All: 1 List of Publications

2026

Conference and Workshop Papers

[C1] A Zhang, H Chen, Y Burkhardt, Y Zhong, J Betz, H Oleynikova and S Leutenegger,
Actron3D: Learning Actionable Neural Functions from Videos for Transferable Robotic Manipulation,
IEEE International Conference on Robotics and Automation (ICRA), 2026.

[C2] Y Zhong, H Chen, S Schaefer, A Zhang and S Leutenegger,
GOPLA: Generalizable Object Placement Learning via Synthetic Augmentation of Human Arrangement,
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2026.

2025

Journal Articles

[J1] B Sun, H Chen, S Leutenegger, C Cadena, M Pollefeys and H Blum,
FrontierNet: Learning Visual Cues to Explore,
IEEE Robotics and Automation Letters (RA-L), 1-8, 2025.

Conference and Workshop Papers

[C1] H Chen, B Sun, A Zhang, M Pollefeys and S Leutenegger,
VidBot: Learning Generalizable 3D Actions from In-the-Wild 2D Human Videos for Zero-Shot Robotic Manipulation,
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2025.

2024

Conference and Workshop Papers

[C1] S Boche, S Barbas Laina and S Leutenegger,
Tightly-Coupled LiDAR-Visual-Inertial SLAM and Large-Scale Volumetric Occupancy Mapping,
IEEE International Conference on Robotics and Automation (ICRA), 2024.

[C2] S Zhou, S Papatheodorou, S Leutenegger and A Schoellig,
Control-Barrier-Aided Teleoperation with Visual-Inertial SLAM for Safe MAV Navigation in Complex Environments,
IEEE International Conference on Robotics and Automation (ICRA), 2024.

[C3] H Chen, B Xu and S Leutenegger,
FuncGrasp: Learning Object-Centric Neural Grasp Functions from Single Annotated Example Object,
IEEE International Conference on Robotics and Automation (ICRA), 2024.

2023

Journal Articles

[J1] X Zuo, N Yang, N Merrill, B Xu and S Leutenegger,
Incremental Dense Reconstruction From Monocular Video With Guided Sparse Feature Volume Fusion,
IEEE Robotics and Automation Letters, 8: 3876-3883, 2023.

[J2] N Funk, J Tarrio, S Papatheodorou, PF Alcantarilla and S Leutenegger,
Orientation-Aware Hierarchical, Adaptive-Resolution A* Algorithm for UAV Trajectory Planning,
IEEE Robotics and Automation Letters, 8: 6723-6730, 2023.

[J3] H Chen, D Hidalgo-Carvajal, GC. Bettelani, J Jung, M Zavaglia, L Busse, A Naceri, S Haddadin and S Leutenegger,
Anthropomorphic Grasping with Neural Object Shape Completion,
IEEE Robotics and Automation Letters (RA-L), 1-8, 2023.

Conference and Workshop Papers

[C1] Y Xue, H Li, S Leutenegger and J Stückler,
Finding Things in the Unknown: Semantic Object-Centric Exploration with an MAV,
IEEE International Conference on Robotics and Automation (ICRA), London, United Kingdom, May 2023.

[C2] C Choi, B Xu and S Leutenegger,
Accurate and Interactive Visual-Inertial Sensor Calibration with Next-Best-View and Next-Best-Trajectory Suggestion,
IEEE International Conference on Intelligent Robots and Systems (IROS), Detroit, United States, October 2023.

[C3] S Schaefer, D Henning and S Leutenegger,
GloPro: Globally-Consistent Uncertainty-Aware 3D Human Pose Estimation 38; Tracking in the Wild,
IEEE International Conference on Intelligent Robots and Systems (IROS), Detroit, United States, October 2023.

[C4] D Henning, C Choi, S Schaefer and S Leutenegger,
BodySLAM++: Fast and Tightly-Coupled Visual-Inertial Camera and Human Motion Tracking,
IEEE International Conference on Intelligent Robots and Systems (IROS), Detroit, United States, October 2023.

[C5] Y Xin, X Zuo, D Lu and S Leutenegger,
SimpleMapping: Real-Time Visual-Inertial Dense Mapping with Deep Multi-View Stereo,
IEEE International Symposium on Mixed and Augmented Reality (ISMAR), October 2023.

[C6] H Chen, F Manhardt, N Navab and B Busam,
Texpose: Neural texture learning for self-supervised 6d object pose estimation,
Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 4841-4852, 2023.

2022

Journal Articles

[J1] S Leutenegger,
OKVIS2: Realtime Scalable Visual-Inertial SLAM with Loop Closure,
arXiv preprint arXiv:2202.09199, 2022.

[J2] K Zhang, P Chermprayong, F Xiao, D Tzoumanikas, B Dams, S Kay, BB Kocer, A Burns, L Orr, C Choi, DD Darekar, W Li, S Hirschmann, V Soana, SA Ngah, S Sareh, A Choubey, L Margheri, VM Pawar, RJ Ball, C Williams, P Shepherd, S Leutenegger, R Stuart-Smith and M Kovac,
Aerial additive manufacturing with multiple autonomous robots,
Nature, 7928: 709-717, 2022.

Conference and Workshop Papers

[C1] N Merrill, Y Guo, X Zuo, S Leutenegger, X Peng, L Ren and G Huang,
Symmetry and Uncertainty-Aware Object SLAM for 6DoF Object Pose Estimation,
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2022.

[C2] D Henning, T Laidlow and S Leutenegger,
BodySLAM: Joint Camera Localisation, Mapping, and Human Motion Tracking,
European Conference on Computer Vision (ECCV), 2022.

[C3] S Boche, X Zuo, S Schaefer and S Leutenegger,
Visual-Inertial SLAM with Tightly-Coupled Dropout-Tolerant GPS Fusion,
International Conference on Intelligent Robots and Systems (IROS), 2022.

[C4] Y Ren, B Xu, CL. Choi and S Leutenegger,
Visual-Inertial Multi-Instance Dynamic SLAM with Object-Level Relocalisation,
International Conference on Intelligent Robots and Systems (IROS), 2022.

[C5] B Xu, A Davison and S Leutenegger,
Learning to Complete Object Shapes for Object-level Mapping in Dynamic Scenes,
International Conference on Intelligent Robots and Systems (IROS), 2022.

2021

Journal Articles

[J1] B Xu, AJ Davison and S Leutenegger,
Deep Probabilistic Feature-metric Tracking,
IEEE Robotics and Automation Letters, 6(1): 223-230, 2021.

[J2] M Popovic, F Thomas, S Papatheodorou, N Funk, T Vidal-Calleja and S Leutenegger,
Volumetric Occupancy Mapping With Probabilistic Depth Completion for Robotic Navigation,
IEEE Robotics and Automation Letters, 6(3): 5072-5079, 2021.

[J3] N Funk, J Tarrio, S Papatheodorou, M Popovic, PF. Alcantarilla and S Leutenegger,
Multi-Resolution 3D Mapping With Explicit Free Space Representation for Fast and Accurate Mobile Robot Motion Planning,
IEEE Robotics and Automation Letters, 6(2): 3553-3560, 2021.

Conference and Workshop Papers

[C1] Y Wang, N Funk, S Papatheodorou, M Popovic, M Camurri, S Leutenegger and M Fallon,
Elastic and efficient lidar reconstruction for large-scale exploration tasks,
IEEE International Conference on Robotics and Automation (ICRA), 2021.

2020

Conference and Workshop Papers

[C1] A Dai, S Papatheodorou, N Funk, D Tzoumanikas and S Leutenegger,
Fast frontier-based information-driven autonomous exploration with an MAV,
2020 IEEE International Conference on Robotics and Automation (ICRA), 9570-9576, 2020.

[C2] D Tzoumanikas, Q Yan and S Leutenegger,
Nonlinear mpc with motor failure identification and recovery for safe and aggressive multicopter flight,
IEEE International Conference on Robotics and Automation (ICRA), 8538-8544, 2020.

[C3] U Bonde, PF Alcantarilla and S Leutenegger,
Towards bounding-box free panoptic segmentation,
German Conference on Pattern Recognition (GCPR), 2020.

[C4] Z Landgraf, F Falck, M Bloesch, S Leutenegger and AJ Davison,
Comparing view-based and map-based semantic labelling in real-time SLAM,
IEEE International Conference on Robotics and Automation (ICRA), 6884-6890, 2020.

[C5] T Laidlow, J Czarnowski, A Nicastro, R Clark and S Leutenegger,
Towards the Probabilistic Fusion of Learned Priors into Standard Pipelines for 3D Reconstruction,
IEEE International Conference on Robotics and Automation (ICRA), 7373-7379, 2020.

[C6] J Ortiz, M Pupilli, S Leutenegger and AJ Davison,
Bundle adjustment on a graph processor,
Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition, 2416-2425, 2020.

[C7] D Tzoumanikas, F Graule, Q Yan, D Shah, M Popovic and S Leutenegger,
Aerial Manipulation Using Hybrid Force and Position NMPC Applied to Aerial Writing,
2020.

2019

Journal Articles

[J1] D Tzoumanikas, W Li, M Grimm, K Zhang, M Kovac and S Leutenegger,
Fully autonomous micro air vehicle flight and landing on a moving target using visual–inertial estimation and model-predictive control,
Journal of Field Robotics, 36(1): 49-77, 2019.

[J2] K Zhang, P Chermprayong, D Tzoumanikas, W Li, M Grimm, M Smentoch, S Leutenegger and M Kovac,
Bioinspired design of a landing system with soft shock absorbers for autonomous aerial robots,
Journal of Field Robotics, 36(1): 230-251, 2019.

[J3] G Gallego, T Delbruck, G Orchard, C Bartolozzi, B Taba, A Censi, S Leutenegger, A Davison, J Conradt, K Daniilidis and others,
Event-based vision: A survey,
arXiv preprint arXiv:1904.08405, 2019.

[J4] TK Kim, S Zafeiriou, B Glocker and S Leutenegger,
Special Issue on Machine Vision,
International Journal of Computer Vision, 127(11): 1611-1613, 2019.

Conference and Workshop Papers

[C1] B Xu, W Li, D Tzoumanikas, M Bloesch, A Davison and S Leutenegger,
Mid-fusion: Octree-based object-level multi-instance dynamic slam,
2019 International Conference on Robotics and Automation (ICRA), 5231-5237, 2019.

[C2] A Nicastro, R Clark and S Leutenegger,
X-section: Cross-section prediction for enhanced RGB-D fusion,
Proceedings of the IEEE/CVF International Conference on Computer Vision, 1517-1526, 2019.

[C3] S Zhi, M Bloesch, S Leutenegger and AJ Davison,
Scenecode: Monocular dense semantic reconstruction using learned encoded scene representations,
Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition, 11776-11785, 2019.

[C4] C Houseago, M Bloesch and S Leutenegger,
KO-Fusion: dense visual SLAM with tightly-coupled kinematic and odometric tracking,
2019 International Conference on Robotics and Automation (ICRA), 4054-4060, 2019.

[C5] T Laidlow, J Czarnowski and S Leutenegger,
DeepFusion: real-time dense 3D reconstruction for monocular SLAM using single-view depth and gradient predictions,
2019 International Conference on Robotics and Automation (ICRA), 4068-4074, 2019.

[C6] S Saeedi, ED Carvalho, W Li, D Tzoumanikas, S Leutenegger, PH Kelly and AJ Davison,
Characterizing visual localization and mapping datasets,
2019 International Conference on Robotics and Automation (ICRA), 6699-6705, 2019.

[C7] M Bloesch, T Laidlow, R Clark, S Leutenegger and AJ Davison,
Learning meshes for dense visual SLAM,
Proceedings of the IEEE/CVF International Conference on Computer Vision, 5855-5864, 2019.

[C8] E Vespa, N Funk, PH Kelly and S Leutenegger,
Adaptive-resolution octree-based volumetric SLAM,
2019 International Conference on 3D Vision (3DV), 654-662, 2019.

2018

Journal Articles

[J1] E Vespa, N Nikolov, M Grimm, L Nardi, PH Kelly and S Leutenegger,
Efficient octree-based volumetric SLAM supporting signed-distance and occupancy mapping,
IEEE Robotics and Automation Letters, 3(2): 1144-1151, 2018.

Conference and Workshop Papers

[C1] M Bloesch, J Czarnowski, R Clark, S Leutenegger and AJ Davison,
CodeSLAM—learning a compact, optimisable representation for dense visual SLAM,
Proceedings of the IEEE conference on computer vision and pattern recognition, 2560-2568, 2018.

[C2] M Li, N Songur, P Orlov, S Leutenegger and AA Faisal,
Towards an Embodied Semantic Fovea: Semantic 3D scene reconstruction from ego-centric eye-tracker videos,
2018.

[C3] W Li, S Saeedi, J McCormac, R Clark, D Tzoumanikas, Q Ye, Y Huang, R Tang and S Leutenegger,
InteriorNet: Mega-scale multi-sensor photo-realistic indoor scenes dataset,
2018.

[C4] J McCormac, R Clark, M Bloesch, A Davison and S Leutenegger,
Fusion++: Volumetric object-level slam,
2018 international conference on 3D vision (3DV), 32-41, 2018.

[C5] R Clark, M Bloesch, J Czarnowski, S Leutenegger and AJ Davison,
Learning to solve nonlinear least squares for monocular stereo,
Proceedings of the European Conference on Computer Vision (ECCV), 284-299, 2018.

[C6] R Clark, M Bloesch, J Czarnowski, S Leutenegger and AJ Davison,
Ls-net: Learning to solve nonlinear least squares for monocular stereo,
2018.

2017

Journal Articles

[J1] P Oettershagen, A Melzer, T Mantel, K Rudin, T Stastny, B Wawrzacz, T Hinzmann, S Leutenegger, K Alexis and R Siegwart,
Design of small hand-launched solar-powered UAVs: From concept study to a multi-day world endurance record flight,
Journal of Field Robotics, 34(7): 1352-1377, 2017.

Conference and Workshop Papers

[C1] J McCormac, A Handa, A Davison and S Leutenegger,
Semanticfusion: Dense 3d semantic mapping with convolutional neural networks,
2017 IEEE International Conference on Robotics and automation (ICRA), 4628-4635, 2017.

[C2] R Lukierski, S Leutenegger and AJ Davison,
Room layout estimation from rapid omnidirectional exploration,
2017 IEEE International Conference on Robotics and Automation (ICRA), 6315-6322, 2017.

[C3] L Platinsky, AJ Davison and S Leutenegger,
Monocular visual odometry: Sparse joint optimisation or dense alternation?,
2017 IEEE International Conference on Robotics and Automation (ICRA), 5126-5133, 2017.

[C4] J Czarnowski, S Leutenegger and AJ Davison,
Semantic texture for robust dense tracking,
Proceedings of the IEEE International Conference on Computer Vision Workshops, 860-868, 2017.

[C5] T Laidlow, M Bloesch, W Li and S Leutenegger,
Dense rgb-d-inertial slam with map deformations,
2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 6741-6748, 2017.

[C6] J McCormac, A Handa, S Leutenegger and AJ Davison,
Scenenet rgb-d: Can 5m synthetic images beat generic imagenet pre-training on indoor segmentation?,
Proceedings of the IEEE International Conference on Computer Vision, 2678-2687, 2017.

[C7] R Clark, J McCormac, S Leutenegger and A Davison,
Meta-learning for instance-level data association,
Neural Information Processing Systems (NIPS), Vol. 1, 2017.

2016

Journal Articles

[J1] M Bloesch, H Sommer, T Laidlow, M Burri, G Nuetzi, P Fankhauser, D Bellicoso, C Gehring, S Leutenegger, M Hutter and others,
A primer on the differential calculus of 3d orientations,
arXiv preprint arXiv:1606.05285, 2016.

[J2] T Whelan, RF Salas-Moreno, B Glocker, AJ Davison and S Leutenegger,
ElasticFusion: Real-time dense SLAM and light source estimation,
The International Journal of Robotics Research, 35(14): 1697-1716, 2016.

Book Chapters

[BC1] S Leutenegger, C Hürzeler, AK Stowers, K Alexis, MW Achtelik, D Lentink, PY Oh and R Siegwart,
Flying robots,
Springer Handbook of Robotics, Springer, Cham, 623-670, 2016.

Conference and Workshop Papers

[C1] E Johns, S Leutenegger and AJ Davison,
Pairwise decomposition of image sequences for active multi-view recognition,
Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, 3813-3822, 2016.

[C2] P Bardow, AJ Davison and S Leutenegger,
Simultaneous optical flow and intensity estimation from an event camera,
Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, 884-892, 2016.

[C3] E Johns, S Leutenegger and AJ Davison,
Deep learning a grasp function for grasping under gripper pose uncertainty,
Intelligent Robots and Systems (IROS), 2016 IEEE/RSJ International Conference on, 4461-4468, 2016.

[C4] J Zienkiewicz, A Davison and S Leutenegger,
Real-time height map fusion using differentiable rendering,
2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 4280-4287, 2016.

[C5] H Kim, S Leutenegger and AJ Davison,
Real-time 3D reconstruction and 6-DoF tracking with an event camera,
European Conference on Computer Vision, 349-364, 2016.

[C6] J Zienkiewicz, A Tsiotsios, A Davison and S Leutenegger,
Monocular, real-time surface reconstruction using dynamic level of detail,
2016 Fourth International Conference on 3D Vision (3DV), 37-46, 2016.

2015

Journal Articles

[J1] S Leutenegger, S Lynen, M Bosse, R Siegwart and P Furgale,
Keyframe-based visual–inertial odometry using nonlinear optimization,
The International Journal of Robotics Research, 34(3): 314-334, 2015.

Conference and Workshop Papers

[C1] M Milford, H Kim, M Mangan, S Leutenegger, T Stone, B Webb and A Davison,
Place recognition with event-based cameras and a neural implementation of SeqSLAM,
Innovative Sensing for Robotics: Focus on Neuromorphic Sensors Workshop at IEEE International Conference on Robotics and Automation (ICRA), 2015.

[C2] P Oettershagen, A Melzer, T Mantel, K Rudin, R Lotz, D Siebenmann, S Leutenegger, K Alexis and R Siegwart,
A solar-powered hand-launchable UAV for low-altitude multi-day continuous flight,
2015 IEEE International Conference on Robotics and Automation (ICRA), 3986-3993, 2015.

[C3] M Milford, H Kim, S Leutenegger and A Davison,
Towards visual slam with event-based cameras,
The problem of mobile sensors workshop in conjunction with RSS, 2015.

[C4] R Lukierski, S Leutenegger and AJ Davison,
Rapid free-space mapping from a single omnidirectional camera,
2015 European Conference on Mobile Robots (ECMR), 1-8, 2015.

[C5] T Whelan, S Leutenegger, RF. Salas-Moreno, B Glocker and AJ. Davison,
ElasticFusion: Dense SLAM Without A Pose Graph,
Robotics: Science and Systems, 2015.

2014

Conference and Workshop Papers

[C1] J Nikolic, J Rehder, M Burri, P Gohl, S Leutenegger, PT Furgale and R Siegwart,
A synchronized visual-inertial sensor system with FPGA pre-processing for accurate real-time SLAM,
2014 IEEE international conference on robotics and automation (ICRA), 431-437, 2014.

[C2] P Oettershagen, A Melzer, S Leutenegger, K Alexis and R Siegwart,
Explicit model predictive control and l 1-navigation strategies for fixed-wing uav path tracking,
22nd Mediterranean Conference on Control and Automation, 1159-1165, 2014.

[C3] S Leutenegger, A Melzer, K Alexis and R Siegwart,
Robust state estimation for small unmanned airplanes,
2014 IEEE Conference on Control Applications (CCA), 1003-1010, 2014.

PhDThesis

[PhD1] S Leutenegger,
Unmanned solar airplanes: Design and algorithms for efficient and robust autonomous operation,
ETH Zurich, 2014.

2013

Journal Articles

[J1] M Bloesch, M Hutter, MA Hoepflinger, S Leutenegger, C Gehring, CD Remy and R Siegwart,
State estimation for legged robots-consistent fusion of leg kinematics and IMU,
Robotics, 17: 17-24, 2013.

Conference and Workshop Papers

[C1] J Nikolic, M Burri, J Rehder, S Leutenegger, C Huerzeler and R Siegwart,
A UAV system for inspection of industrial facilities,
2013 IEEE Aerospace Conference, 1-8, 2013.

[C2] M Burri, L Gasser, M Käch, M Krebs, S Laube, A Ledergerber, D Meier, R Michaud, L Mosimann, L Müri and others,
Design and control of a spherical omnidirectional blimp,
2013 IEEE/RSJ International Conference on Intelligent Robots and Systems, 1873-1879, 2013.

[C3] L Marconi, S Leutenegger, S Lynen, M Burri, R Naldi and C Melchiorri,
Ground and aerial robots as an aid to alpine search and rescue: Initial sherpa outcomes,
2013 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR), 1-2, 2013.

2012

Journal Articles

[J1] S Leutenegger and others,
Image Keypoint Detection, Description, and Matching,
ETH Zurich, Jul, 5: 1-27, 2012.

Conference and Workshop Papers

[C1] L Marconi, C Melchiorri, M Beetz, D Pangercic, R Siegwart, S Leutenegger, R Carloni, S Stramigioli, H Bruyninckx, P Doherty and others,
The SHERPA project: Smart collaboration between humans and ground-aerial robots for improving rescuing activities in alpine environments,
2012 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR), 1-4, 2012.

[C2] S Leutenegger and RY Siegwart,
A low-cost and fail-safe inertial navigation system for airplanes,
2012 IEEE International Conference on Robotics and Automation, 612-618, 2012.

2011

Journal Articles

[J1] S Leutenegger, M Jabas and RY Siegwart,
Solar airplane conceptual design and performance estimation,
Journal of Intelligent &38; Robotic Systems, 61(1): 545-561, 2011.

Conference and Workshop Papers

[C1] S Leutenegger, M Chli and RY Siegwart,
BRISK: Binary robust invariant scalable keypoints,
2011 International conference on computer vision, 2548-2555, 2011.

[C2] P Fankhauser, S Bouabdallah, S Leutenegger and R Siegwart,
Modeling and decoupling control of the coax micro helicopter,
2011 IEEE/RSJ International Conference on Intelligent Robots and Systems, 2223-2228, 2011.

2010

MastersThesis

[M1] P Fankhauser and C Gwerder,
Modeling and control of a ballbot,
Eidgenössische Technische Hochschule Zürich, 2010.

2009

Journal Articles

[J1] A Noth,
Designing solar airplanes for continuous flight,
SPIE Newsroom, 2009.

2008

Conference and Workshop Papers

[C1] C Bermes, S Leutenegger, S Bouabdallah, D Schafroth and R Siegwart,
New design of the steering mechanism for a mini coaxial helicopter,
2008 IEEE/RSJ International Conference on Intelligent Robots and Systems, 1236-1241, 2008.

[C2] C Bermes, S Leutenegger, S Bouabdallah and R Siegwart,
Design and Comparison of a Steering Mechanism for an Autonomous Coaxial Indoor Helicopter,
Proceedings of The ASME International Symposium on Flexible Automation (ISFA), 2008.

2007

Journal Articles

[J1] S Leutenegger, C Bermes and S Bouabdallah,
Mechanical design and realization of a steering mechanism for a coaxial helicopter,
Semester Thesis, 2007.

Conference and Workshop Papers

[C1] DJ Bell, S Leutenegger, K Hammar, L Dong and BJ Nelson,
Proceedings 2007 IEEE international conference on robotics and automation, 1128-1133, 2007.