MARTIN SJOGARD, MSc, PhD

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Clinical data scientist & Cognitive neuroscientist | Biomarker development and deployment

PROFILE

Clinical data scientist with 10+ years of experience applying computational modeling, signal processing, and machine learning to real-world clinical and biosignal data. Extensive hands-on work with EEG (scalp and intracranial), MEG, MRI, actigraphy, ECG, PPG, EOG, and a wide range of wearable devices across diverse patient populations including epilepsy, multiple sclerosis, schizophrenia, and autism. Proven track record in end-to-end pipeline development, from data acquisition and cleaning to predictive modeling and biomarker discovery. Skilled in translating scientific insights into scalable tools that support digital health, clinical trials, and translational R&D. Experienced collaborator across clinical, data science, and product teams in both academic and cross-institutional settings.

SKILLS

- **Programming and Tools :** Python, R, MATLAB, SQL, Julia, Git, Bash, pyTorch, scikit-learn
- **Machine Learning and Data Science:** Deep learning,time-series analysis, un-/supervised learning, agentic AI
- **Biomedical Signals and Modalities:** EEG, MEG, MRI, ECG, PPG,EOG, actigraphy, OPM, wearable headbands
- **Clinical and Translational Focus:** Biomarker discovery, physiological monitoring, real-world data, cognitive assessment, psychiatric and neurological disorders
- **Research and Collaboration:** Cross-functional team leadership, technical mentorship, regulatory documentation, data visualization, scientific writing

EXPERIENCE

- **Harvard Medical School, Massachusetts General Hospital [🌐]** *Jan 2021 - Present*
  Postdoctoral Research Fellow, Sleep, Cognition and Neuroscience (SCAN) lab Boston MA, USA
  - Led end-to-end data science efforts on clinical and interventional studies, integrating clinical outcome assessments with multimodal biosignal data (wearables, EEG, MEG, MRI) to support biomarker discovery
  - Designed and deployed deep learning models to predict neurophysiological patterns from non-invasive EEG, enabling early detection of brain function changes
  - Built and maintained scalable machine learning pipelines for graph-based connectomics inference on high-dimensional neuroimaging data, resulting in novel connectivity-based digital biomarkers
  - Developed novel semi-automated signal processing tools with user interface for quality control and artifact removal in wearable EEG headband, enhancing robustness of real-world data
  - Directed multi-year, cross-functional collaborations spanning clinical, engineering, and data science teams across institutions
  - Supervised and mentored junior researchers, data analysts, and clinical research coordinators

EDUCATION

- **Université Libre de Bruxelles** *Dec 2016 - Oct 2020*
  PhD - Biomedical and Pharmaceutical sciences Brussels, Belgium
- **Norwegian University of Science and Technology** *Aug 2014 - Oct 2016*
  MSc - Neuroscience Trondheim, Norway
- **Norwegian University of Science and Technology** *Aug 2010 - June 2013*
  BSc - Human Movement Science Trondheim, Norway

PROJECTS

- **Improving Signal Quality in Wearable EEG Devices** *2023 - 2025*
  Tools: MATLAB, Python | Wearable EEG headband (4 channels)
  - Developed and validated cardiac artifact detection and cleaning algorithms for consumer-grade EEG headbands
  - Improved wearable EEG data reliability, enabling downstream analytics and biomarker extraction in real-world and at-home remote monitoring settings
- **Biomarker Discovery in Sleep and Neurodevelopmental Disorders** *2022 - 2025*
  Tools: MATLAB, Python, R | MEG, EEG, MRI
  - Developed novel detection algorithms for sleep spindles using multimodal MEG/EEG data, enhancing spatial accuracy of signal localization
  - Applied biomarker pipeline to assess memory function in schizophrenia and autism, supporting early-stage cognitive biomarker research

- **Hippocampal Ripples and Offline Learning Dynamics** *2023-2025*
  Tools: R, MATLAB | Intracranial EEG, Scalp EEG
  - Created preprocessing pipelines for intracranial EEG data in epilepsy patients, optimizing detection of memory-related ripple activity
  - Improved ripple classification algorithm, boosting predictive accuracy for learning outcomes
  - Led multi-site clinical collaboration from study design through publication
- **Estimating Subcortical Brain Activity from Scalp EEG** *2024-Present*
  Tools: Python, R, MATLAB | Intracranial EEG, Scalp EEG
  - Designed the first pipeline to estimate and classify cortico-subcortical coupling using non-invasive EEG
  - Benchmarked model predictions against intracranial ground truth, enabling development of non-invasive neural biomarkers tied to behavior
- **Predicting Cognitive Decline in Multiple Sclerosis via Functional Connectivity** *2016-2020*
  Tools: R, MATLAB | MEG, MRI
  - Analyzed resting-state MEG data to identify brain network disruptions associated with cognitive deficits in MS
  - Conducted validation of standard neuroimaging algorithms, revealing limitations and proposing improved models
  - Built and analyzed a multi-site clinical dataset including detailed cognitive and functional assessments

PUBLICATIONS (SELECTED)

FULL LIST AVAILABLE HERE

[J.1] **Sjøgård M**, et al. (2025). *Hippocampal ripples predict motor learning during brief rest breaks in humans*. *Nature Communications*, 16: 6089. **Demonstrated intracranial biomarkers of offline learning relevant to neuromodulation and cognitive enhancement**

[J.2] **Sjøgård M**, et al. (2025). *Increased sleep spindles in regions engaged during motor learning predict memory consolidation*. *Journal of Neuroscience*, Accepted, in press. **Identified sleep-based biomarkers with potential for application in neurodegenerative and neurodevelopmental disorders**

[J.3] **Sjøgård M**, et al. (2022). *A Novel Approach to Estimating the Cortical Sources of Sleep Spindles Using Simultaneous EEG/MEG*. *Frontiers in Neurology*, 13: 871166. **Developed algorithmic enhancements for signal localization in combined EEG/MEG which improved biomarker spatial fidelity**

[J.6] **Sjøgård M**, et al. (2021). *Brain dysconnectivity relates to disability and cognitive impairment in multiple sclerosis*. *Human Brain Mapping*, 42(3): 626-643. **Mapped functional connectomics in MS to clinical and cognitive phenotypes using MEG**

[J.13] **Sjøgård M**, et al. (2019). *Do the posterior midline cortices belong to the electrophysiological default-mode network?* *Neuroimage*, 200:221-230. **Provided novel electrophysiological evidence revising conventional models of default-mode network architecture**