MARTIN SJØGÅRD (SJOEGAARD), MSc, PhD

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Clinical data scientist & Cognitive neuroscientist | Biomarker development and deployment

PROFILE

Neuroscientist and clinical data scientist focusing on the relationship between memory and sleep oscillations. Expertise in real-world and clinical MEG, EEG, MRI and wearables datasets, focused on biomarker development for psychiatric disorders. Expertise in statistical and computational analysis of cognitive and health-related data and electrophysiological neuroimagings. I develop validated, reproducible end-to-end analysis pipelines and apply advanced methods (e.g., multivariate modeling of functional connectivity, signal processing, and machine learning) to support translational research and biomarker discovery. I have led and contributed to projects that involved data analysis and reporting in real-world and clinical study contexts, collaborating between academic and clinical teams of different institutions, leading to publications in high-impact journals.

EXPERIENCE

- **Harvard Medical School, Massachusetts General Hospital [🌐]** *Jan 2021 - Present*
  Postdoctoral Research Fellow, Sleep, Cognition and Neuroscience (SCAN) lab Boston MA, USA
  - Developed, validated and applied deep learning classifiers for predicting deep subcortical oscillatory coupling based on scalp EEG alone
  - Developed in-house end-to-end analysis pipeline for thresholded graph inference on combined MEG & EEG brain data to create novel biomarkers for cognitive impairments in psychiatric disease
  - Uncovered relationship between brain oscillations and memory using electrophysiological neuroimaging techniques (intracranial EEG, EEG, MEG) in healthy participants and multiple patient groups
  - Developed a novel method for detecting cortical sleep spindles based on combined MEG/EEG and applied this to healthy cohort and schizophrenia patients
  - Developed semi-automated pipeline for detection and subtraction of cardiac artifacts in wearable EEG headband
  - Led multi-year projects and meetings involving collaborators from multiple hospitals and various clinical and research backgrounds, leading to several major publications

EDUCATION

- **Université Libre de Bruxelles** *Dec 2016 - Oct 2020*
  PhD - Biomedical and Pharmaceutical sciences Brussels, Belgium
  - Thesis: Investigations of static and dynamic neuromagnetic resting state functional connectivity in healthy subjects and brain disorders
- **Norwegian University of Science and Technology** *Aug 2014 - Oct 2016*
  MSc - Neuroscience Trondheim, Norway
  - Thesis: Environmental representations in patterns of activity along the anterior-posterior axis of the medial temporal lobe
- **Norwegian University of Science and Technology** *Aug 2010 - June 2013*
  BSc - Human Movement Science Trondheim, Norway

PROJECTS

- **Cortical memory encoding, focal sleep spindles, and sleep-dependent memory consolidation** *2022 - 2025*
  Tools: MATLAB, Python, R, MEG, EEG, MRI FieldTrip, SPM
  - Developed algorithm for sleep spindle detection in combined MEG/EEG data to increase spatial fidelity
  - Implemented algorithm to show that cortical distribution of spindles predicts learning and consolidation separately
  - Extended pipeline to schizophrenia patients, showing for the first time how regionally specific spindle deficits create cognitive deficits
- **Hippocampal ripples and wake offline learning in humans** *2023-2025*
  Tools: R, MATLAB, iEEG, EEG
  - Created and implemented novel data cleaning pipeline for implanted intracranial hippocampal electrodes in epilepsy patients
  - Refined existing ripple detection pipeline, leading to increased prediction accuracy of learning
  - Led multi-hospital collaboration from start to publication
- **Classifying subcortical oscillations using scalp EEG** *2024-Present*
  Tools: Python, R, MATLAB, iEEG, EEG

- Led efforts to create a first-ever pipeline for reliable estimation and classification of coupling among canonical cortical and subcortical oscillations using only scalp EEG
- Created benchmarks based on ground truth intracranial EEG and evaluated validity and performance of multiple methods for prediction and classification of scalp oscillations and behavioral correlates

- **Predicting cognitive deficits in multiple sclerosis using MEG resting-state functional connectivity** *2016-2020*
  Tools: R, MATLAB, MEG, MRI
  - Demonstrated falsehoods in industry-standard algorithms for cortical network characterization using combination of analytic and neural network simulation approaches
  - Collected large data set of multiple sclerosis and controls across multiple cognitive and clinical indices
  - Demonstrated previously unknown network disruptions in multiple sclerosis and their correlations with heterogeneous cognitive and clinical deficits.

PUBLICATIONS

J=PUBLISHED JOURNAL PAPER, A = ACCEPTED, IN PRESS, P=PREPRINT, S=IN SUBMISSION, T=THESIS

[J.1] **Sjøgård M**, et al. (2025). **Hippocampal ripples predict motor learning during brief rest breaks in humans**. *Nature Communications*, 16: 6089.

[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.

[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.

[J.4] Costers L, ..., **Sjøgård M**, ... (2021). **The role of hippocampal theta oscillations in working memory impairment in multiple sclerosis. Human Brain Mapping 42(5): 1376-1390**. *Frontiers in Neurology*, 13: 871166.

[J.5] Elands S, ..., **Sjøgård M**, ... (2021). **Early Venous Filling Following Thrombectomy: Association With Hemorrhagic Transformation and Functional Outcome**. *Frontiers in Neurology*, 12: 649079.

[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.

[J.7] Van Schependom J, ..., **Sjøgård M**, ... (2021). **Increased brain atrophy and lesion load is associated with stronger lower alpha MEG power in multiple sclerosis patients**. *NeuroImage: Clinical*, 30: 102632.

[J.8] Costers L, ..., **Sjøgård M**, ... (2020). **Spatiotemporal and spectral dynamics of multi-item working memory as revealed by the n-back task using MEG**. *Human Brain Mapping*, 41(9): 2431-2446.

[J.9] Naeije G, ..., **Sjøgård M**, ... (2020). **Cerebellar cognitive disorder parallels cerebellar motor symptoms in Friedreich ataxia**. *Annuals of Clinical and Translational Neurology*, 7(6):1050-1054.

[J.10] Lamartine MM, ..., **Sjøgård M**, ... (2020). **Electrophysiological evidence of spino-cortical proprioceptive tracts dysfunction in hereditary spastic paraplegia with thin corpus callosum**. *Clinical Neurophysiology*, 131(6): 1171.

[J.11] Naeije G, ..., **Sjøgård M**, ... (2020). **Age of onset determines intrinsic functional brain architecture in Friedreich ataxia**. *Annuals of Clinical and Translational Neurology*, 7 (1): 94-104.

[J.12] Van Schependom J, ..., **Sjøgård M**, ... (2019). **Altered transient brain dynamics in multiple sclerosis: Treatment or pathology?** *Human Brain Mapping*, 40(16): 4789-4800.

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

[P.1] **Sjøgård M**, et al. (2022). **Intrinsic/extrinsic duality of large-scale neural functional integration in the human brain**. *bioRxiv*.

[P.2] Bruffaerts R, ..., **Sjøgård M**, ... (2025) **Functional identification of language-responsive channels in individual participants in MEG investigations**. *bioRxiv*.

[S.1] **Sjøgård M**, et al. (2025). Failure to increase regionally specific spindles after memory encoding predicts sleep-dependent consolidation deficits in schizophrenia. *Manuscript submitted for publication*.

SKILLS

- **Programming Languages:** MATLAB, R (Highly proficient), Python, Julia (proficient), Git, Bash/Linux, SQL 5
- **Data Science & Machine Learning:** pyTorch, scikit-learn
- **DevOps & Version Control:** git, bash
- **Specialized Area:** Neuroimaging, statistical/machine learning, cognitive neuroscience
- **Research Skills:** Grant writing, project leadership, junior scientist mentoring, writing/revising/publishing papers

Leadership Experience

- **Project leader: multi-site project on classification of intracranial oscillations** *Jan 2023 - Present*
  Massachusetts General Hospital, Beth Israel Deaconess Medical Center, Martinos Center for Medical Imaging
  - Led project from data ingestion through publication
  - Head analyst, writer and meeting leader
  - Coordinated and led collaborators from multiple different scientific backgrounds and expertise fields
- **Mentoring multiple 2-year research coordinators** *Jan 2021 - May 2024*
  Massachusetts General Hospital/Harvard Medical School
  - Taught statistics and programming to junior group members
  - Supervised 1/2-year projects from start to completion
  - Led to 4 mentees presenting final posters at MGH and Harvard conferences

Additional Information

Languages: Norwegian (Native fluency), English (Fluent), French (Beginner), Vietnamese (Beginner)