

Marine Robotics Publications of John Folkesson

Articles:

1. I. Torroba, M. Cella, A. Terán, N. Rolleberg and J. Folkesson, "[Online Stochastic Variational Gaussian Process Mapping for Large-Scale Bathymetric SLAM in Real Time](#)," in IEEE Robotics and Automation Letters, vol. 8, no. 6, pp. 3150-3157, June 2023, doi: 10.1109/LRA.2023.3264750.
2. J. Zhang, Y. Xie, L. Ling and J. Folkesson, "[A fully-automatic side-scan sonar simultaneous localization and mapping framework](#)," IET Radar Sonar Navig. 1–10, 2023, doi: 10.1049/rsn2.12500.
3. Y. Xie, N. Bore and J. Folkesson, "[Neural Network Normal Estimation and Bathymetry Reconstruction From Sidescan Sonar](#)," in IEEE Journal of Oceanic Engineering, vol. 48, no. 1, pp. 218-232, Jan. 2023, doi: 10.1109/JOE.2022.3194899.
4. Y. Xie, N. Bore and J. Folkesson, "[Bathymetric Reconstruction From Sidescan Sonar With Deep Neural Networks](#)," in IEEE Journal of Oceanic Engineering, vol. 48, no. 2, pp. 372-383, April 2023, doi: 10.1109/JOE.2022.3220330.
5. N. Bore and J. Folkesson, "[Neural Shape-From-Shading for Survey-Scale Self-Consistent Bathymetry From Sidescan](#)," in IEEE Journal of Oceanic Engineering, vol. 48, no. 2, pp. 416-430, April 2023, doi: 10.1109/JOE.2022.3215822.
6. I. Torroba, C. I. Sprague and J. Folkesson, "[Fully-Probabilistic Terrain Modelling and Localization With Stochastic Variational Gaussian Process Maps](#)," in IEEE Robotics and Automation Letters, vol. 7, no. 4, pp. 8729-8736, Oct. 2022, doi: 10.1109/LRA.2022.3182807.
7. Y. Xie, N. Bore and J. Folkesson, "[Sidescan Only Neural Bathymetry from Large-Scale Survey](#)," in Sensors, 22, 5092, 2022, doi: 10.3390/s22145092
8. Stenius, I.; Folkesson, J.; Bhat, S.; Sprague, C.I.; Ling, L.; Özkahraman, Ö.; Bore, N.; Cong, Z.; Severholt, J.; Ljung, C.; et al., "[A System for Autonomous Seaweed Farm Inspection with an Underwater Robot](#)," Sensors, 22, 5064, 2022, doi: 10.3390/s22135064
9. N. Bore and J. Folkesson, "[Modeling and Simulation of Sidescan Using Conditional Generative Adversarial Network](#)," in IEEE Journal of Oceanic Engineering, vol. 46, no. 1, pp. 195-205, Jan. 2021, doi:10.1109/JOE.2020.2980456.
10. I. Torroba, C. I. Sprague, N. Bore and J. Folkesson, "[PointNetKL: Deep Inference for GICP Covariance Estimation in Bathymetric SLAM](#)," in IEEE Robotics and Automation Letters, vol. 5, no. 3, pp. 4078-4085, July 2020, doi: 10.1109/LRA.2020.2988180.
11. Xie, Y., Bore, N. and Folkesson, J. "[Inferring depth contours from sidescan sonar using convolutional neural nets](#)," IET Radar Sonar Navig., 14: 328-334, 2020, doi: 10.1049/iet-rsn.2019.0428,
12. D. Peng, T. Zhou, J. Folkesson and C. Xu, "[Robust particle filter based on Huber function for underwater terrain-aided navigation](#)," IET Radar Sonar Navig., 13: 1867-1875, 2019, doi: 10.1049/iet-rsn.2019.0123

13. M. F. Fallon, J. Folkesson, H. McClelland and J. J. Leonard, "[Relocating Underwater Features Autonomously Using Sonar-Based SLAM](#)," in IEEE Journal of Oceanic Engineering, vol. 38, no. 3, pp. 500-513, July 2013, doi: 10.1109/JOE.2012.2235664.
14. M. F. Fallon, H. Johannsson, M. Kaess, J. Folkesson, H. McClelland, B. J. Englot, F. S. Hover and J. J. Leonard, "[Simultaneous Localization and Mapping in Marine Environments](#)," in: Seto, M. (eds) Marine Robot Autonomy. Springer, New York, NY., 2013, doi:10.1007/978-1-4614-5659-9_8
15. J. Folkesson, and J. Leonard, "[Autonomy through SLAM for an Underwater Robot](#)," in: Pradalier, C., Siegwart, R., Hirzinger, G. (eds) Robotics Research. Springer Tracts in Advanced Robotics, vol 70. Springer, Berlin, Heidelberg, 2011, doi: 10.1007/978-3-642-19457-3_4
16. J. Folkesson, J. Leederkerken, R. Williams, A. Patrikalakis, J. Leonard, "[A Feature Based Navigation System for an Autonomous Underwater Robot](#)," in: Laugier, C., Siegwart, R. (eds) Field and Service Robotics. Springer Tracts in Advanced Robotics, vol 42. Springer, Berlin, Heidelberg, 2008, doi:10.1007/978-3-540-75404-6_10

Conferences papers:

1. A. Terán, A. T. Espinoza, J. Folkesson, P. Sigray, J. Kutteneuler, "Boundary Factors for Seamless State Estimation between Autonomous Underwater Docking Phases", (accepted) 2024 IEEE International Conference on Robotics and Automation (ICRA), Japan.
2. L. Ling, J. Zhang, Nils Bore, John Folkesson, Anna Wåhlin, "Benchmarking Classical and Learning-Based Multibeam Point Cloud Registration", (accepted) 2024 IEEE International Conference on Robotics and Automation (ICRA), Japan.
3. J. Tan, I. Torroba, Y. Xie and J. Folkesson, "[Data-driven Loop Closure Detection in Bathymetric Point Clouds for Underwater SLAM](#)," 2023 IEEE International Conference on Robotics and Automation (ICRA), London, United Kingdom, 2023, pp. 3131-3137, doi: 10.1109/ICRA48891.2023.10160783.
4. W. Xu, L. Ling, Y. Xie, J. Zhang, J. Folkesson, "Evaluation of a Canonical Image Representation for Sidescan Sonar", OCEANS 2023 – Limerick
5. I. Athanasiadis, N. Bore and J. Folkesson, "[Underwater Image Classification via Multiview-based Auxiliary Learning](#)," OCEANS 2022, Hampton Roads, Hampton Roads, VA, USA, 2022, pp. 1-7, doi:10.1109/OCEANS47191.2022.9977242
6. Y. Xie, N. Bore and J. Folkesson, "[Towards Differentiable Rendering for Sidescan Sonar Imagery](#)," 2022 IEEE/OES Autonomous Underwater Vehicles Symposium (AUV), Singapore, 2022, pp. 1-6, doi: 10.1109/AUV53081.2022.99659
7. M. Larsson, N. Bore and J. Folkesson, "[Latent Space Metric Learning For Sidescan Sonar Place Recognition](#)," 2020 IEEE/OES Autonomous Underwater Vehicles Symposium (AUV), St. Johns, NL, Canada, 2020, pp. 1-6, doi: 10.1109/AUV50043.2020.9267885.
8. S. Bhat et al., "[A Cyber-Physical System for Hydrobotic AUVs: System Integration and Field Demonstration](#)," 2020 IEEE/OES Autonomous Underwater Vehicles Symposium (AUV), St. Johns, NL, Canada, 2020, pp. 1-8, doi: 10.1109/AUV50043.2020.9267947.

9. J. Folkesson, H. Chang and N. Bore, "[Lambert's Cosine Law and Sidescan Sonar Modeling](#)," 2020 IEEE/OES Autonomous Underwater Vehicles Symposium (AUV), St. Johns, NL, Canada, 2020, pp. 1-6, doi: 10.1109/AUV50043.2020.9267946.
10. I. Torroba, N. Bore, A. Wåhlin and J. Folkesson, "[Loop Closure Detection Through Environmental Indicators In Underwater SLAM](#)," OCEANS 2019 - Marseille, Marseille, France, 2019, pp. 1-7, doi: 10.1109/OCEANSE.2019.8867097.
11. I. Torroba, N. Bore and J. Folkesson, "[Towards Autonomous Industrial-Scale Bathymetric Surveying](#)," 2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Macau, China, 2019, pp. 6377-6382, doi: 10.1109/IROS40897.2019.8968241.
12. I. Torroba, N. Bore and J. Folkesson, "[A Comparison of Submap Registration Methods for Multibeam Bathymetric Mapping](#)," 2018 IEEE/OES Autonomous Underwater Vehicle Workshop (AUV), Porto, Portugal, 2018, pp. 1-6, doi: 10.1109/AUV.2018.8729731.
13. N. Bore, I. Torroba and J. Folkesson, "[Sparse Gaussian Process SLAM, Storage and Filtering for AUV Multibeam Bathymetry](#)," 2018 IEEE/OES Autonomous Underwater Vehicle Workshop (AUV), Porto, Portugal, 2018, pp. 1-6, doi: 10.1109/AUV.2018.8729748.
14. J. Folkesson, J. Leonard, J. Leederkerken and R. Williams, "[Feature tracking for underwater navigation using sonar](#)," 2007 IEEE/RSJ International Conference on Intelligent Robots and Systems, San Diego, CA, USA, 2007, pp. 3678-3684, doi: 10.1109/IROS.2007.4399201.

Doctoral Thesis

Main Supervisor:

Torroba, I. (2022). [Data-driven Approaches to Uncertainty Modelling for SLAM in the Open Sea](#) (PhD dissertation, KTH Royal Institute of Technology). Retrieved from <https://urn.kb.se/resolve?urn=urn:nbn:se:kth:diva-321605>

Co-Supervisor:

Sprague, C. (2022). [Efficient and Trustworthy Artificial Intelligence for Critical Robotic Systems](#) (PhD dissertation, Kungliga Tekniska högskolan). Retrieved from <https://urn.kb.se/resolve?urn=urn:nbn:se:kth:diva-321151>

Özkahraman, Ö. (2023). [Multi-Agent Mission Planning and Execution for Small Autonomous Underwater Vehicles](#) (PhD dissertation, KTH Royal Institute of Technology). Retrieved from <https://urn.kb.se/resolve?urn=urn:nbn:se:kth:diva-322817>

Master thesis Supervision/Examination:

1. K. A. Kulbay, 'Exploring Simultaneous Localization and Mapping for Multiple Autonomous Underwater Vehicles - Resampling strategies in a Rao-Blackwellized particle filter implementation, Dissertation, 2024.
2. Ivaylo Georgiev, '3D Object Detection Using Sidescan Sonar Images', Dissertation, 2024.
3. Erik Anderberg. 'Stabilizing a Single Strut Hydrofoil using Linear-Quadratic Control and Gain Scheduling An Adaptive Approach to Optimal Control', Dissertation, 2024.
4. Julian Valdez, 'AUV SLAM for Algae Farm Inspection 3D Mosaicing using Sonar-Based SLAM', Dissertation, 2023.

5. Diogo Antunes, 'Robust Non-Linear State Estimation for Underwater Acoustic Localization Expanding on Gaussian Mixture Methods', Dissertation, 2023.
6. Z. Ji, '[Multi-Resolution Inference of Bathymetry From Sidescan Sonar](#)', Dissertation, 2023.
7. G. Woźniak, '[Reinforcement Learning for Hydrobatic AUVs](#)', Dissertation, 2022.
8. M. Schouten, '[AUV SLAM constraint formation using side scan sonar](#)', Dissertation, 2022.
9. W. Xu, '[Pixel correspondences for SLAM using sidescan sonar with canonical representations](#)', Dissertation, 2022.
10. J. Tan, '[Submap Correspondences for Bathymetric SLAM Using Deep Neural Networks](#)', Dissertation, KTH Royal Institute of Technology, Stockholm, 2022.
11. A. Caraffa, '[Monocular Visual Odometry for Autonomous Underwater Navigation : An analysis of learning-based monocular visual odometry approaches in underwater scenarios](#)', Dissertation, 2021.
12. S. Olsson, '[Underwater Rao-Blackwellized Particle Filter SLAM using Stochastic Variational Gaussian Processes maps](#)', Dissertation, 2021.
13. L. Ling, '[Local Feature Correspondence on Side-Scan Sonar Seafloor Images](#)', Dissertation, 2021.
14. H. Chang, '[Canonical Representation of sidescan sonar images for robotics application](#)', Dissertation, 2021.
15. F. Hestell, '[Combining Sidescan Sonar and Multibeam Echo Sounder to Improve Bathymetric Resolution per Ping](#)', Dissertation, 2021.
16. A. Teran Espinoza, '[Acoustic-Inertial Forward-Scan Sonar Simultaneous Localization and Mapping](#)', Dissertation, 2020.
17. Y. Xie, '[Machine Learning for Inferring Depth from Side-scan Sonar Images](#)', Dissertation, 2019.
18. D. Eriksson, '[Underwater Change Detection by Fusing Multiple Sonar Images](#)', Dissertation, 2019.
19. Zitao Zhang, "[Machine Learning for Inferring Sidescan Images from Bathymetry and AUV Pose](#)", Master thesis, July 10, 2019