Khazar Ahmadi

khazar.ahmadi@rub.de | @khAzArAhmAdi | Google Scholar | Orcid |
https://khazarahmadi.github.io/

Research Overview

My research is primarily focused on elucidating the underlying mechanisms of visual perception and higher order cognitive functions in health, aging and disease. To this end, I use a variety of techniques including state-of-the-art neuroimaging, neuropsychological assessments, and computational models to explore the functional and structural architecture of the human brain in particular the medial temporal lobe regions at fine levels of detail.

Academic Experience

National Institute of Mental Health (NIMH) *Bethesda, USA*
Visiting Researcher with Dr. Renzo Huber 2024

Ruhr University Bochum *Bochum, Germany*
Postdoctoral Researcher with Prof. Nikolai Axmacher 2022 - Present

Lund University *Lund, Sweden*
Postdoctoral Researcher with Prof. Oskar Hansson 2020 - 2022

Spinoza Center for Neuroimaging *Amsterdam, Netherlands*
Visiting Researcher with Prof. Serge Dumoulin 2017

University Medical Center Groningen *Groningen, Netherlands*
Visiting Researcher with Prof. Frans Cornelissen 2017

Education

Otto-von-Guericke University *Magdeburg, Germany*
PhD in psychology (magna cum laude) 2014 - 2019

- Thesis title: Plasticity and stability of the cortical wiring in the human visual system
- Advisor: Prof. Michael Hoffmann

Shahid Beheshti University *Tehran, Iran*
M.Sc. in child and adolescent clinical psychology (with distinction) 2010 - 2013

Tabriz University *Tabriz, Iran*
B.Sc. in clinical psychology (with distinction) 2006 - 2010

Publications

Published Manuscripts

- **Ahmadi, K.**, Pereira, J., van Westen, D., Pasternak, O., Zhang, F., Nilsson, Stomrud, E., Spotorno, N. and Hansson, O. (2024). Fixel-based analysis reveals tau-related white matter changes in early stages of Alzheimer's disease. Journal of Neuroscience. [Link]
- Molz, B., Herbik, A., Baseler, H., de Best, P., RAZ, N., Gouws, A., **Ahmadi, K.**, Lowndes, R., McLean, R., Gottlob, I., Kohl, S., Choritz, L., Maguire, J., Kanowski, M., Käsmann-Kellner, B., Wieland, I., Banin, E., Levin, N., Morland, A., and Hoffmann, M.B. (2023). Achromatopsia - limits to visual cortex plasticity in the absence of functional cones. Investigative Ophthalmology & Visual Science [Link]
- Cicognola, C., Mattsson-Carlgren, N., van Westen, D., Zetterberg, H., Blennow, K., Palmqvist, S., **Ahmadi, K.**, Strandberg, O., Stomrud, E., Janelidze, S., Hansson, O. (2023). Associations of CSF PDGFRβ with aging, blood-brain barrier damage, neuroinflammation and Alzheimer disease pathological changes. Neurology. [Link]

- **Ahmadi, K.**, Pereira, J. B., Berron, D., Vogel, J., Ingala, S., Strandberg, O. T., Janelidze, S., Barkhof, F., Pfeuffer, J., Knutsson, L., van Westen, D., Palmqvist, S., Mutsaerts, H. J., Hansson, O. (2022). Gray matter hypoperfusion is a late pathological event in the course of Alzheimer's disease. Journal of Cerebral Blood Flow & Metabolism. [Link]
- Molz, B., Herbik, A., Baseler, H. A., de Best, P., Vernon, R., Raz, N., Gouws, A. D., **Ahmadi, K.**, Lowndes, R., Mclean, R. J., Gottlob, I., Kohl, S., Choritz, L., Maguire, J., Kanowski, M., Käsmann-Kellner, B., Wieland, I., Banin, E., Levin, N., Hoffmann, M. B., Morland, A. B. (2021). Structural changes to primary visual cortex in the congenital absence of cone input in achromatopsia. NeuroImage: Clinical. [Link]
- Puzniak, R. J., McPherson, B.*, **Ahmadi, K.***, Herbik, A., Kaufmann, J., Liebe, T., Gouws, A. D., Morland, A. B., Gottlob, I., Hoffmann, M. B., Pestilli, F. (2021). CHIASM, the human brain albinism and achiasma MRI dataset. Scientific data. [* shared second-authorship; Link]
- Lowndes, R., Molz, B., Warriner, L., Herbik, A., de Best, P., Raz, N., Gouws, A. D., **Ahmadi, K.**, Mclean, R. J., Gottlob, I., Kohl, S., Choritz, L., Maguire, J., Kanowski, M., Käsmann-Kellner, B., Wieland, I., Banin, E., Levin, N., Hoffmann, M. B., Morland, A. B., Baseler, H. (2021). Structural differences across multiple visual cortical regions in the absence of cone function in congenital achromatopsia. Frontiers in Neuroscience. [Link]
- **Ahmadi, K.**, Fracasso, A., Puzniak, R. J., Gouws, A. D., Yakupov, R., Speck, O., Kaufmann, J., Pestilli, F., Dumoulin, S. O., Morland, A. B.,Hoffmann, M. B. (2020).Triple visual hemifield maps in optic chiasm hypoplasia. NeuroImage. [Link]
- Carvalho, J., Invernizzi, A., **Ahmadi, K.**, Hoffmann, M. B., Renken, R. J., Cornelissen, F. W. (2020).Micro-probing enables fine-grained mapping of neuronal populations using fMRI. NeuroImage. [Link]
- Puzniak, R. J., **Ahmadi, K.**, Kaufmann, J., Gouws, A. D., Morland, A. B., Pestilli, F., Hoffmann, M. B. (2019). Quantifying nerve decussation abnormalities in the optic chiasm. NeuroImage: Clinical. [Link]
- **Ahmadi, K.**, Herbik, A., Wagner, M., Kanowski, M., Thieme, H., Hoffmann, M. B. (2019). Population receptive field and connectivity properties of the early visual cortex in human albinism. NeuroImage. [Link]
- Eick, C., **Ahmadi, K.**, Sweeney-Reed, C. M., Hoffmann, M. B. (2019). Interocular transfer of visual memory: influence of visual impairment and abnormalities of the optic chiasm. Neuropsychologia. [Link]
- **Ahmadi, K.**, Fracasso, A., van Dijk, J. A., Kruijt, C., van Genderen, M., Dumoulin, S. O., & Hoffmann, M. B. (2018). Altered organization of the visual cortex in FHONDA syndrome. NeuroImage. [Link]
- Arngrim^{+}, N., Hougaard^{+}, A., **Ahmadi, K.***, Vestergaard*, M. B., Schytz, H. W., Amin, F. M., Larsson, H.B.W., Olesen, J., Hoffmann, M.B. & Ashina, M. (2017). Heterogenous migraine aura symptoms correlate with visual cortex functional magnetic resonance imaging responses. Annals of neurology. [$^{+}$ & * shared first & second-authorship; Link]
- Hoffmann, M. B., Thieme, H., & **Ahmadi, K.** (2017). Potential of fMRI for the Functional Assessment of the Pathological Visual System. Klinische Monatsblätter für Augenheilkunde. [Link]
- **Ahmadi, K.**, Pouretemad, H. R., Esfandiari, J., Yoonessi, A., Yoonessi, A. (2015). Psychophysical evidence for impaired Magno, Parvo, and Konio-cellular pathways in dyslexic children. Journal of ophthalmic & vision research. [Link]

Conference Presentations

Talks

- **Ahmadi, K.** (2024). Laminar profile of hippocampal subregions during spatial navigation. International Society for Magnetic Resonance in Medicine (ISMRM), Singapore, Singapore.
- **Ahmadi, K.** (2022). Tau accumulation is associated with fiber-specific white matter degeneration in Alzheimer's disease. International Society for Magnetic Resonance in Medicine (ISMRM), London, England.
- **Ahmadi, K.** (2022). Disentangling fiber-specific white matter alterations in relation to hallmarks of Alzheimer's disease. Alzheimer's Disease and Parkinson's Disease (ADPD), Barcelona, Spain.
- **Ahmadi, K.** (2021). Altered cerebral blood perfusion in Alzheimer's disease spectrum and its association with amyloid-β and tau pathology. Alzheimer's Disease and Parkinson's Disease (ADPD), Virtual conference.

- **Ahmadi, K.** (2018). Macroscopic and mesoscopic cortical organization in congenital visual pathway abnormalities. Brain-in-depth (BID) - Symposium on layer-dependent MRI, German Center for Neurodegenerative Diseases (DZNE), Magdeburg, Germany.
- **Ahmadi, K.** (2018). Altered organization of the visual cortex in FHONDA syndrome. 4th European Days of Albinism, Hurdal Vision and Activity Center, Oslo, Norway.
- **Ahmadi, K.**, (2016). Altered retino-cortical connections and visual cortex reorganization in the recently discovered FHONDA syndrome. Society for neuroscience (SfN), San Diego, USA.

Poster Presentations

- **Ahmadi, K.**, Stawarczyk, D., Pfaffenrot, V., Gomes, C. A., Kashyap, S., Patai, Z., Norris, D. G., Axmacher, N. (2024). Laminar profiles of hippocampal subfields are differentially associated with navigation strategies. Organization for Human Brain Mapping (OHBM), Seoul, south Korea.
- Rau, E. M. B., Herweg, N. A., Heinen, R., **Ahmadi, K.**, Axmacher, N. (2024). Functions of the medial temporal lobe in memory and navigation of abstract conceptual spaces. Federation of European Neuroscience Societies (FENS), Vienna, Austria.
- Kashyap, S., Gomes, C. A., **Ahmadi, K.**, Axmacher, N., Uludag, K. (2024). A new proposed workflow for processing high spatial resolution MRI data with multiple sessions. Cognitive Computational Neuroscience (CCN), Boston , USA.
- **Ahmadi, K.**, Pereira, J. B., Berron, D., Vogel, J., Ingala, S., Strandberg, O. T., Janelidze, S., Barkhof, F., Pfeuffer, J., Knutsson, L., van Westen, D., Mutsaerts, H. J., Palmqvist, S., Hansson, O. (2021). Tau and synaptic biomarkers but not amyloid-β are associated with cerebral perfusion in the Alzheimer's disease spectrum. Alzheimer's Association International Conference (AAIC), Virtual conference.
- Cicognola, C., Janelidze, S., Van Westen, D., **Ahmadi, K.**, Hansson, O. (2021). Cerebrospinal fluid platelet-derived growth factor receptor beta measured in BioFinder-2: an early biomarker in the Alzheimer's disease continuum? Clinical Trials on Alzheimer's Disease (CTAD), Boston, USA.
- Puzniak, R. J., McPherson, B., **Ahmadi, K.**, Herbik, A., Kaufmann, J., Liebe, T., Gouws, A. D., Morland, A. B., Gottlob, I., Hoffmann, M. B., Pestilli, F. (2020). Chiasmal malformations dataset: a unique neuroimaging testbed. Vision Science Society (VSS), Virtual conference.
- Hoffmann, M. B., Molz, B., Herbik, A., de Best, P., Raz, N., Gouws, A. D., **Ahmadi, K.**, Lowndes, R., Mclean, R. J., Kohl, S., Gottlob, I., Choritz, L., Maguire, J., Kanowski, M., Käsmann-Kellner, B., Wieland, I., Banin, E., Levin, N., Baseler, H. Morland, A. B. (2020). Visual cortex stability and plasticity in the absence of functional cones in achromatopsia. Vision Science Society (VSS), Virtual conference.
- **Ahmadi, K.**, Fracasso, A., Puzniak, R. J., Gouws, A. D., Yakupov, R., Speck, O., Kaufmann, J., Pestilli, F., Dumoulin, S. O., Morland, A. B.,Hoffmann, M. B. (2019). Triple hemi-field input to the visual cortex in a patient with chiasmal hypoplasia. Organization for Human Brain Mapping (OHBM), Rome, Italy.
- Carvalho, J., **Ahmadi, K.**, Invernizzi, A., Hoffmann, M. B., Renken, R., Cornelissen, F. W. (2019). Micro-probing the visual cortex: high-resolution mapping of neuronal sub-populations. Organization for Human Brain Mapping (OHBM), Rome, Italy.
- Puzniak, R. J., **Ahmadi, K.**, Kaufmann, J., Gouws, A. D., Morland, A. B., Pestilli, F., Hoffmann, M. B. (2019). Quantification of nerve decussation abnormalities in the optic chiasm. Organization for Human Brain Mapping (OHBM), Rome, Italy.
- Prabhakaran, G., Al-Nosairy, K. O., Tempelmann, C., **Ahmadi, K.**, Hoffmann, M. B. (2019). Brain activity in input-deprived visual cortex in glaucoma – no fMRI-evidence of plasticity. Organization for Human Brain Mapping (OHBM), Rome, Italy.
- **Ahmadi, K.**, Fracasso, A., Gouws, A. D., Morland, A. B., Dumoulin, S. O., Hoffmann, M. B. (2017). Functional organization of the visual cortex in a unique case of achiasma. Society for neuroscience (SfN), Washington, D.C., USA.
- **Ahmadi, K.**, Fracasso, A., van Dijk, J. A., Kruijt, C., van Genderen, M., Dumoulin, S. O., & Hoffmann, M. B. (2017). Cortical plasticity in FHONDA: a new inherited visual system disorder. European conference on visual perception (ECVP), Berlin, Germany.

- **Ahmadi, K.**, Pouretemad, H. R., Esfandiari, J., Yoonessi, A. (2013). Investigation of magno, parvo and koniocellular pathways in children with dyslexia. International conference of cognitive sciences (ICCS), Tehran, Iran.

Technical Skills

Neuroimaging Modalities	fMRI (at 7 and 3 T), dMRI, sMRI & ASL
Neuroimaging Software	Nipype, AFNI, FSL, MRtrix, DIPY, FreeSurfer, Laynii, ExploreASL, Hippunfold, ASHS, SPM, ANTs & MrVista
Neuroimaging Hardware	Siemens 7T MAGNETOM Terra Scanner Operator
Programming	Bash, R, Python, MATLAB, LaTeX
Experiment Software	Psychtoolbox, Neurobehavioral Systems Presentation
Languages	Azerbeijani (native), Persian (native), English (fluent), German (upper-intermediate fluency; Level B2)

Awards and Honors

Erwin L. Hahn Institute's brain-art competition *2023*
(About) Essen, Germany
- Winning art-work "Hippocampal Moon" € 200

Greta & Johan Kock's foundation grant for medical research *2021*
(About) Lund, Sweden
- Role: Principal Investigator
- Project: Clinical use of novel diffusion-MRI markers in Alzheimer's disease
- € 10K research funds

Lund University MultiPark travel grant *2021-2022*
(About) Lund, Sweden
- € 2K in total covering conference registrations and travel costs

The ISMRM Summa Cum Laude Merit Award *2022*
(About) London, UK
- Selected abstract in top 5% of all submissions

Marie Curie Ph.D Fellowship *2015-2018*
Research Training in Computational Visual Neuroscience Magdeburg, Germany

Top Student Award *2010*
Undergraduate Class Ranked: 1st/50 Tabriz, Iran

Teaching & Mentorship

Ruhr University Bochum *Bochum, Germany*
Main Instructor of "Aging, dementia and memory disorders" 2024

Main Instructor of "fMRI: From Theory to Practice" 2022 - 2023
- Mentored Students: Dana Schröder & Paul Höchter (research assistants), Kubra Karatas, Niko Britt (M.Sc & B.Sc interns), Alena Machentanz (B.Sc Thesis)

Neuromatch Academy: Computational Neuroscience Workshop *Online Event*
Mentor of the group "NeuroMatched Philosophers" 2021
- Project: predicting fearful stimuli from HCP fMRI data using MVPA

Otto-von-Guericke University *Magdeburg, Germany*
Instructor of "Neuroscience Journal Club" 2016 - 2018

- Co-mentored Students: Charlotta Eick (M.Sc Thesis), Gokulraj Prabhakaran (PhD student) Anne Herbik (Postdoc)

Professional Service

Ad-hoc Reviewer

Alzhimer's & Dementia, Alzheimer's Research & Therapy, Journal of Cerebral Blood Flow & Metabolism, Brain Communications, Scientific Reports, Neuropsychologia, British Journal of Ophthalmology, ISMRM abstracts (x 33), OHBM abstracts (x 31)

Symposia & Lecture Organization *Bochum, Germany*

"Advances in Layer-specifc fMRI"
"Surface-based analysis for Hippocampal subfield segmentation" 2023

Public Outreach *Magdeburg, Germany*

Long Night of Science at Otto-von-Guericke University 2016 - 2019

Memberships

Trainee Member of ISMRM, OHBM, SfN, ECVP, ADPD & AAIC