# Martin Norgaard

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## Education and training

2010-2013: BSc in Biomedical Engineering, Technical University of Denmark, Copenhagen, Denmark
2013-2015: MSc in Biomedical Engineering, Technical University of Denmark, Copenhagen, Denmark
2015-2015: Visiting MSc student, University of Toronto, Toronto, Canada (4 months)
2016-2019: PhD in Neuroscience, University of Copenhagen, Copenhagen, Denmark
2017-2017: Visiting PhD student, Martinos Center, Harvard Medical School & MIT, Boston, USA (5 months)
2019-2020: Postdoctoral Fellow, Neurobiology Research Unit, Rigshospitalet, Copenhagen, Denmark
2020-2022: Postdoctoral Fellow, 1) Stanford Data Science, Center for Open and Reproducible Science, 2) Center for Reproducible Neuroscience, 3) Department of Psychology, Stanford University, Stanford, CA, USA

## Employment and professional affiliations

2023-present: Assistant Professor in Computer Science, University of Copenhagen, Copenhagen, Denmark
2023-present: Assistant Professor, Pioneer Centre for Artificial Intelligence, Copenhagen, Denmark
2023-present: Senior Consultant to the OpenNeuroPET Data Sharing Initiative (molecular imaging branch and the data science/sharing team), National Institute of Mental Health (NIMH), Bethesda, USA

## Honors and Awards

2020-2023: Independent Research Fund Denmark (DFF), International Postdoc Fellowship, Stanford University
Title: Reliable Prediction of Brain Dynamics in Depression using Big Neuroimaging Datasets
Amount: 211,000 USD (Mentor: Prof. Russell A Poldrack)

2019: Carlsberg Foundation, International Postdoc Fellowship (declined in favor of DFF), Stanford University
Title: Reliable Prediction of Brain Dynamics in Depression using Big Neuroimaging Datasets
Amount: 100,000 USD (Mentor: Prof. Russell A Poldrack)

2019: Lundbeckfonden travel stipend – attending the 22$^{nd}$ international conference on Medical Image Computing and Computer Assisted Interventions (MICCAI) in Shenzhen, China
Amount: 2,800 USD

2018: Lundbeckfonden travel stipend – attending the 8$^{th}$ International Workshop on Pattern Recognition In NeuroImaing (PRNI) in Singapore, Singapore
Amount: 1,250 USD

2017: Young Researcher of the Year at Rigshospitalet (3$^{rd}$ place), Copenhagen University Hospital, Denmark
Title: Brain Networks involved in Seasonal Affective Disorder: A Neuroimaging PET Study of the Serotonin Transporter
Amount: 1,000 USD

2017: Lundbeckfonden travel stipend – Visiting PhD student at the MGH/Harvard/MIT Martinos Center for Biomedical Imaging, Harvard Medical School, Massachusetts, USA
Amount: 10,000 USD (Mentor: Prof. Douglas N Greve)

2017: University of Copenhagen travel stipend 2017 - Visiting PhD student at the MGH/Harvard/MIT Martinos Center for Biomedical Imaging, Harvard Medical School, Massachusetts, USA
Amount: 5,500 USD (Mentor: Prof. Douglas N Greve)

2017: Rigshospitalets Jubilæumsfond travel stipend – attending the annual Organization for Human Brain Mapping (OHBM) meeting in Vancouver, Canada
Amount: 600 USD

## Invited Presentations

2023: NeuroPharm Closing Symposium, Copenhagen, Denmark: Bioinformatics, Statistical and Predictive Models: *"Reviving Historical Neuroimaging Data for Biomarker Discovery Through Data Sharing and International*

*Collaborations"*

2022: Stanford University, Department of Psychology, FriSem: *"Reviving Historical Neuroimaging Data to Understand the Role of Serotonin in Depression"*

2022: Molecular Imaging Branch at the National Institute of Mental Health (NIMH): *"Reproducible PET Analysis Pipelines: Current Status and Moving Forward"*

2021: BrainHack Nordic Copenhagen: *"The Brain Imaging Data Structure for PET Derivatives"*

2020: Open Science Room 2020 (Open Data 2.0): "*Introduction to BIDS for PET data"*

2020: Organization for Human Brain Mapping (OHBM) Annual Meeting: *"A High-Resolution In Vivo Atlas of the Human Brain's $GABA_A$ Receptor System"*

*2019:* NeuroPharm Annual Meeting, Copenhagen Denmark: Bioinformatics, statistical and predictive models: "*Non-parametric Framework for Statistical Significance Testing in Predictive Modeling: Extension to Brain Imaging and Multiple Preprocessing Strategies*"

2018: NeuroPharm Annual Meeting, Copenhagen Denmark: Bioinformatics, statistical and predictive models: "*Preprocessing Pipelines and their Impact on Univariate and Multivariate Analyses of PET data*"

2018: The 8th International Workshop on Pattern Recognition in Neuroimaging (PRNI), National University of Singapore, Singapore: *"The Impact of Preprocessing Pipeline Choice in Univariate and Multivariate Analyses of PET Data"*

2017: MGH/Harvard/MIT Martinos Center for Biomedical Imaging, Laboratory for Computational Neuroimaging, Boston MA: "*Optimizing Surface-based Preprocessing Pipelines in PET-MRI Neuroimaging*"

2017: NeuroPharm Annual Meeting, Copenhagen Denmark: Bioinformatics, statistical and predictive models: "*Optimizing Preprocessing Pipelines in PET-MRI Neuroimaging*"

2017: IDA Sundhedsteknologi event (forskningens døgn) - IDA Copenhagen Denmark: "*Analysis of Multi-Modal Neuroimaging in the Age of Big Data*"

2016: FreeSurfer Course, Copenhagen Denmark: "*Multivariate Analysis of in vivo PET data using Partial Least Squares*"

2016: NeuroPharm Annual Meeting, Copenhagen Denmark: Bioinformatics, statistical and predictive models: "*5-HTT Brain Network Response to Seasonal Affective Disorder in Females with The Short 5-HTTLPR Genotype*"

2015: MICCAI Workshop on Computational Methods for Molecular Imaging, Münich Germany: *"Estimation of Regional Seasonal Variations in SERT-levels using the FreeSurfer PET pipeline: a reproducibility study"*

# Reviewing duties

Journal of Cerebral Blood Flow and Metabolism, Frontiers in Neuroscience: Brain Imaging Methods, Brain and Behaviour, Neuroimage, Human Brain Mapping, Translational Psychiatry

# Services

2022-2026: Certified examiner/censor in Computer Science at Danish universities (https://services2.brics.dk/censor/censor-721)

2022: Organization for Human Brain Mapping (reviewer), ICML workshop on Interpretable Machine Learning in Healthcare (program committee), International workshop on Medical Optical Imaging and Virtual Microscopy Image Analysis (program committee), Medical Imaging meets NeurIPS (program committee)

2021: ICML workshop on Interpretable Machine Learning in Healthcare (program committee), Organization for Human Brain Mapping (reviewer)

2020: Medical Imaging meets NeurIPS (program committee), Organization for Human Brain Mapping (reviewer)

2018-2022: Brain Imaging Data Structure (BIDS) extension proposal co-lead for Positron Emission Tomography

# Professional societies

2020-now: Organization for Human Brain Mapping

2019: Medical Image Computing and Computer Assisted Interventions (MICCAI)

# Research funding

1RF1MH121867-01A1: NIPreps: integrating neuroimaging preprocessing workflows across modalities, populations, and species (2021-2024)
Amount: 1,445,753 USD
Role: Co-responsible for developing PETPrep

The OpenNeuroPET Archive - A Molecular Neuroimaging Archive (2020-2025)
Amount: 10,000,000 DKK
Role: WP-PI

# Software

2022: Nipype: a flexible, lightweight and extensible neuroimaging data processing framework in Python
Github: https://github.com/nipy/nipype
Language: Python

2022: BIDS-MATLAB
Github: https://github.com/bids-standard/bids-matlab
Language: MATLAB

2022: PET2BIDS
Github: https://github.com/openneuropet/PET2BIDS
Language: Python/MATLAB

2022: PETPrep: A Robust Preprocessing Pipeline for PET Data
Github: https://github.com/mnoergaard/petprep
Language: Python

2023: PETPrep Head Motion Correction BIDS Application
Github: https://github.com/mnoergaard/petprep_hmc
Language: Python

# Teaching/Outreach

2023: Course Responsible, Data Analysis and Machine Learning
(https://kursuskatalog.au.dk/en/course/117527/Data-Analysis-and-Machine-Learning)

2022: Stanford Scientific Teaching Institute (https://postdocs.stanford.edu/events/scientific-teaching-institute-1)

2022: Neuromatch Academy, Mentor (https://compneuro.neuromatch.io/tutorials/intro.html)

2022: Stanford University, Teaching Workshop for Postdocs (https://postdocs.stanford.edu/events/teaching-workshop-postdocs-10)

2020: TA, PhD course on Basic Kinetic Modeling in PET and MR Imaging, University of Copenhagen, Denmark

2020: External lecturer, NDAK10005U Medical Image Analysis (MIA), University of Copenhagen, Denmark
Presentation: *"Medical Image Analysis in the Age of Big Data: Data Sharing, Preprocessing and Prediction"*

2019: Informations Medieskole for forskere (https://butik.information.dk/collections/kurser-for-forskere/products/informations-medieskole-for-forskere-forar-2022)

2019: External lecturer, NDAK10005U Medical Image Analysis (MIA), University of Copenhagen, Denmark
Presentation: *"Preprocessing, Prediction and Data Sharing: Pitfalls and Solutions in Medical Imaging"*

2015: TA, Introduction to Biomedical Engineering II KU008, Technical University of Denmark, Denmark
Help students gain knowledge in transducers, signal amplification, data collection, clinical EEG, signal analysis, and computational models (Assoc. Prof. Carsten E. Thomsen)

2014: TA, Introduction to Biomedical Engineering II KU008, Technical University of Denmark, Denmark
Help students gain knowledge in transducers, signal amplification, data collection, clinical EEG, signal analysis, and computational models (Assoc. Prof. Carsten E. Thomsen)

2013: TA, Introduction to Medical Imaging 31540, Technical University of Denmark, Denmark
Help students gain knowledge of the physics and application of imaging modalities CT, PET, MRI, X-ray and ultrasound (Prof. Jens E. Wilhjelm)

# Supervision

2021: Computer science student Avneet Kaur, MSc thesis with the title *"Development of a robust and reproducible preprocessing pipeline for Positron Emission Tomography (PET) data"*, University of Copenhagen.
Grade: 10 (B)

2020: Computer science student Emil Due Rasmussen, BSc thesis with the title "*Extending the BIDS validator*", University of Copenhagen.
Grade: 10 (B)

2020: Computer science student Andreea-Veronica Vascaan, MSc thesis with the title "*How do children move in the MR scanner with and without anaesthesia?*", University of Copenhagen:
Grade: 12 (A)

2020: Computer science student Michael Nguyen, MSc thesis with the title "*Visual Tracking of Rodent Behaviour Using Deep Learning*", Unversity of Copenhagen. Grade: 10 (B)

2019: Bioinformatics student Kristine Nielsen, MSc thesis with the title "*Evaluating measures of intra-cranial volume in same-subject multiple MR images over time*", University of Copenhagen.
Grade: 12 (A)

2019: Bioinformatics student Emily Barot, MSc thesis with the title "*Optimization of Voxelwise and Surface-Based Preprocessing Pipelines in PET/MRI Neuroimaging*", University of Copenhagen.
Grade: 12 (A)

2017: Medical Engineering students Sidra Rafique and Kevser Sert, BSc thesis with the title "*Optimization of Motion Correction of Frames in Dynamic PET Molecular Imaging Studies*", University of Copenhagen & DTU.
Grade: 10 (B)

2016: Medical Engineering students Rana Al-Tayar and Sana Ahmed, BSc thesis with the title "*Evaluating Preprocessing Pitfalls in Parametric PET/MRI Neuroimaging*", University of Copenhagen & DTU.
Grade: 12 (A)

# Publications (Google Scholar H-index = 13, i10-index = 11)

21 publications, 10 first authorships, 3 second authorships

**2022:**

**Nørgaard, M.**, Matheson, G. J., Hansen, H. D., Thomas, A., Searle, G., Rizzo, G., … Ganz, M. (2022). PET-BIDS, an extension to the brain imaging data structure for positron emission tomography. *Sci Data*, *9*(65). https://doi.org/10.1038/s41597-022-01164-1
IF: 8.501

Hansen, J. Y., Markello, R. D., Tuominen, L., **Nørgaard, M.**, Kuzmin, E., Palomero-Gallagher, N., Dagher, A., & Misic, B. (2022). Correspondence between gene expression and neurotransmitter receptor and transporter density in the human brain. Accepted, October 2022, *Neuroimage.* https://doi.org/10.1016/j.neuroimage.2022.119671
IF: 7.4

Hansen, J. Y., Shafiei, G., Markello, R. D., Smart, K., Cox, S. M. L., **Nørgaard, M.**, Wu, Y., Gallezot, J.-D., Aumont, É., Servaes, S., Scala, S. G., DuBois, J. M., Wainstein, G., Bezgin, G., Funck, T., Schmitz, T. W., Spreng, R. N., Soucy, J.-P., Baillet, S., Guimond, S., … Misic, B. (2022). Mapping neurotransmitter systems to the structural and functional organization of the human neocortex. Accepted, September 2022. *Nature Neuroscience.*
IF: 24.884

**2021:**

Levitis, E., Praag, C. G. van, Gau, R., Heunis, S., DuPre, E., Kiar, G., **Nørgaard, M.**, … Maumet, C. (2021). Centering inclusivity in the design of online conferences - An OHBM - Open Science perspective. *Gigascience*, 1–14. https://doi.org/10.31234/OSF.IO/VJ5TU
IF: 6.524

**Nørgaard, M.**, Beliveau, V., Ganz, M., Svarer, C., Pinborg, L. H., Keller, S. H., … Knudsen, G. M. (2021). A high-resolution in vivo atlas of the human brain's benzodiazepine binding site of GABAA receptors. *NeuroImage*, *232*. https://doi.org/10.1016/j.neuroimage.2021.117878
IF: 7.4

Eichhorn, H. S., Vascan, A.-V, **Nørgaard, M.**, …, Ganz, M. (2021). Characterisation of children's head motion for Magnetic Resonance Imaging with and without general anaesthesia. *Frontiers in Neuroradiology*, *1*(December), 1–10. https://doi.org/10.3389/fradi.2021.789632

Beliveau, V., **Nørgaard, M.**, Birkl, C., Seppi, K., & Scherfler, C. (2021). Automated Segmentation of Deep Brain Nuclei using Convolutional Neural Networks and Susceptibility Weighted Imaging. *Human Brain Mapping*, (March), 1–14. https://doi.org/10.1002/hbm.25604
IF: 5.399

**2020:**

**Nørgaard, M.***, Ganz, M.*, Beliveau, V., Svarer, C., Knudsen, G. M., & Greve, D. N. (2020). False positive rates in positron emission tomography (PET) voxelwise analyses. *Journal of Cerebral Blood Flow and Metabolism*, 1–11. https://doi.org/10.1177/0271678X20974961
IF: 6.96

Veronese, M., Rizzo, G., Belzunce, M. A., Schubert, J., Searle, G. E., Whittington, A., … , **Nørgaard, M., …,** Participants, F. the G. C. (2020). Reproduciblity of findings in modern PET neuroimaging: insight from the NRM2018 Grand Challenge. *Journal of Cerebral Blood Flow & Metabolism*. https://doi.org/10.1177/0271678X211015101
IF: 6.96

Knudsen, G. M., Ganz, M., Appelhoff, S., Boellaard, R., Bormans, G., Carson, R. E., **Nørgaard, M.**, … Rizzo, G. (2020). Guidelines for the content and format of PET brain data in publications and archives : A consensus paper. *Journal of Cerebral Blood Flow and Metabolism*. https://doi.org/10.1177/0271678X20905433
IF: 6.96

**2019:**

**Nørgaard, M.**, Ganz, M., Svarer, C., Frokjaer, V. G., Greve, D. N., Strother, S. C., & Knudsen, G. M. (2019). Optimization of preprocessing strategies in Positron Emission Tomography (PET) neuroimaging: A [11C]DASB PET study. *NeuroImage*, *199*(October 2019), 466–479. https://doi.org/10.1016/j.neuroimage.2019.05.055
IF: 7.4

**Nørgaard, M.**, Ozenne, B., Svarer, C., Frokjaer, V. G., Schain, M., Strother, S. C., & Ganz, M. (2019). Preprocessing, Prediction and Significance : Framework and Application to Brain Imaging. *Medical Image Computing and Computer Assisted Intervention (MICCAI)*, 196–204.

**Nørgaard, M.**, Ganz, M., Svarer, C., Feng, L., Ichise, M., Lanzenberger, R., … Knudsen, G. M. (2019). Cerebral serotonin transporter measurements with [ 11 C]DASB: A review on acquisition and preprocessing across 21 PET centres. *Journal of Cerebral Blood Flow and Metabolism*, *39*(2), 210–222. https://doi.org/10.1177/0271678X18770107
IF: 6.96

**Nørgaard, M.**, Ganz, M., Svarer, C., Frokjaer, V. G., Greve, D. N., Strother, S. C., & Knudsen, G. M. (2019). Different preprocessing strategies lead to different conclusions : A [ 11 C ] DASB-PET reproducibility study. *Journal of Cerebral Blood Flow and Metabolism*. https://doi.org/10.1177/0271678X19880450
IF: 6.96

**2018:**

Mc Mahon, B., **Nørgaard, M.**, Svarer, C., Andersen, S. B., Madsen, M. K., Baaré, W. F. C., … Knudsen, G. M. (2018). Seasonality-resilient individuals downregulate their cerebral 5-HT transporter binding in winter – A longitudinal combined 11C-DASB and 11C-SB207145 PET study. *European Neuropsychopharmacology*, *28*(10), 1151–1160. https://doi.org/10.1016/j.euroneuro.2018.06.004
IF: 5.415

**Nørgaard, M.**, Greve, D. N., Svarer, C., Strother, S. C., Knudsen, G. M., & Ganz, M. (2018). The Impact of Preprocessing Pipeline Choice in Univariate and Multivariate Analyses of PET Data. *2018 International Workshop on Pattern Recognition in Neuroimaging, PRNI 2018*, 2–5. https://doi.org/10.1109/PRNI.2018.8423962

Deen, M., Hansen, H. D., Hougaard, A., **Nørgaard, M.**, Eiberg, H., Lehel, S., … Knudsen, G. M. (2018). High brain serotonin levels in migraine between attacks: A 5-HT4 receptor binding PET study. *NeuroImage: Clinical*, *18*(October 2017), 97–102. https://doi.org/10.1016/j.nicl.2018.01.016
IF: 4.891

Deen, M., Hansen, H. D., Hougaard, A., da Cunha-Bang, S., **Nørgaard, M.**, Svarer, C., … Knudsen, G. M. (2018). Low 5-HT1B receptor binding in the migraine brain: A PET study. *Cephalalgia*, *38*(3), 519–527. https://doi.org/10.1177/0333102417698708
IF: 6.075

**2017:**

**Nørgaard, M.**, Ganz, M., Svarer, C., Fisher, P. M., Churchill, N. W., Beliveau, V., … Knudsen, G. M. (2017). Brain networks implicated in seasonal affective disorder: A neuroimaging PET study of the serotonin transporter. *Frontiers in Neuroscience*, *11*(NOV), 1–12. https://doi.org/10.3389/fnins.2017.00614
IF: 5.152

Rasmussen, J. H., **Nørgaard, M.**, Hansen, A. E., Vogelius, I. R., Aznar, M. C., Johannesen, H. H., … Fischer, B. M. (2017). Feasibility of multiparametric imaging with PET/MR in head and neck Squamous cell carcinoma. *Journal of Nuclear Medicine*, *58*(1), 69–74. https://doi.org/10.2967/jnumed.116.180091
IF: 11.082

**2015:**

**Nørgaard, M.**, Ganz, M., Fisher, P. M., Mahon, B. M., & Strother, S. C. (2015). Estimation of Regional Seasonal Variations in SERT-levels using the FreeSurfer PET pipeline: a reproducibility study. *MICCAI Workshop on Computational Methods for Molecular Imaging 2015*, (October), 1–12.