

# Mikihiro Ikura (Ph.D)

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## EDUCATION

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- **Italian Institute of Technology** Jun. 2024 - Current  
*Postdoctoral researcher at Event-Driven Perception for Robotics* Genoa, Italy
  - High-speed line segment extraction with modern event-based cameras at high spatial resolution
  - Velocity-invariant event representation at high event rate
  - Real-time depth estimation with stereo event cameras without motion cues
  - Supervise Ph.D/Master students  
(Supervisor: Prof. Chiara Bartolozzi, Dr. Arren Glover)
- **The University of Tokyo** Oct. 2023 - May 2024  
*Project researcher at the Department of Human and Engineered Environmental Studies* Chiba, Japan
  - Supervise a Master student for multiple object tracking with event-based cameras
- **German Aerospace Center (DLR)** Nov. 2022 - Sep. 2023  
*Guest researcher at the Department of Perception and Cognition* Munich, Germany
  - Robust visual odometry with event-based cameras for MAV  
(Supervisor: Dr. Wolfgang Stürzl, Marcus Müller)
- **Technical University of Munich** Apr. 2022 - Sep. 2023  
*Visiting Ph.D student in Robotics, Artificial Intelligence and Embedded Systems Laboratory* Munich, Germany
  - Vehicle detection for Intelligent Transportation Systems with Spiking Neural Network and event-based cameras in adverse environment  
(Supervisor: Prof. Alois Knoll, Dr. Florian Walter)
- **The University of Tokyo** Apr. 2020 - Sep. 2023  
*Ph.D in Engineering* Tokyo, Japan
  - Ph.D thesis: "Robust Visual Sensing Systems against Fast and Adverse Environments Using High-speed and Event-based Cameras", Jul. 2023.  
(Supervisor: Prof. Atsushi Yamashita)
- **The University of Tokyo** Apr. 2018 - Mar. 2020  
*M.S. in Creative Informatics* Tokyo, Japan
  - Master thesis: "Real-time Landing Gear Control System Based on Adaptive 3D Sensing for UAV Safe Landing on Rough Ground", Jan. 2020.  
(Supervisor: Prof. Masatoshi Ishikawa)
- **The University of Tokyo** Apr. 2013 - Mar. 2018  
*B.E. in Aeronautics and Astronautics* Tokyo, Japan
  - Bachelor thesis: "Estimation Algorithm of Relative Position and Attitude during Proximity Rendezvous and Docking Using Multiple Ultra-Wide-Band Devices", Mar. 2018.  
(Supervisor: Prof. Shinichi Nakasuka)

## EXPERIENCE

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- **zen intelligence (Ex. Softroid inc.)** 🌐 Oct. 2023 - May 2024  
*Computer Vision Engineer* Tokyo, Japan
  - Visual SLAM with spherical cameras for construction sites based on deep learning approach for feature extraction (Superpoint) and matching (Lightglue)
  - Developed a modern python-based pipeline with VSLAM and image processing (Dagster)
- **Ito Lab.** 🌐 Oct. 2022 - Sep. 2023  
*Research Assistant* Remote
  - Work on object detection for vehicles in Intelligent Transportation System

- **Mujin** [🌐] Nov. 2021 - Feb. 2022  
*Computer Vision engineer, Robotics Technology Internship Program* Tokyo, Japan
  - Work on camera calibration and robot kinematic calibration improvements (Supervisor: Dr. José Jerónimo Moreira Rodrigues)
- **Ishikawa Group Lab.** [🌐] Jun. 2018 - Feb. 2022  
*Research Assistant* Tokyo, Japan
  - Research theme: UAV-UGV cooperative real-time superimposed image generation system
- **TATA Consultancy Services** Sep. 2019 - Oct. 2019  
*Software engineer* Tokyo, Japan
  - Theme: Drone-to-Drone detection and tracking algorithm with computer vision  
Studied at Indian Institute of Science (IISc)
- **AQT-D** [🌐] Jun. 2018 - Apr. 2020  
*Software engineer for 3U Cubesat deployed from the International Space Station* Tokyo, Japan
  - Attitude Determination and Control System (ADCS) software development
- **Mitsubishi Electric Co.** Aug. 2018 - Sep. 2018  
*Software engineer internship* Kyoto, Japan
  - Theme: Driver's posture estimation using car inner camera by machine learning and Genetic Algorithm
- **ispace inc.** [🌐] Sep. 2017 - Jun. 2018  
*Long-term internship* Tokyo, Japan
  - Lunar lander mechatronics analysis engineer
- **Nakasuka Funase Lab. (ISSL)** [🌐] Apr. 2016 - Sep. 2017  
*Development of nano spacecraft, EQUULEUS* Tokyo, Japan
  - Mission I/F, DELPHINUS
  - ADCS software
- **ARLIS 2015** [🌐] Jun. 2015 - Sep. 2015  
*CanSat development* Tokyo, Japan
  - ARLIS (A Rocket Launch for International Student Satellites) is a robotics competition for small artificial satellite (CanSat).
  - Software engineer

## PUBLICATIONS

### Journal Papers

- [J.8] Takuya Igaue, Toko Hayamizu, Hiroshi Higuchi, **Mikihiro Ikura**, Kenichi Yoshida, Satoshi Yamanaka, Takashi Yamaguchi, Hajime Asama and Atsushi Yamashita: "Cooperative 3D Tunnel Measurement Based on 2D-3D Registration of Omnidirectional Laser Light", Journal of Field Robotics, 2023. DOI: [10.1002/rob.22241](https://doi.org/10.1002/rob.22241)
- [J.7] Toko Hayamizu, Takuya Igaue, **Mikihiro Ikura**, Hiroshi Higuchi, Jun Younes Louhi Kasahara, Satoshi Ito, Nobuhiro Taniguchi, Hiroyuki Morino, Kenichi Yoshida, Hajime Asama, Atsushi Yamashita: "Position and Direction Measurement of Rock Bolt Hole Using Cross Line Laser and Camera" Journal of the Japan Society for Precision Engineering, Vol. 89, No. 4, pp. 328-335, 2023. DOI: [10.2493/jjspe.89.328](https://doi.org/10.2493/jjspe.89.328)
- [J.6] **Mikihiro Ikura**, Leo Miyashita, Atsushi Yamashita, Masatoshi Ishikawa, Hajime Asama: "Occlusion-Free Video Superimposing System from Arbitrary Viewpoint Using a High-Speed Blinking LED Markers and Multiple RGB-D Sensors" Journal of the Japan Society for Precision Engineering, Vol. 88, No.3, March 2022. DOI: [10.2493/jjspe.88.282](https://doi.org/10.2493/jjspe.88.282)
- [J.5] **Mikihiro Ikura**, Sarthak Pathak, Jun Younes Louhi Kasahara, Atsushi Yamashita, Hajime Asama: "AdjustSense: Adaptive 3D Sensing System with Adjustable Spatio-temporal Resolution and Measurement Range Using High-speed Omnidirectional Camera and Direct Drive Motor", Sensors, Vol. 21, No. 21, pp.1-18, 2021. DOI: [10.3390/s21216975](https://doi.org/10.3390/s21216975)
- [J.4] Takuya Igaue, Hiroshi Higuchi, **Mikihiro Ikura**, Kenichi Yoshida, Satoshi Ito, Nobuhiro Taniguchi, Atsushi Yamashita, Hajime Asama: "Line Structured Light-Based Tunnel 3D Measurement with 2D-3D Point Cloud Matching on Projected Light of Ring Laser", Journal of the Japan Society for Precision Engineering, Vol. 87, No. 12, December 2021. DOI: [10.2493/jjspe.87.987](https://doi.org/10.2493/jjspe.87.987)

- [J.3] **Mikihiro Ikura**, Leo Miyashita, and Masatoshi Ishikawa: "Stabilization System for UAV Landing on Rough Ground by Adaptive 3D Sensing and High-speed Landing Gear Adjustment", Journal of Robotics and Mechatronics, Vol. 33, No. 1, pp.108-118, 2021. DOI: [10.20965/jrm.2021.p0108](https://doi.org/10.20965/jrm.2021.p0108)
- [J.2] Kazuya Yaginuma, Jun Asakawa, Yuichi Nakagawa, Yoshihiro Tsuruda, Hiroyuki Koizumi, Kota Kakihara, Kanta Yanagida, Yusuke Murata, **Mikihiro Ikura**, Shuhei Matsushita, Yoshihide Aoyanagi, Takeshi Matsumoto: "AQT-D: CubeSat Demonstration of a Water Propulsion System Deployed from ISS", Transaction of JSASS, Aerospace Technology Japan, Vol. 18, No. 4, pp.141-148, 2020. DOI: [10.2322/tastj.18.141](https://doi.org/10.2322/tastj.18.141)
- [J.1] **Mikihiro Ikura**, Satoshi Ikari, Atsushi Tomiki, Ryu Funase, Shinichi Nakasuka: "Estimation Algorithm of Relative Position and Attitude during Proximity Rendezvous Using Multiple Ultra-Wide-Band Devices", The 31st ISTS Special Issue of Transaction of JSASS, Aerospace Technology Japan, Vol. 17, No. 1, pp.43-50, 2019. DOI: [10.2322/tastj.17.43](https://doi.org/10.2322/tastj.17.43)

#### International Conference

- [C.12] **Mikihiro Ikura**, Arren Glover, Masayoshi Mizuno, and Chiara Bartolozzi: "Lattice-allocated Real-time Line Segment Feature Detection and Tracking Using Only an Event-based Camera", Proceedings of 2nd Workshop on NeVi2025, International Conference on Computer Vision (ICCV), 2025. [[Paper](#)] [[ArXiv](#)] [[Code](#)] **Spotlight session**
- [C.11] Luna Gava, **Mikihiro Ikura**, Chiara Bartolozzi, Arren Glover: "SCARF: A Set of Centre Active Receptive Fields for Velocity Invariant Event Representation", Proceedings of Workshop on Neuromorphic Perception for Real World Robotics, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2025. [[Paper](#)] **Spotlight talk**
- [C.10] Jiahang Wu, **Mikihiro Ikura**, Luna Gava, Masayoshi Mizuno, Arren Glover, and Chiara Bartolozzi: "Depth Estimation from Moving Stereo Event Cameras without Motion Cues", Proceedings of Workshop on Neuromorphic Perception for Real World Robotics, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2025. [[Paper](#)] **Best Paper Award, Spotlight talk**
- [C.9] **Mikihiro Ikura**, Cedric Le Gentil, Marcus G. Müller, Florian Schuler, Atsushi Yamashita and Wolfgang Stürzl: "RATE: Real-time Asynchronous Feature Tracking with Event Cameras", Proceedings of the 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS2024), Abu Dhabi (UAE), October 2024. DOI: [10.1109/IROS58592.2024.10802050](https://doi.org/10.1109/IROS58592.2024.10802050) [[Code](#)]
- [C.8] **Mikihiro Ikura**, Florian Walter, Alois Knoll: "Spiking Neural Networks for Robust and Efficient Object Detection in Intelligent Transportation Systems With Roadside Event-Based Cameras" IEEE Intelligent Vehicles Symposium 2023, June 2023. DOI: [10.1109/IV55152.2023.10186751](https://doi.org/10.1109/IV55152.2023.10186751)
- [C.7] **Mikihiro Ikura**, Sarthak Pathak, Atsushi Yamashita, Hajime Asama: "Polynomial-fitting Based Calibration for an Active 3D Sensing System Using Dynamic Light Section Method", Proceedings of SPIE, Vol. 11794, 15th International Conference on Quality Control by Artificial Vision (QCAV2021), pp. 131-137, Tokushima (Japan), 2021. DOI: [10.1117/12.2590827](https://doi.org/10.1117/12.2590827)
- [C.6] **Mikihiro Ikura**, Leo Miyashita, Masatoshi Ishikawa: "Real-time Landing Gear Control System Based on Adaptive 3D Sensing for Safe Landing of UAV", 2020 IEEE/SICE International Symposium on System Integration (SII2020), Hawaii Convention Center, Honolulu, Hawaii, USA, January 12-15, 2020. DOI: [10.1109/SII46433.2020.9026177](https://doi.org/10.1109/SII46433.2020.9026177) [[Project Page](#)] **Best Student Paper Award**
- [C.5] Jun Asakawa, Kazuya Yaginuma, Yoshihiro Tsuruda, Hiroyuki Koizumi, Yuichi Nakagawa, Kota Kakihara, Kanta Yanagida, Yoshihide Aoyanagi, Takeshi Matsumoto, Shuhei Matsushita, Yusuke Murata, **Mikihiro Ikura**: "AQT-D: Demonstration of the Water Resistojet Propulsion System by the ISS-Deployed CubeSat", In Proceedings of 33rd Annual AIAA/USU Conference on Small Satellites (SSC). SSC19-WKV-07, 2019.
- [C.4] Jun Asakawa, Kazuya Yaginuma, Yuichi Nakagawa, Yoshihiro Tsuruda, Hiroyuki Koizumi, Kota Kakihara, Kanta Yanagida, **Mikihiro Ikura**, Shuhei Matsushita, Yusuke Murata, Yoshihide Aoyanagi, Takeshi Matsumoto: "Development of AQT-D: the ISS-Deployed CubeSat For the Demonstration of the Water Micro-Propulsion System", In Proceedings of International Space Station Research and Development Conference (ISSRDC). 2019-H-39, 2019.
- [C.3] Ryu Funase, Satoshi Ikari, Yosuke Kawabata, Kota Miyoshi, Shintaro Nakajima, Takumi Kudo, Yuki Koshiro, Masashi Tomooka, Shunichiro Nomura, Akifumi Wachi, Kota Kakihara, Ryohei Takahashi, Kanta Yanagida, Shuhei Matsushita, Akihiro Ishikawa, **Mikihiro Ikura**, Nobuhiro Funabiki, Yuta Kobayashi, Atsushi Tomiki, Taichi Ito, et al.: "EQUULEUS: A 6U CUBESAT TO FLY TO LUNAR LAGRANGE POINT ONBOARD SLS EM-1", Low-Cost Planetary Missions Conference, Pasadena, the United States, August 2017.
- [C.2] **Mikihiro Ikura**: "Estimation Algorithm of Relative Position and Attitude during Proximity Rendezvous and Docking Using Multiple Ultra-Wide-Band Devices", The 31st International Symposium on Space Technology and Science (ISTS), Matsuyama (Japan), June 2017. DOI: [10.2322/tastj.17.43](https://doi.org/10.2322/tastj.17.43) **SPSS (Society for Promotion of Space Science) President Award**

- [C.1] Shunichiro Nomura, Ryohei Takahashi, **Mikihiro Ikura**, Kenshiro Oguri, Toshihiro Obata, Satoshi Ikari, Ryu Funase: "Initial Design of EQUULEUS Attitude Determination and Control System: How to Design an ADCS with High Reliability for a Deep Space CubeSat", 31st International Symposium on Space Technology and Science (ISTS), Matsuyama (Japan), June 2017.

Please refer to my website  for the complete paper list.

## SKILLS

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- **Programming Languages:** C/C++, Python, MATLAB, Javascript, Ruby, HTML
- **Development:** OpenCV, OpenGL, Linux(Ubuntu), Git, Github, Docker, PyTorch, ROS, Carla simulator, CUDA, Open3D, OpenVSLAM, Dagstar, Poetry, uv, AWS
- **Design & Modeling:** Inventor (CAD), Adobe Illustrator, AfterEffects
- **Documents & Presentation:** Microsoft Office, LaTeX
- **Hardware:** High-speed camera, Event-based camera, GPU, RealSense, MBED, raspberry pi, Arduino
- **Languages:** Japanese (Native), English (Professional, TOEIC 860)

## AWARDS

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- **Best Paper Award** Oct. 2025  
*IROS 2025 Workshop on Neuromorphic Perception for Real World Robotics (NeuRobots)*
- **Encouragement Award** Mar. 2021  
*2020 Sensing Solution University Collaborative Research Program (SSUP) Research Presentation*
  - Award from Sony Semiconductor Solutions for a collaborative research
  - Research title: "AdjustSense: Adaptive 3D Sensing System with Adjustable Spatio-temporal Resolution and Measurement Range Using High-speed Omnidirectional Camera and Direct Drive Motor"
- **Young Excellent Presentation Fellow Award** Jun. 2020  
*The Japan Society of Mechanical Engineers (JSME)*
  - Research title: "Adaptive 3D Shape Measurement for Improved Spatio-temporal Resolution in Safe UAV Landing"
- **Best Student Paper Award** Jan. 2020  
*2020 IEEE/SICE International Symposium on System Integration (SII2020)*
  - Research title: "Real-time Landing Gear Control System Based on Adaptive 3D Sensing for Safe Landing of UAV"
- **SPSS President Award** Jun. 2017  
*31st International Symposium on Space Technology and Science (ISTS)*
  - Research title: "Estimation Algorithm of Relative Position and Attitude during Proximity Rendezvous and Docking Using Multiple Ultra-Wide-Band Devices"

## SCHOLARSHIPS

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- **Overseas Research Fellowships** Jun. 2024 - May 2026  
*Japan Society for the Promotion of Science (JSPS)* 
  - Host researcher: Prof. Chiara Bartolozzi,  
Event Driven Perception for Robotics, Italian Institute of Technology (IIT)
- **Satomi Scholarship** Oct. 2022 - Mar. 2023  
*The Satomi Scholarship Foundation* 
  - Host researcher: Dr. Wolfgang Stürzl,  
German Aerospace Center (DLR)
- **Overseas Challenge Program for Young Researchers** Apr. 2022 - Sep. 2022  
*Japan Society for the Promotion of Science (JSPS)* 
  - Host researcher: Prof. Alois Knoll,  
Technical University of Munich
- **Research Fellowship for Young Scientists DC1** Apr. 2020 - Sep. 2023  
*Japan Society for the Promotion of Science (JSPS)* 
  - Host researcher: Prof. Atsushi Yamashita,  
The University of Tokyo
- **Graduate Program for Social ICT Global Creative Leaders** Apr. 2019 - Mar. 2020  
*The University of Tokyo Program for Leading Graduate Schools*