Robin Gutzen

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RESEARCH INTERESTS

Neural Network Dynamics
Data Visualization
Simulation & Validation
Statistical Testing
Signal Processing
Data Management

SKILLS

PROGRAMMING/PLATFORMS

- Python
- C++
- Java
- MatLab
- JavaScript
- PHP
- SQL
- HTML/CSS
- Latex
- Git
- Linux

LANGUAGE

- German
- English
- French

NON-RESEARCH INTERESTS

Woodworking & Pottery
Cooking & Fermentation
Writing & Reading

PROFESSIONAL EXPERIENCE

RESEARCH CENTER JÜLICH

PhD. at Institute for Computational and Systems Neuroscience
Jul 2018 - today
Dissertation on "Analysis and quantitative comparison of neural network dynamics on a neuron-wise and population level"

RWTH INSTITUTE 1A

Research Assistant
Mar 2014 – Aug 2014
Literature research about novel materials for neuromorphic computing

EDUCATION

RWTH AACHEN UNIVERSITY

Master Physics
Oct 2015 - Mar 2018
Major in Nanoelectronics, Minor in Biophysics
Thesis on validation of neural network simulations (@ Research Center Jülich)
Final grade 1.2

UNIVERSITÉ MONTPELLIER II

Erasmus exchange
Sep 2013 - Jun 2014 | Montpellier, France

RWTH AACHEN UNIVERSITY

Bachelor Physics
Oct 2011 - Sep 2015
Thesis on detection and analysis of dissolved fluorescent molecules

EXTRACURRICULAR ACTIVITY

Organisator and Manager of a BrainArt Exhibition
2022 | OHBM Conference, Glasgow

Representative in the EBRAINS Data Governance Working Group
2020 - today

Serving on the Scientific and Technical Council
2020 - 2022

Scientific Supervision of Students
2017, 2022 - today

Content Curator
2019 – 2021 | Establishing IT infrastructure for reproducibleresearch practices

Serving on Admission Committees
2018, 2019

Organisator and Chair for TEDxRWTHAachen Conference
2016, 2017

ACADEMIC WORK

PUBLICATIONS

2023 C. Capone, C. De Luca, G. De Bonis, **R. Gutzen**, I. Bernava, E. Pastorelli, F. Simula, C. Lupo, L. Tonielli, A.L. Allegra Mascaro, F. Resta, F. Pavone, M. Denker, P.S. Paolucci *"Simulations Approaching Data: Cortical Slow Waves in Inferred Models of the Whole Hemisphere of Mouse"* Communications Biology 6, 266. doi: 10.1038/s42003-023-04580-0

2022 **R. Gutzen**, S. Grün, M. Denker *"Evaluating the statistical similarity of neural network activity and connectivity via eigenvector angles"* BioSystems, 223, 104813.doi: 10.1016/j.biosystems.2022.104813

2022 **R. Gutzen**, G. De Bonis, C. De Luca, E. Pastorelli, C. Capone, A.L. Allegra Mascaro, F. Resta, A. Manasanch, F.S. Pavone, M.V. Sanchez-Vives, M. Mattia, S. Grün, P.S. Paolucci, M. Denker *"Comparing apples to apples - Using a modular and adaptable analysis pipeline to compare slow cerebral rhythms across heterogeneous datasets"* arXiv doi: 10.48550/arXiv.2211.08527

2018 **R. Gutzen**, M. von Papen, G. Trensch, P. Quaglio, S. Grün, M. Denker *"Reproducible neural network simulations: statistical methods for model validation on the level of network activity data"* Frontiers in Neuroinformatics 12:90, doi:10.3389/fninf.2018.00090

2018 G. Trensch, **R. Gutzen**, I. Blundell, M. Denker, A. Morrison *"Rigorous neural network simulations: a model substantiation methodology for increasing the correctness of simulation results in the absence of experimental validation data"* Frontiers in Neuroinfromatics 12:81, doi:10.3389/fninf.2018.00081

TALKS (SELECTION)

2022 BASSES workshop, Rome
"Blocks instead of puzzles pieces - analyzing cortical wave activity across scales in an adaptable framework"

2022 Helmholtz PoF Topic 3 Talk series, Jülich
"Rigorous comparison and validation of network activity data"

2022 BrainMatters webinar, online
"An adaptable analysis pipeline makes cortical wave phenomena comparable across heterogeneous datasets"

2021 Neural Coding, online
"Eigenangles: evaluating the statistical similarity of neural network simulations via eigenvector angles"

2020 Human Brain Project Summit, Athens
"Developing pipelines for multi- scale/species/method analysis"

2019 INCF Neuroinformatics Conference, Warsaw
"Evaluating neural network models within a formal validation framework"

POSTER PRESENTATIONS (SELECTION)

2022 Bernstein Conference, Berlin
R. Gutzen, S. Grün, M. Denker
"Using eigenvector angles to statistically evaluate the influences of connectivity structure on correlation structure"

2022 OHBM Conference, Glasgow
R. Gutzen, G. De Bonis, E. Pastorelli, C. Capone, C. De Luca, G. Mattheisen, A.L. Allegra Mascaro, F. Resta, F.S. Pavone, M.V. Sanchez-Vives, M. Mattia, S. Grün, A. Davison, P.S. Paolucci, M. Denker
"Cobrawap: a modular cortical wave analysis pipeline for heterogeneous data"

2021 Sfn Conference, online
R. Gutzen, G. De Bonis, E. Pastorelli, C. Capone, C. De Luca, G. Mattheisen, A.L. Allegra Mascaro, F. Resta, F.S. Pavone, M.V. Sanchez-Vives, M. Mattia, S. Grün, A. Davison, P.S. Paolucci, M. Denker
"An adaptable analysis pipeline makes cortical wave phenomena comparable across heterogeneous datasets"

WORKSHOPS & SCHOOLS (SELECTION)

2021 Neuromatch Academy Deep Learning Summer School, online

2019 3 week lab visit @ APE lab, INFN, *Rome*

2017 Data Science Summer School, *Paris*

SERVICE

- Contributing to open source software: NetworkUnit, Cobrawap, Elephant, SciUnit, Neo
- Peer review for Frontiers of Neuroinformatics (2018, 2019), and ReScience (2019, 2021)

2020, 21 Tutoring the Elephant User Workshop, & EBRAINS Infrastructure Training on Model Validation, *online*

2021 Presenting a workshop at the Human Brain Project Student Conference, *online*

2018, 19, 21 Tutoring the G-Node Advance Neural Data Analysis Course, *Barmen*

2018-22 Tutoring the RWTH lecture 'Introduction to Computational Neuroscience', & Seminar, *Aachen*

AWARDS

2020 2nd place in the John Hunter Excellence in Plotting Contest (750$)

2019 INCF Neuroinformatics poster price (sponsored by De Gruyter, 1500€)