Publication List

Journal Articles as First-Author

1) **Stephan Naunheim**, Yannick Kuhl, Torsten Solf, David Schug, Volkmar Schulz, and Florian Mueller. "Analysis of a convex time skew calibration for light sharing-based PET detectors." In: Physics in Medicine & Biology (2022). DOI: 10.1088/1361-6560/aca872
2) **Stephan Naunheim**, Yannick Kuhl, David Schug, Volkmar Schulz, and Florian Mueller. "Improving the Timing Resolution of Positron Emission Tomography Detectors Using Boosted Learning-A Residual Physics Approach." In: IEEE Transactions on Neural Networks and Learning Systems (2023), pp. 1-13. DOI: 10.1109/TNNLS.2023.3323131
3) **Stephan Naunheim**, Florian Mueller, Vanessa Nadig, Yannick Kuhl, Johannes Breuer, Nan Zhang, Sanghee Cho, Maciej Kapusta, Robert Mintzer, Martin Judenhofer, and Volkmar Schulz. "Holistic evaluation of a machine learning-based timing calibration for PET detectors under varying data sparsity." In: Physics in Medicine & Biology (2024). DOI: 10.1088/1361-6560/ad63ec
4) **Stephan Naunheim**, Luis Lopes de Paiva, Vanessa Nadig, Yannick Kuhl, Stefan Gundacker, Florian Mueller, and Volkmar Schulz. "Rethinking Timing Residuals: Advancing PET Detectors with Explicit TOF Corrections." Submitted to Frontiers in Physics (2025). Arxiv: 2502.07630

Journal Articles as Co-Author

1) Florian Mueller, **Stephan Naunheim**, Yannick Kuhl, David Schug, Torsten Solf, and Volkmar Schulz. „A semi-monolithic detector providing intrinsic DOI-encoding and sub-200 ps CRT TOF-capabilities for clinical PET applications." In: Medical Physics (2022), DOI: 10.1002/mp.16015
2) Yannick Kuhl, **Stephan Naunheim**, David Schug, Volkmar Schulz, and Florian Mueller. "Angular Irradiation Methods for DOI Calibration of Light-Sharing Detectors -A perspective for PET In-System Calibration." In: IEEE Transactions on Radiation and Plasma Medical Sciences (2023), pp. 1-1. DOI:10.1109/TRPMS. 2023.3272015
3) Yannick Kuhl, Florian Mueller, **Stephan Naunheim**, Matthias Bovelett, Janko Lambertus, David Schug, Bjoern Weissler, Eike Gegenmantel, Pierre Gebhardt, and Volkmar Schulz. "A finely segmented semi-monolithic detector tailored for high-resolution PET." In: Medical Physics (2024), pp. 3421-3436. DOI: 10.1002/mp.16928
4) Yannick Kuhl, Florian Mueller, Julian Thull, **Stephan Naunheim**, David Schug, and Volkmar Schulz. "3D in-system calibration method for PET detectors." In: Medical Physics (2025), pp. 232-245. DOI:10.1002/mp .17475
5) Vanessa Nadig, Stefan Gundacker, Katrin Herweg, **Stephan Naunheim**, David Schug, Bjoern Weissler, and Volkmar Schulz. "ASICs in PET: what we have and what we need." In: EJNMMI Physics 12.1 (2025), p.16. DOI: 10.1186/s40658-025-00717-8

Conference Proceedings as First-Author

1) **Stephan Naunheim**, Torsten Solf, Yannick Kuhl, David Schug, Volkmar Schulz, and Florian Mueller. "Towards 200 ps CRT in DOI-capable Semi-Monolithic PET-Detectors for Clinical Applications." In: 2021 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). 2021
2) **Stephan Naunheim**, Torsten Solf, Yannick Kuhl, David Schug, Volkmar Schulz, and Florian Mueller. "Exploring Timing Resolution Limits of Cost-Effective DOI-capable Semi-Monolithic Detectors for Total-Body PET." In: Total-Body PET Conference. Place: Edinburgh. 2021. DOI: 10.1055/s-0040-1708150
3) **Stephan Naunheim**, Yannick Kuhl, David Schug, Volkmar Schulz, and Florian Müller. "Pushing the CTR of (Semi-)Monolithic PET Detectors below 200 ps using Machine Learning." In: 2022 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). 2022
4) **Stephan Naunheim**, Yannick Kuhl, Bjoern Weissler, David Schug, Harald Radermacher, Florian Mueller, Vanessa Nadig, Laiyin Yin, Karl Krueger, Max Peters, Pierre Gebhardt, Nicolas Groß-Weege, Teresa Nolte, Eike Gegenmantel, Martina Borgo, J van der Berghe, D Gareis, T Celik, Sebastian Aussenhofer, Andre Salomon, Dennis R Schaart, Rene Bakker, Langen K J, Christiane Kuhl, and

Volkmar Schulz. "The HYPMED PET /MRI Insert for Enhanced Diagnosis of Breast Cancer." In: PSMR. 2022

5) **Stephan Naunheim**, Yannick Kuhl, Bjoern Weissler, David Schug, Harald Radermacher, Florian Mueller, Vanessa Nadig, Laiyin Yin, Karl Krueger, Max Peters, Pierre Gebhardt, Nicolas Groß-Weege, Teresa Nolte, Eike Gegenmantel, Martina Borgo, J van der Berghe, D Gareis, T Celik, Sebastian Aussenhofer, Andre Salomon, Dennis R Schaart, Rene Bakker, Langen K J, Christiane Kuhl, and Volkmar Schulz. "Enhanced Diagnosis of Breast Cancer With The HYPMED PET /MRI Insert." In: 2022 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). 2022
6) **Stephan Naunheim**, Florian Mueller, Yannick Kuhl, Luis Lopes de Paiva, David Schug, and Volkmar Schulz. "First steps towards in-system applicability of a novel PET timing calibration method reaching sub-200 ps CTR." In: 2023 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). 2023. DOI:10.1109/NSSMICRTSD49126.2023.10338073
7) **S. Naunheim**, F. Mueller, V. Nadig, Y. Kuhl, J. Breuer, N. Zhang, S. Cho, M. Kapusta, R. Mintzer, S. Gundacker, D. Schug, B. Weissler, M. Judenhofer, and V. Schulz. "Using Residual Physics to reach near-200 ps CTR with TOFPET2 ASIC Readout and Clinical Detector Blocks." In: 2024 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). 2024, DOI:10.1109/NSS/MIC/RTSD57108.2024.10655453

Conference Proceedings as Last-Author

1) K. Lavronenko, L. Lopes de Paiva, F. Mueller, V. Schulz, and **S. Naunheim**. "Towards artificial data generation for accelerated PET detector ML-based timing calibration using GANs." In: 2024 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). DOI: 10.1109/NSS/MIC/RTSD57108.2024.10657766
2) T. Masbaum, L. Lopes de Paiva, F. Mueller, V. Schulz, and **S. Naunheim**. "First Steps towards a Foundation Model for Positioning in Positron Emission Tomography Detectors." In: 2024 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). DOI: 10.1109/NSS/MIC/RTSD57108.2024.10655512

Conference Proceedings as Co-Author

1) Florian Mueller, **Stephan Naunheim**, David Schug, Torsten Solf, and Volkmar Schulz. "Optimization of a Semi-Monolithic Detector with high Spatial Resolution providing intrinsic DOI encoding and TOF-Capabilities." In: 2020 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). 2020
2) Yannick Kuhl, **Stephan Naunheim**, Adalbert Mazur, Melissa Martin, Ronja Hetzel, David Schug, Volkmar Schulz, and Florian Mueller. "Design and Experimental Characterization of a Multi Fan Beam Collimator for Fast Cal-ibration of (Semi-)Monolithic Scintillators." In: 2021 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). 2021
3) Yannick Kuhl, **Stephan Naunheim**, Adalbert Mazur, Melissa Martin, Ronja Hetzel, David Schug, Volkmar Schulz, and Florian Mueller. "Fast Calibration of (Semi-)Monolithic Detectors based on a Multi-Fan-Beam Collimator." In: Total-Body PET Conference. Place: Edinburgh. 2021. DOI:10.1186/s40658-018-0218-7.F.
4) Yannick Kuhl, **Stephan Naunheim**, David Schug, Volkmar Schulz, and Florian Mueller. "Angular DOI Calibration Methods towards PET In-System Calibration of (Semi-)Monolithic Scintillators." In: 2022 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). 2022
5) B. Weissler, D. Schug, E. Gegenmantel, F. Mueller, **S. Naunheim**, Y. Kuhl, Radermacher, K. Krueger, E. Yin-Grossmann, V. Nadig, K. Herweg, S. Gundacker, and V. Schulz. "Dedicated PET /MRI Research Systems based on the Hyperion III Detector Platform." In: Nuklearmedizin - NuclearMedicine. Vol. 62. Georg Thieme Verlag, Apr. 2023, DOI: 10.1055/s-0043-1766386
6) F. Mueller, **S. Naunheim**, Y. Kuhl, H. Radermacher, E. Gegenmantel, D. Schug, B.Weissler, and V. Schulz. "HD-MetaPET: Development of a long axial field-of-view (LAFOV) PET /MRI system with dedicated local PET detectors for spatial resolution enhancement." In: Nuklearmedizin - NuclearMedicine. Vol. 62. Georg Thieme Verlag, Apr. 2023, P108. DOI: 10.1055/s-0043-1766384

7) Matthias Bovelett, Yannick Kuhl, **Stephan Naunheim**, David Schug, Volk-mar Schulz, and Florian Mueller. "Implementation and Evaluation of a 3D-dependent Energy-calibration algorithm." In: 2023 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semi-conductor Detector Conference (RTSD). 2023. DOI:10.1109/NSSMICRTSD49126.2023.10338045
8) Vanessa Nadig, Florian Mueller, Johannes Breuer, Stefan Gundacker, David Schug, Robert Mintzer, Bjoern Weissler, **Stephan Naunheim**, Yannick Kuhl, Sanghee Cho, Martin Judenhofer, and Volkmar Schulz. "Characterization of a state-of-the-art clinical detector block with TOFPET2 ASIC readout." In: 2023 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). 2023. DOI:10.1109/NSSMICRTSD49126.2023.10338758
9) Florian Mueller, Andrea Gonzalez-Montoro, Marta Freire, **Stephan Naunheim**, Volkmar Schulz, and Antonio J. Gonzalez. "Performance Comparison of two Machine Learning Methods for Positioning in Analog and Digitally Read-out Slab-detectors." In: 2023 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). 2023. DOI: 10.1109/NSSMICRTSD49126.2023.10337970
10) Florian Mueller, Yannick Kuhl, **Stephan Naunheim,** Matthias Bovelett, Thuy-My Mai, David Schug, and Volkmar Schulz. "Advances in Calibration and Data-Processing for a clinical semi-monolithic DOI-capable PET Detector reaching sub-200 ps Timing Resolution." In: 2023 IEEE Nuclear Science Sympo-sium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semi-conductor Detector Conference (RTSD). Place: Boston. 2023. DOI: 10.1109/NSSMICRTSD49126.2023.10338079
11) Yannick Kuhl, Florian Mueller, **Stephan Naunheim**, Matthias Bovelett, Janko Lambertus, David Schug, Bjoern Weissler, Eike Gegenmantel, Pierre Gebhardt, and Volkmar Schulz. "A High-Resolution Semi-Monolithic Slab Detector tailored for Pre-Clinical PET." In: 2023 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). 2023. DOI:10.1109/NSSMICRTSD49126.2023.10338576
12) B. Weissler, D. Schug, E. Gegenmantel, F. Mueller, Y. Kuhl, **S. Naunheim**, H. Radermacher, and V. Schulz. "Dedicated PET /MRI Research Systems based on the Hyperion III Detector Platform." In: 2023 IEEE Nuclear Science Symposium, Medical Imaging Conference and International Symposium an Room-Temperature Semiconductor Detectors (NSS MIC RTSD). 2023, DOI:10.1109/NSSMICRTSD49126.2023.10338099
13) Y. Kuhl, F. Mueller, J. Thull, **S. Naunheim**, D. Schug, and V. Schulz. "3D In-System Calibration of Advanced PET Detector Topologies." In: 2024 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). 2024, DOI: 10.1109/NSS/MIC/RTSD57108.2024.10657107
14) D. Schug, V. Nadig, B. Weissler, Y. Kuhl, H. Radermacher, **S. Naunheim**, F. Mueller, S. Gundacker, O. Muelhens, E. Gegenmantel, and V. Schulz. "Upgrade for the Hyperion Detector Platform: Calibration Methods for the TOP-PET ASIC." In: 2024 IEEE Nuclear Science Symposium (NSS), Medical Imag-ing Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). 2024, DOI: 10.1109/NSS/MIC/RTSD57108.2024.10654971
15) B. Weissler, D. Schug, Y. Kuhl, H. Radermacher, O. Muelhens, F. Mueller, T. Solf, E. Gegenmantel, V. Nadig, **S. Naunheim**, and V. Schulz. "Upgrade for the Hyperion Detector Platform: Analog SiPM and TOFPET ASIC Integration." In: 2024 IEEE Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC) and Room Temperature Semiconductor Detector Conference (RTSD). 2024. DOI:10.1109/N55/MIC/RTSD57108.2024.10656412