRA)
  - IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
  - American Control Conference (ACC)