

Curriculum Vitae – Anders Stevnhoved Olsen

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Current appointments

2025 – Postdoc, Neurobiology research unit, Copenhagen University Hospital. Mentor: Prof. Gitte M Knudsen

Previous appointments (research related)

- 2021 – 2025 PhD student, Section for Cognitive Systems, DTU Compute, Technical University of Denmark.
Project title: *Uncovering Brain Dynamics using Directional Statistics and Functional Neuroimaging Data*.
Supervisors: Prof. Morten Mørup, assoc. prof. Kristoffer H Madsen, assoc. prof. Patrick M Fisher.
- 2024 Research assistant (3 months), Section for Cognitive Systems, DTU Compute. Supervisor: Bjørn S Jensen.
- 2023 Visiting PhD student, Medical Image Processing lab, Ecole Polytechnique Fédérale de Lausanne, Geneva.
- 2021 Research assistant, Neurobiology Research Unit, Copenhagen University Hospital.
- 2019 – 2021 Pre-graduate research assistant, Neurobiology Research Unit, Copenhagen University Hospital (part-time).

Scientific focus area

I research unsupervised machine learning models for uncovering brain dynamics. My methods are primarily applied to functional neuroimaging data including fMRI, EEG/MEG, and PET/SPECT. During my PhD studies I focused on methods for dynamic functional connectivity in the healthy brain at rest in fMRI data and for uncovering microstates in EEG/MEG ERP/resting-state data. Visiting the lab of Prof. Dimitri Van De Ville in Geneva also sparked my interest in brain structure-function modeling using tractography and fMRI.

Keywords

⊛K-means/mixtures/Hidden Markov models for uni/multi/matrix-variate clustering. ⊛Matrix and tensor factorizations: (sparse) PCA, ICA, NMF, Archetypal analysis, Tucker, CP. ⊛Riemannian statistical distributions: Watson, Angular central Gaussian, (singular) Wishart etc. ⊛Geometry-aware statistical modeling on the (hyper-) sphere, Grassmann, torus, SPD manifold. ⊛Graph analyses and graph signal processing. ⊛Multisubject/multimodal data fusion. ⊛Statistical methods: Mixed effects models, survival analysis. ⊛Stochastic block models. ⊛Low-rank model reparametrization. ⊛Time-shift and -stretch-invariant modeling. ⊛Data preprocessing: fmriprep, aslprep, mriqc, tedana, SPM, FSL, MNE, eeglab, connectome workbench.

Education

- 2021 – 2025 PhD in Machine Learning, Technical University of Denmark
- 2015 – 2020 BSc & MSc in Biomedical Engineering, Technical University of Denmark & University of Copenhagen
- 2019 Exchange student (MSc) at Ecole Polytechnique Fédérale de Lausanne, Switzerland

Supervision, teaching, funding, and peer reviews

⊛Supervised 3 MSc theses, 4 BSc theses (5 separate students), 10 semester project groups (~30 separate students). ⊛TA'ed introductory data science methods (3 semesters) and introductory machine learning (3 semesters). ⊛Recipient of the highly competitive 3-year DTU Compute PhD scholarship. ⊛Peer-reviewed for NeuroImage, Network Neuroscience, Frontiers in Psychiatry, Communications Biology, Nature Mental Health, Annals of NY academy of science.

Programming experience

Python: primary language since 2022. Packages: PyTorch, SciPy, NumPy, MNE, Nilearn, Nibabel, Nitime, Pandas, Seaborn.
MATLAB: since 2015.
R (for statistics only): since 2021.

Conference attendance

OHBM 2021 (online), 2022 (Glasgow), and 2024 (Seoul), ICPR 2022 (Haarlem), DDS 2022 (Billund), ICASSP 2023 (Rhodes), Resting state 2023 (Dallas), EUSIPCO 2024 (Lyon), ISBI 2025 (Houston), ICASSP 2026 (Barcelona), OHBM 2026 (Bordeaux).

Volunteering

2018 Medical technician and hygiene educator in Nepal, Engineering World Health

2017 – 2018 Fundraising coordinator, Engineering World Health Denmark

Previous appointments (not research related, all part-time during BSc/MSc studies)

2017 – 2019 Data analysis assistant, CIMT, Capital region of Denmark

2017 – 2018 Instructor in the course Cell- and Tissue Biology, Faculty of Health at University of Copenhagen

2017 Student assistant, Center for Hyperpolarization in Magnetic Resonance, Technical University of Denmark

2017 IT specialist, Diagnostic center, Rigshospitalet

List of publications (†first author). H-index: 5. Abstracts not included.

1. **AS Olsen**†, K Larsen, DE McCulloch, M Ganz, MK Madsen, B Ozenne, GM Knudsen, Nur Rehman, PM Fisher (2026): Psilocybin acutely reduces low-frequency BOLD power and frequency-specific connectivity (bioRxiv, submitted)
2. **AS Olsen**†, A Brammer, PM Fisher, M Mørup (2026): *Uncovering dynamic human brain phase coherence networks* (bioRxiv, under review at PNAS).
3. K Larsen†, DE McCulloch, **AS Olsen**, F Müller, ME Liechti, S Borgwadt, F Holze, L Ley, P Vizeli, A Klaiiber, AM Becker, B Ozenne, M Avram, PM Fisher (2026): *Psychedelics distinctly alter brain entropy and complexity compared to psychostimulants* (medRxiv).
4. **AS Olsen**†, ML Navarro, C Svarer, JL Hinrich, M Mørup, GM Knudsen (2025): *Shift- and stretch-invariant non-negative matrix factorization with an application to brain tissue delineation in emission tomography data* (arXiv, accepted at ICASSP).
5. SMU Larsen†, SC Holst†, **AS Olsen**, B Ozenne, DB Zilstorff, K Brendstrup-Brix, P Weikop, S Pleinert, V Kiviniemi, PJ Jennum, M Nedergaard, GM Knudsen (2025): *Sleep deprivation promotes cerebral vasomotion while respiration- and cardiac-driven brain pulsations escalate with sleep intensity*. PLoS Biology.
6. A Milloz†, J Vogel, **AS Olsen**, JC Pang, O Strandberg, TE Anijärv, S Palmqvist, N Sportono, R Ossenkoppele, D Van De Ville, O Hansson, H Behjat (2025): *Multiscale Quantification of hemispheric asymmetry in Cortical Maps using Geometric Eigenmodes* (ISBI).
7. **AS Olsen**†, S Mansour L, JC Pang, A Zalesky, D Van De Ville, H Behjat (2025): *On reconstruction of cortical functional maps using subject-specific geometric and connectome eigenmodes* (ISBI).
8. **AS Olsen**†, Nielsen JD, Mørup M (2024): *Coupled generator decomposition for fusion of electro- and magnetoencephalography data*. EUSIPCO.
9. NB Iskov†, **AS Olsen**, KH Madsen, M Mørup (2024): *Discovering Prominent Differences in Structural and Functional Connectomes Using a Multinomial Stochastic Block Model*. Network Neuroscience.
10. DE McCulloch†, **AS Olsen**†, B Ozenne, DS Stenbæk, S Armand, MK Madsen, GM Knudsen, PM Fisher (2023): *Navigating the chaos of psychedelic neuroimaging: A multi-metric evaluation of acute psilocybin effects on brain entropy*. medRxiv (accepted at Nature Communications).
11. **AS Olsen**†, E Ortvald, KH Madsen, MN Schmidt, M Mørup (2023): *Angular central Gaussian and Watson mixture models for assessing dynamic functional brain connectivity during a motor task*. ICASSP.
12. **AS Olsen**†, A Lykkebo-Valløe, B Ozenne, MK Madsen, DS Stenbæk, S Armand, M Mørup, GM Knudsen, PM Fisher (2022): *Psilocybin modulation of dynamic functional connectivity is associated with plasma psilocin and subjective effects*. Neuroimage.
13. **AS Olsen**†, RMT Høegh†, JL Hinrich, KH Madsen, M Mørup (2022): *Combining electro-and magnetoencephalography data using directional archetypal analysis*. Frontiers in Neuroscience.
14. KHR Jensen†, DE McCulloch†, **AS Olsen**†, SEP Bruzzone, SV Larsen, PM Fisher, VG Frøkjær (2022): *Effects of an Oral Contraceptive on Dynamic Brain States and Network Modularity in a Serial Single-Subject Study*. Frontiers in Neuroscience.

References

Morten Mørup, Professor, DTU Compute

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Claus Svarer, Senior Researcher, Neurobiology Research Unit

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