Matías Mattamala

Publications List

Journal Articles

(*equal contribution)

[J8] Michal Staniaszek, Tobit Flatscher, Joseph Rowell, Hanlin Niu, Wenxing Liu, Yang You, Matt Gadd, **Matías Mattamala**, Alex Schutz, Daniele De Martini, Luke Pitt, Robert Skilton, Maurice Fallon and Nick Hawes. July 2025. "AutoInspect: Towards Long-Term Autonomous Industrial Inspection". *IEEE Trans. Field Robotics*. **Invited paper**.

[J7] **Matías *Mattamala**, Jonas *Frey, Piotr Libera, Nived Chebrolu, Georg Martius, Cesar Cadena, Marco Hutter and Maurice Fallon. July 2025. "Wild Visual Navigation: Fast Traversability Learning via Pre-Trained Models and Online Self-Supervision". *Autonomous Robots*. **Invited paper**.

[J6] **Matías Mattamala**, Nived Chebrolu, Jonas Frey, Leonard Freißmuth, Haedam Oh, Benoit Casseau, Jonas Frey, Marco Hutter and Maurice Fallon. June 2025. "Building Forest Inventories with Autonomous Legged Robots — System, Lessons, and Challenges Ahead". *IEEE Trans. Field Robotics*. **Invited paper**.

[J5] Jianeng Wang, **Matías Mattamala**, Christina Kassab, Guillaume Burger, Fabio Elnecave, Lintong Zhang, Marine Petriaux and Maurice Fallon. Feb. 2025. "Exosense: A Vision-Based Scene Understanding System For Exoskeletons". *IEEE Robot. Autom. Lett. (RA-L)*.

[J4] Marco Tranzatto, [...], **Matías Mattamala** et al. Apr. 2024. "Team CERBERUS Wins the DARPA Subterranean Challenge: Technical Overview and Lessons Learned". *Field Robotics*. arXiv: 2207.04914.

[J3] Yiduo Wang, Milad Ramezani, **Matías Mattamala**, Sundara Tejaswi Digumarti and Maurice Fallon. Sept. 2022. "Strategies for Large Scale Elastic and Semantic LiDAR Reconstruction". *Robot. Auton. Syst.*

[J2] Milad Ramezani, **Matías Mattamala** and Maurice Fallon. Apr. 2022. "AEROS: AdaptivE RObust Least-Squares for Graph-Based SLAM". *Frontiers in Robotics and AI*.

[J1] **Matías Mattamala**, Nived Chebrolu and Maurice Fallon. Apr. 2022. "An Efficient Locally Reactive Controller for Safe Navigation in Visual Teach and Repeat Missions". *IEEE Robot. Autom. Lett. (RA-L)*.

Peer-Reviewed Conference Articles

[C20] Alex Schutz, Yang You, **Matías Mattamala**, Ipek Caliskanelli, Bruno Lacerda and Nick Hawes. Aug. 2025. "A Finite-State Controller Based Offline Solver for Deterministic POMDPs". *Intl. Joint Conf. on Artificial Intelligence (IJCAI)*.

[C19] Haedam Oh, Nived Chebrolu, **Matías Mattamala**, Leonard Freißmuth and Maurice Fallon. Oct. 2024. "Evaluation and Deployment of LiDAR-based Place Recognition in Dense Forests". *IEEE/RSJ Intl. Conf. Intell. Robots Syst. (IROS)*.

[C18] Benoit Casseau, Nived Chebrolu, **Matías Mattamala**, Leonard Freißmuth and Maurice Fallon. Oct. 2024. "Markerless Aerial-Terrestrial Co-Registration of Forest Point Clouds Using a Deformable Pose Graph". *IEEE/RSJ Intl. Conf. Intell. Robots Syst. (IROS)*.

[C17] Leonard Freißmuth, **Matías Mattamala**, Nived Chebrolu, Simon Schaefer, Stefan Leutenegger and Maurice Fallon. Oct. 2024. "Online Tree Reconstruction and Forest Inventory on a Mobile Robotic System". *IEEE/RSJ Intl. Conf. Intell. Robots Syst. (IROS)*.

[C16] Timo Schönegg, Turcan Tuna, Fan Yang, Gabriel Waibel, **Matías Mattamala** and Marco Hutter. July 2024. "Global Path Planning for Autonomous Vehicles in Orchards and Vineyards". *Intl. Work. on Robot Motion and Control (RoMoCo).* **Best Conference Paper By a Young Author**.

[C15] Christina Kassab, **Matías Mattamala**, Lintong Zhang and Maurice Fallon. May 2024. "Language-EXtended Indoor SLAM (LEXIS): A Versatile System for Real-time Visual Scene Understanding". *IEEE Int. Conf. Robot. Autom. (ICRA).*

[C14] Chong *Zhang, Jin *Jin, Jonas Frey, Nikita Rudin, **Matías Mattamala**, César Cadena and Marco Hutter. May 2024. "Resilient Legged Local Navigation: Learning to Traverse with Compromised Perception End-to-End". *IEEE Int. Conf. Robot. Autom. (ICRA).* **Best Cognitive Robotics Paper Finalist**.

[C13] Yifu Tao, Yash Bhalgat, Lanke Frank Tarimo Fu, **Matías Mattamala**, Nived Chebrolu and Maurice Fallon. May 2024. "SiLVR: Scalable Lidar-Visual Reconstruction with Neural Radiance Fields for Robotic Inspection". *IEEE Int. Conf. Robot. Autom. (ICRA).*

[C12] Meher V. R. Malladi, Tiziano Guadagnino, Luca Lobefaro, **Matías Mattamala**, Holger Griess, Janine Schweier, Nived Chebrolu, Maurice Fallon, Jens Behley and Cyrill Stachniss. May 2024. "Tree Instance Segmentation and Traits Estimation for Forestry Environments Exploiting LiDAR Data Collected by Mobile Robots". *IEEE Int. Conf. Robot. Autom. (ICRA).*

[C11] Gian Erni, Jonas Frey, Takahiro Miki, **Matías Mattamala** and Marco Hutter. Oct. 2023. "MEM: Multi-Modal Elevation Mapping for Robotics and Learning". *IEEE/RSJ Intl. Conf. Intell. Robots Syst. (IROS).*

[C10] Jonas *Frey, **Matías *Mattamala**, Nived Chebrolu, Cesar Cadena, Maurice Fallon and Marco Hutter. July 2023. "Fast Traversability Estimation for Wild Visual Navigation". *Robotics: Science and Systems (RSS).*

[C9] Yiduo Wang, Milad Ramezani, **Matías Mattamala** and Maurice Fallon. Sept. 2021. "Scalable and Elastic LiDAR Reconstruction in Complex Environments Through Spatial Analysis". *European Conference on Mobile Robotics (ECMR).*

[C8] **Matías Mattamala**, Milad Ramezani, Marco Camurri and Maurice Fallon. May 2021. "Learning Camera Performance Models for Active Multi-Camera Visual Teach and Repeat". *IEEE Int. Conf. Robot. Autom. (ICRA).*

[C7] Milad Ramezani, Yiduo Wang, Marco Camurri, David Wisth, **Matías Mattamala** and Maurice Fallon. Oct. 2020. "The Newer College Dataset: Handheld LiDAR, Inertial and Vision with Ground Truth". *IEEE/RSJ Intl. Conf. Intell. Robots Syst. (IROS).*

[C6] **Matías Mattamala**, María José Alfaro, Francisco Casado, Cristóbal Mesías, Gustavo Holmberg, Fernanda Sanchirico, Ramiro Insunza and Loreto Aguirre. 2019b. "Hackers, bandas y squads: Implementación de cursos flexibles para el desarrollo transversal de proyectos en la FCFM". *XXXII Congreso de la Sociedad Chilena de Educación en Ingeniería (SOCHEDI).*

[C5] Cristopher *Gómez, **Matías *Mattamala**, Tim *Resink and Javier Ruiz-del-Solar. July 2018. "Visual SLAM-Based Localization and Navigation for Service Robots: The Pepper Case". *RoboCup 2018: Robot World Cup XXII.*

[C4] **Matías Mattamala**, Matías Lasen, Rodrigo Chi, Andrés Caba, Miguel Patiño, Javier Larrondo and Viviana Meruane. 2018c. "Beauchef Proyecta: Implementación Curricular de Proyectos Multidisciplinarios". *XXXI Congreso de la Sociedad Chilena de Educación en Ingeniería (SOCHEDI).*

[C3] **Matías *Mattamala**, Gonzalo *Olave, Clayder González, Nicolás Hasbún and Javier Ruiz-del-Solar. July 2017. "The NAO Backpack: An Open-Hardware Add-on for Fast Software Development with the NAO Robot". *RoboCup 2017: Robot World Cup XXI*.

[C2] **Matías Mattamala**, Gonzalo Olave, Miguel Campusano, Cristopher Gómez, Luz Martínez, Pablo Estefó, Joakin Ugalde, Javier Urrutia, Felipe San Martín, Javier Carrasco, Pablo Villar and Rocío Gonzalez. 2017b. "Aprendizaje Interdisciplinario en Robótica: La Experiencia Innovadora de Duckietown Chile". *XXX Congreso de la Sociedad Chilena de Educación en Ingeniería (SOCHEDI)*.

[C1] **Matías Mattamala**, Constanza Villegas, José Miguel Yáñez, Pablo Cano and Javier Ruiz-del-Solar. July 2015. "A Dynamic and Efficient Active Vision System for Humanoid Soccer Robots". *RoboCup 2015: Robot World Cup XIX*.

Book Chapters

[BC3] Marco Camurri and **Matías Mattamala**. 2025f. "Leg Odometry for SLAM". *SLAM Handbook — From Localization and Mapping to Spatial Intelligence*. Ed. by Luca Carlone, Ayoung Kim, Frank Dellaert, Timothy Barfoot and Daniel Cremers. **In preparation**. Cambridge University Press.

[BC2] **Matías Mattamala**. Nov. 2020. "La promesa de los robots en los tiempos del Covid-19: Desafíos y oportunidades para Chile". *La Robótica al Servicio de la Pandemia*. Ed. by Sofía Calvo Foxley. (Spanish). Chile: Biblioteca del Congreso Nacional de Chile.

[BC1] **Matías Mattamala**. 2019a. "¿Qué es la inteligencia artificial?" *Inteligencia Artificial y Bienestar de las Juventudes en América Latina*. Ed. by Lionel Brossi, Tomás Dodds and Ezequiel Passeron. (Spanish). Chile: LOM Ediciones.

Pre-prints

[P3] Christina *Kassab, Sacha *Morin, Martin *Büchner, **Matías Mattamala**, Kumaraditya Gupta, Abhinav Valada, Liam Paull and Maurice Fallon. 2025g. "OpenLex3D: A New Evaluation Benchmark for Open-Vocabulary 3D Scene Representations". **Under review**. arXiv: 2503.19764 [cs.CV].

[P2] Christina Kassab, **Matías Mattamala**, Sacha Morin, Martin Büchner, Abhinav Valada, Liam Paull and Maurice Fallon. Dec. 2024. "The Bare Necessities: Designing Simple, Effective Open-Vocabulary Scene Graphs". **Under review**. arXiv: 2412.01539 [cs.CV].

[P1] **Matías Mattamala**, Nived Chebrolu, Benoit Casseau, Leonard Freißmuth, Jonas Frey, Turcan Tuna, Marco Hutter and Maurice Fallon. May 2024. "Autonomous Forest Inventory with Legged Robots: System Design and Field Deployment". arXiv: 2404.14157.

Other Contributions

[O5] **Matías Mattamala** and Nived Chebrolu. Nov. 2023. *Tutorial on SLAM and factor graphs*. URL: https://github.com/ori-drs/slam_tutorial/ (visited on 31/10/2024).

[O4] **Matías Mattamala**. Oct. 2023. *Designing Graphics for Scientific Publications*. URL: https://github.com/mmattamala/paper-graphics (visited on 31/10/2024).

[O3] **Matías Mattamala**. Feb. 2021. *Reducing the uncertainty about the uncertainties, part 1: Linear and nonlinear*. URL: https://gtsam.org/2021/02/23/uncertainties-part1.html (visited on 16/09/2024).

[O2] **Matías Mattamala**. Feb. 2021. *Reducing the uncertainty about the uncertainties, part 2: Frames and manifolds*. URL: https://gtsam.org/2021/02/23/uncertainties-part2.html (visited on 16/09/2024).

[O1] **Matías Mattamala**. Feb. 2021. *Reducing the uncertainty about the uncertainties, part 3: Adjoints and covariances*. URL: https://gtsam.org/2021/02/23/uncertainties-part3.html (visited on 16/09/2024).