

Assistant Professor, PhD

Computational Neuroimaging Team
Centre for Modern Interdisciplinary Technologies
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Research interests

<i>Connectomics</i>	Plasticity of the human brain networks, reorganization of functional brain network during cognition
<i>Neuroplasticity</i>	Experience-dependent plasticity, compensatory brain plasticity
<i>Cognition</i>	Learning, offline memory replay, decision making, working memory, consciousness
<i>Data science</i>	Network analysis, machine learning, data visualization, bayesian statistics
<i>Open science</i>	Reproducible data processing pipelines, building open-source software

Academic career

2021 - present	Postdoctoral researcher , Max Planck Institute for Human Development, Max Planck Research Group NeuroCode – Neural and Computational Basis of Learning, Memory and Decision Making (supervisor: Nicolas Schuck), Berlin, Germany.
2020 - present	Assistant Professor , Centre for Modern Interdisciplinary Technologies, Nicolaus Copernicus University in Toruń, Poland; leader of the Computational Neuroimaging Team.
2020 - present	Member of the Center of Excellence Dynamics, Mathematical Analysis & Artificial Intelligence, group: Neuroinformatics and Artificial Intelligence.
2019	Visiting Student Researcher , Stanford University, Department of Psychology, The Poldrack Lab (supervisor: Russell Poldrack), Stanford, USA.
2018	Visiting Student Researcher , University of Pennsylvania, Department of Bioengineering, Complex Systems Group (supervisor: Danielle Bassett), Philadelphia, USA.
2014 - 2020	Research Assistant , Neurocognitive Laboratory, Centre for Modern Interdisciplinary Technologies, Nicolaus Copernicus University in Toruń, Poland.
2014	Visiting Student Researcher , Max Planck Institute for Human Development, Center for Lifespan Psychology. Mechanisms and Sequential Progression of Plasticity Group (supervisor: Simone Kühn), Berlin, Germany.
2014	Intern , Neurocognitive Laboratory, Centre for Modern Interdisciplinary Technologies, Nicolaus Copernicus University in Toruń, Poland.

Education

2017 - 2019	Natural Sciences in Physical Sciences , Ph.D. (16/10/2019), Faculty of Physics, Astronomy and Informatics, Nicolaus Copernicus University, Torun, Poland. Thesis: <i>Dynamics and plasticity of human brain functional network during working memory task performance</i> (supervisor: Włodzisław Duch).
2017 - 2018	Applied Mathematics , Nicolaus Copernicus University, Faculty of Mathematics and Computer Science.
2012 - 2014	Cognitive Science , Master of Art Degree (03/07/2014), Nicolaus Copernicus University, Faculty of Humanities, Institute of Philosophy. Thesis: <i>Effect of action video game training on temporal information processing in the range of tens of milliseconds</i> .
2009 - 2012	Cognitive Science , Bachelor of Art Degree (04/07/2012), Nicolaus Copernicus University, Faculty of Humanities, Institute of Philosophy. Thesis: <i>The role of sleep in neuroplasticity in the learning and memory context</i> .

Scholarships & Awards

2021	Bekker scholarship sponsored by the Polish National Agency for Academic Exchange (NAWA) for postdoctoral internship at Max Planck Institute for Human Development, Berlin, Germany.
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2020	ReproNim/INCF 2020-2021 Training Fellowship, sponsored by the Center for Reproducible Neuroimaging Computation and the International Neuroinformatics Coordinating Facility (INCF).
2018	START travel grant for 1-month study visit in the Poldrack Lab at Stanford University (16 000 PLN).
2018	START scholarship for outstanding young scholars at the beginning of their scientific careers additionally increased by prof. Barbara Skarga scholarship for research that displays courageous breaking of interdisciplinary boundaries, opening new research perspectives and creating new values in science, Foundation for Polish Science (36 000 PLN).
2017	ETIUDA scholarship for PhD candidates (88 838 PLN), National Science Centre (2017/24/T/HS6/00105), Poland.
2017	I prize (Best Oral Presentation Award) “Dynamics and plasticity of functional networks in the human brain”, Neuromania, Toruń, Poland.
2014	Erasmus+ Scholarship for the internship at the Max Planck Institute for Human Development, Center for Lifespan Psychology, Berlin, Germany.
2014	Award for the Best Master Thesis on the Faculty of Humanities, Nicolaus Copernicus University
2014	Award for the Best Graduate from the Faculty of Humanities, Nicolaus Copernicus University
2014	Laureate of the regional “Student Nobel” contest.
2014	Entry in the Golden Book of the Best Students at the Faculty of Humanities, Nicolaus Copernicus University.
2013/2014	Scholarship of Minister of Science and Higher Education for outstanding academic performance
2013	I prize (Best Poster Award) “Brain in the mourning: neurobiological correlates of resilience”, VIII International Scientific-Educational Conference „Life-Giving Death – in Memory of Elizabeth Kubler-Ross”, Medical University of Białystok, Białystok.
2013/2014	Rector Scholarship for the best students at the Nicolaus Copernicus University.
2012/2013	
2011/2012	
2010/2011	Scholarship for high academic performance at the Nicolaus Copernicus University.

Publications

- [11] Finc, K., Bonna, K., He, X., Lydon-Staley, D. M., Kühn, S., Duch, W., & Bassett, D. S. (2020). Dynamic reconfiguration of functional brain networks during working memory training. *Nature Communications* 11, 2435.
- [10] Esteban, O., Ciric, R., Finc, K., Blair, R. W., Markiewicz, C. J., Moodie, C. A., ... & Gorgolewski, K. J. (2020). Analysis of task-based functional MRI data preprocessed with fMRIPrep. *Nature Protocols*.
- [9] Dreszer, J., Grochowski, M., Lewandowska, M., Nikadon, J., Gorgol, J., Bałaj, B. Finc, K., ... & Piotrowski, T. (2020). Spatiotemporal complexity patterns of resting-state bioelectrical activity explain fluid intelligence: Sex matters. *Human Brain Mapping*.
- [8] Bielczyk, N. Z., Ando*, A., Badhwar*, A., Caldinelli*, C., Gao*, M., Haugg*, A., Hernandez*, L. M., Ito*, K., Kessler*, D., Lurie*, D., Makary*, M. M., Nikolaidis*, A., Veldsman*, M., Allen, C., Bankston, A., Costa Boffino, C., Bottenhorn, K. L., Braukmann, R., Cheplygina, V., Ercan, E., Finc, ..., OHBM Student and Postdoc Special Interest Group. Effective self-management for early career researchers in the natural and life sciences. *Neuron* 106(2), 212–217.
- [7] Asanowicz, D., Gociewicz, K., Koculak, M., Finc, K., Bonna, K., Cleeremans, A., & Binder, M. (2020). The response relevance of visual stimuli modulates the P3 component and the underlying sensorimotor network. *Scientific Reports*, 10(1), 1-20.
- [6] Thompson, W. H., Kastrati, G., Finc, K., Wright, J., Shine, J. M., & Poldrack, R. A. (2020). Time-varying nodal measures with temporal community structure: A cautionary note to avoid misinterpretation. *Human Brain Mapping*, 41(9), 2347-2356.
- [5] Bonna, K.*, Finc, K.*, Zimmermann, M., Bola, Ł., Mostowski, P., Szul, M., Rutkowski, P., Duch, W., Marchewka, A., Jednoróg, K., Szwed, M. (2019). Early deafness leads to re-shaping of global functional connectivity beyond the auditory cortex. Accepted in *Brain Imaging and Behaviour*. *equal contribution
- [4] Naumczyk, P., Sawicka, A. K., Brzeska, B., Sabisz, A., Jodzio, K., Radkowski, M., Czachowska, K., Winklewski, P. J., Finc, K., Szurowska, E., Demkow, U., Szarmach, A. (2018). Cognitive Predictors of Cortical Thickness in Healthy Aging. In: . *Advances in Experimental Medicine and Biology*. Springer, New York, NY.
- [3] Burzynska, A. Z. , Finc, K. , Taylor, B. K., Knecht, A., Kramer A. F. (2017). The dancing brain: Structural and functional signatures of professional dance training. *Frontiers in Human Neuroscience* 11, 566.
- [2] Binder, M., Gociewicz, K., Windey, B., Koculak, M., Finc, K., Nikadon, J., Derda, M., Cleeremans, A. (2017). The levels of perceptual processing and the neural correlates of increasing subjective visibility. *Consciousness and*

- [1] Finc, K., Bonna, K., Lewandowska, M., Wolak, T., Nikadon, J., Dreszer, J., Duch, W., Kühn, S. (2017). Transition of the functional brain network related to increasing cognitive demands. *Human Brain Mapping* 38 (7), 3659–3674.

Contribution to open-source software

- fMRIDenoise Automated denoising and quality control of functional connectivity data, <https://github.com/compneuro-ncu/fmridenoise>, developer.
- fMRIPrep A Robust Preprocessing Pipeline for fMRI Data, <https://github.com/poldracklab/fmriprep>, contributor.
- FitLins Fitting Linear Models to BIDS Datasets, <https://github.com/poldracklab/fitlins>, contributor.
- Nilearn Machine learning for Neuro-Imaging in Python, <https://github.com/nilearn/nilearn>, contributor.

Projects & Grants

- 202-2020 Principal investigator in Excellence Initiative - Research University grant “Modern equipment for audio-visual stimulation and collecting behavioral responses dedicated to functional magnetic resonance imaging”, funded by the Ministry of Science and Higher Education
- 2019 - 2020 Principal investigator in KUBUS 2.0 grant “Gamified neurocognitive tests adjusted to functional magnetic resonance imaging”, funded by the Ministry of Science and Higher Education.
- 2019 - 2020 Investigator in DSM grant “Neuronal correlates of reinforcement learning. The role of individual differences in learning strategies” funded by the Faculty of Physics, Astronomy and Informatics NCU. PI: Kamil Bonna.
- 2018 - 2022 Principal investigator of computational grant “Dynamics and plasticity of the human connectome related to higher cognitive functions”, funded by Wrocław Centre for Networking and Supercomputing.
- 2018 - 2022 Investigator in SONATA BIS grant “The comprehensive study on the brain basis of low numeracy skills and the behavioral and neuroplastic changes evoked by training of spatial-numerical association”, funded by the National Science Centre (2017/26/E/HS6/00033). PI: Małgorzata Gut.
- 2016 - 2018 Principal investigator in PRELUDIUM 9 grant “Temporal dynamics of functional connectivity changes induced by cognitive training. The role of individual differences”, funded by the National Science Centre (2015/17/N/HS6/03549). Supervisor: Simone Kühn.
- 2014 - 2016 Investigator in HARMONIA 4 “Dynamic neural correlates of consciousness as a function of the level of processing”, funded by the National Science Centre (2013/08/M/HS6/00004). PI: Marek Binder.
- 2014 - 2016 Investigator in PRELUDIUM 5 grant “The brain correlates of the normal cognitive ageing assessment with the use of the functional magnetic resonance imaging”, funded by the National Science Centre (2013/091N/HS6/O2634). PI: Patrycja Naumczyk.

Conference presentations

- [1] Finc, K., Bonna, K., Chojnowski, M. (2019). fMRIDenoise: tool for automatic denoising and quality control of functional connectivity data. INCF Neuroinformatics, Warsaw, Poland, demo & poster.
- [2] Finc, K., Bonna, K. (2019). fMRIDenoise: automated denoising strategies comparison and quality control of functional connectivity data. Annual Meeting of the Organization for Human Brain Mapping. Open science Room, Rome, Italy, talk.
- [3] Finc, K., Bonna, K., He, X., Lydon-Staley, D. M., Kühn, S., Duch, W., & Bassett, D. S. (2019). Dynamic functional network reconfiguration during 6-week working memory task training. Annual Meeting of the Organization for Human Brain Mapping. Rome, poster.
- [4] Finc, K., M., Bonna, Kosik, K., Duch, W., Kühn, S. (2018). Dynamics and plasticity of functional brain networks. University of Washington eScience Institute, Seattle, USA, poster.
- [5] Finc, K., M., Bonna, Kosik, K., Duch, W., Kühn, S. (2018). Ongoing dynamics of functional brain network changes during 6-week working memory training, Annual Meeting of the Organization for Human Brain Mapping. Singapore, poster.
- [6] Finc, K., Kosik, M., Bonna, K., Duch, W., Kühn, S. (2018). Task-based Functional Network Changes Following 6-week Working Memory Training, NEURONUS 2018 IBRO&IRUN Neuroscience Forum, Kraków, poster.

- [7] Kosik, M., Finc, K., Bonna, K., Duch, W., Kühn, S. (2018). Exploring working memory modalities - functional network alterations due to increasing demands of visuospatial and auditory working memory tasks, NEURONUS 2018 IBRO&IRUN Neuroscience Forum, Kraków, poster.
- [8] Bonna, K., Finc, K., Bola, Ł., Zimmermann, M., Mostowski, P., Jednoróg, K., Marchewka, A., Rutkowski, P., Szwed, M. (2018). Various aspects of compensatory plasticity during resting-state in early deaf adults. NEURONUS 2018 IBRO&IRUN Neuroscience Forum, Kraków, poster.
- [9] Finc, K., Bonna, K., Dobija, M., Pięta, B., Kosik, M., Lubiński, A., Muchlado M., Przybysz, A., Narębski, S., Migala, B., Duch, W., Kühn, S. (2017). Temporal dynamics of functional network changes following 6-week working memory training: preliminary results, Aspects of Neuroscience, Warszawa, poster.
- [10] Finc, K., Bonna, K., Lewandowska, M., Wolak, T., Nikadon, J., Dreszer, J., Duch, W., Kühn, S. (2017) Default Mode Network Role in Global Workspace Formation During Increasing Cognitive Demands. Keystone Symposia: Connectomics, Santa Fe (USA), invited talk & poster.
- [11] Bonna, K., Finc, K., Duch, W. (2017) Discovering generative model of human connectome by symbolic regression. Keystone Symposia: Connectomics, Santa Fe (USA) poster.
- [12] Bonna, K., Finc, K., Dobija, M., Lubiński, A., Nikadon, J., Wolak, T., Lewandowska, M., Dreszer, J. (2016). The relationship between whole-brain modularity of the functional network and behavioral performance during a working memory task. Annual Meeting of the Organization for Human Brain Mapping, Geneva, poster.
- [13] Finc K., Bonna, K. (2016) Functional network reconfiguration related to increasing cognitive effort. NEURONUS 2016 IBRO&IRUN Neuroscience Forum, Kraków, talk.
- [14] Finc K., Bonna, K., Dobija, M., Lubiński, A., Nikadon, J., Lewandowska, M. (2015) Frontoparietal and default mode network functional connectivity changes during increased load of working memory task associated with behavioral performance, Aspects of Neuroscience, Warszawa, poster.
- [15] Bonna, K., Finc, K., Dobija, M., Lubiński, A., Nikadon, J., Lewandowska, M. (2015) Global modularity changes during increased load of working memory task associated with behavioral performance, Aspects of Neuroscience, Warszawa, poster.
- [16] Finc, K., Nikadon, J., Szczypiński J., Szmytke, M., Bonna, K., Sadlok, M., Pawlaczek, N., Wojciechowski, J., Wach, P., Patyk, J., Bałaj, B., Dreszer-Drogorób, J., Wolak, T., Lewandowska, M. (2015). Resting state functional connectivity predicts BOLD activity during working memory task, NEURONUS 2015 IBRO&IRUN Neuroscience Forum, Kraków, poster.
- [17] Finc, K., Szymaszek, A., Dreszer-Drogorób, J. (2014) Does improvement in temporal information processing underlie cognitive benefits after action video game training? The FENS Forum of Neuroscience, Mediolan, poster.
- [18] Finc, K. (2013). The stability-plasticity dilemma in sleep and memory context, Philosophy of Neuroscience, Rostock, Germany, talk.
- [19] Finc, K., Goraczewski, Ł., Wójcik, A. (2013). Games for brains: a new way of maximizing motivation in education, California Cognitive Science Conference, Berkeley, poster.
- [20] Finc, K. (2013). Brain in the mourning: neurobiological correlates of resilience, VIII International Scientific-Educational Conference „Life-Giving Death – in Memory of Elizabeth Kubler-Ross”, Białystok, Poland, poster.

Teaching experience

2019/2020	Advanced fMRI data analysis, laboratory (30h), Cognitive Science (all years), Nicolaus Copernicus University
2019/2020	Neurobiology, lectures (30h), Cognitive Science (2nd year), Nicolaus Copernicus University
2015/2016	Neuropsychology, laboratory (30h), Cognitive Science (1st year), Nicolaus Copernicus University
2014/2015	EEG workshops, laboratory (30h), Cognitive Science (2nd year) Nicolaus Copernicus University

Additional training

2020	Neuromatch Academy (interactive track)
2020	Eastern European Machine Learning Summer School: Deep Learning and Reinforcement Learning (Virtual)
2020	Certified GitHub Campus Advisor (GitHub)
2020	Crash Course on Python (Google)
2019	The Virtual Brain Workshop (INCF Neuroinformatics, Warsaw)
2018	Neurohackademy Summer School (University of Washington eScience Institute)

2018	Data Scientist with Python (DataCamp, 84h Career Track, 22 courses)
2018	Data Scientist with R (DataCamp, 95h Career Track, 23 courses)
2018	Introduction to Shell for Data Science (DataCamp)
2016	Exploring the Human Connectome (Dutch Connectome Lab, Utrecht Summer School)
2015	Second Brain Connectivity Course (Neurometrika, Grenoble Institute of Neuroscience)
2015	Research team management (Foundation for Polish Science, SKILLS project, Poznań)
2015	Scientific communication for different audiences (Foundation for Polish Science, SKILLS project, Poznań)
2015	Commercialization of research results (Foundation for Polish Science, SKILLS project, Poznań)
2015	Research management (Foundation for Polish Science, SKILLS project, Warsaw)
2014	MRI safety training (Max Planck Institute for Human Development)
2014	Data Management for Clinical Research (Vanderbilt University, Coursera)
2014	R Programming (Johns Hopkins University, Coursera)
2014	fMRI data analysis in SPM (SWPS, Warsaw)
2014	Neuroimaging of structure and function of human brain (SWPS Training, Warsaw),
2014	Statistical Analysis of fMRI Data (Johns Hopkins University, Coursera)
2013	Simultaneous EEG and fMRI workshop (Brain Products GmbH, ICNT, Toruń)
2013	Simultaneous EEG and TMS workshop (Brain Products GmbH & MAG & More GmbH, Toruń)
2013	fMRI safety & data acquisition training (General Electric, ICNT, Toruń)
2013	Statistics in Medicine (Stanford University, Stanford Online)
2013	Data Analysis (Johns Hopkins University, Coursera)
2012	Adobe InDesign (AdAstra Society, Toruń)

Other scientific activities

2019	Brainhack Toruń organizer
2019	Brainhack Warsaw organizer
2016 - present	Supervisor of the Neuroimaging Club at Nicolaus Copernicus University in Toruń
2016	Conducting fMRI workshop for University of Children, Nicolaus Copernicus University in Toruń
2015	Conducting workshops “Memory Labyrinth” at Nencki Institute of Experimental Biology, Polish Academy of Science, Warsaw
2014, 2013	Co-organizer of NeuroMania Conference at Nicolaus Copernicus University in Toruń
2010/2011	President of Students’ Cognitive Science Circle at Nicolaus Copernicus University in Toruń
2010/2011	Vice-president of Students’ Cognitive Science Circle at Nicolaus Copernicus University in Toruń

Membership

2019	Neuroinformatics Coordinating Facility (INCF)
2016, 2018, 2019	Organization for Human Brain Mapping
2018 - present	Neuroimaging Club at Nicolaus Copernicus University in Toruń

Skills

- Programming: Python, R, MATLAB, SQL, bash
- fMRI data analysis: graph theory, representational similarity analysis (RSA), machine learning, GLM
- GitHub
- PRESENTATION
- Linux
- LaTeX
- fMRI, EEG and simultaneous fMRI-EEG data acquisition