Dr. Farbod Nosrat Nezami

Postdoctoral researcher at the Neuroinformatics research group

PERSONAL AND CONTACT INFORMATION

Osnabrück University
Institute of Cognitive Science
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49090, Osnabrück Germany

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Date of Birth: 05.09.1990
Nationality: German

Google Scholar: Farbod Nosrat Nezami
ORCID: 0000-0003-1599-6958

SUMMARY

Publications:	18
Total Citations:	125
h-index:	5
Journals peer reviewed:	6
Invited talks:	5
Workshops offered:	2
Lectures held:	36
Students supervised:	24
Research Interests:	embodied cognition and robotic, neuromorphic computing
	spiking/artificial neural networks, neuromodeling
	virtual and augmented reality

CURRENT ACADEMIC APPOINTMENTS

Postdoctoral Researcher, Osnabrück University — December 2021 to **current**
Institute of Cognitive Science

- Dendritic computation for time series processing
  - Supervisor (PI): Professor Dr. Gordon Pipa
  - Area of research: neuro-modeling, spiking neural networks, optimization and learning algorithms, hardware design

EDUCATION

Osnabrück University, Osnabrück, Germany

Ph.D., Cognitive Science, August 2022

- *Summa Cum Laude*
- Thesis Topic: *Immersiorama, immersive, yet controlled*
- Supervisors and examination board: Professor Dr. Peter König, Professor Dr. Gordon Pipa, Professor Dr. Lewis L. Chuang
- Area of Study: Cognitive and behavioral neuroscience, embodied cognition, virtual reality in behavioral studies

M.S., Cognitive Science, August 2018

- *With Distinction*
- Thesis Title: *Building Westdrive: Documentation of A Virtual Reality Experiment Using Verbal Feed-forward and Feedback*

- Supervisors: Professor Dr. Peter König, Professor Dr. Gordon Pipa
- Majors in: Neuroscience and Neuroinformatics

Isfahan University of Technology, Isfahan, Iran

B.S., Electrical and Computer Engineering, February 2014

- Computer Hardware Engineering (emphasis on computer architecture, programming and digital circuit design)

TEACHING
EXPERIENCE

Osnabrück University, Osnabrück, Germany. (student evaluations available as attachment)

Lecturer   **Spring 2019 to present**

- SoSe 2024 (Modeling of Synaptic Plasticity)
- WiSe 2021/22 (Human Robot Interaction)
- SoSe 2021 (Social Interaction in VR)
- SoSe 2021 (Advance Experiment Design in Unity and VR)
- WiSe 2020/21 (Dyadic Interactions in VR)
- WiSe 2020/21 (Introduction to Unity)
- WiSe 2020/21 (Colloquium of the Institute of Cognitive Science)
- SoSe 2020 (Advanced Experiment Design and Programming in Unity)
- SoSe 2020 (Introduction to Unity)
- SoSe 2020 (Colloquium of the Institute of Cognitive Science)
- WiSe 2019/20 (Ringvorlesung Vertrauen und Akzeptanz in erweiterten und virtuellen Arbeitswelten)
- SoSe 2019 (Ein interdisziplinärer Überblick zur methodischen Fundierung im VR/ AR-Bereich)
- SoSe 2019 (Experimental Design in Unity/VR)

Co-Lecturer   **Spring 2021 to present**

- WiSe 2022/23 (Neuroinformatics)
  - Undergraduate course in cognitive science introducing the Bayesian probability and regression.
  - Main Lecturer: Prof. Dr. Gordon Pipa

- SoSe 2022 (Neurodynamics)
  - Undergraduate and graduate course in cognitive science introducing various neuron models and foundation of dynamical systems.
  - Main Lecturer: Prof. Dr. Gordon Pipa

Study Projects   **Spring 2020 to present**

- WiSe 2024/25 (Computing With Spikes)
- SoSe 2020 and WiSe 2020/21 (Treatment of Eating Disorders in Virtual Reality Part II and III)

Tutor/Examiner   **fall 2022 to present**

- Examiner for bachelor module examination in Neuroinformatics and Neurodynamics.
- SoSe 2024 (Decoding Neuronal Activity)
  - Block seminar introducing the concepts of BCI, Fourier and wavelet transforms and EEG data analysis.
  - Lecturer: Prof. Dr. Gordon Pipa

- WiSe 2022/23 (Neuromorphic computing: Principles, Implementation of Computing with neuroinspired technologies)
  - External Lecturer: Dr. Daniel Brunner

- WiSe 2022/23 (How does a quantum computer work?)
  - External Lecturer: Dr. Peter Rabl

Isfahan University of Technology, Isfahan, Iran

Laboratory Instructor   **September 2009 to February 2013**
- WiSe2013/14 (Operation Systems Lab)
  - Reconstruct Lab course syllables based on Minix Operation System, Instruct new syllables, administered grades and assignments.

- WiSe2011/12 and SoSe 2012 (Micro controller Lab)
  - Instructed basics of micro controller programming and interfacing with external io devices and graded students.

- 2009 - 2011(Digital Design Lab)
  - 3 Winter semesters and 2 summer semesters
  - Instructed Verilog language, basic concepts of digital designed and graded the students.

Teaching Assistant   **September 2008 to February 2015**

- Winter 2013/14 (Co instruction of C programming course for computer engineering students)
  - Responsible for 1-hour hands on weekly lecture and grading of assignments.

- Co instruction of advance C++ programming course
  - Winter 2013/14 , Winter 2009/10
  - Responsible for 1-hour hands on weekly lecture and grading of assignments.

- Spring 2009 (Co instruction of advance programming with Java)
  - Responsible for 1-hour lecture and grading of assignment for students of the online course.

- 2008 and 2009 (Teaching assistant for general Computer programming course)
  - 2 winter and 2 summer semesters
  - Responsible for 1-hour lecture and design and grading of assignment for the computer programming course for non computer engineering student of the university.

Undergraduate Researcher   **September 2000 to March 2002**
- RTOS Research Team Leader and Researcher
  - Researched on different RTOS used in avionic systems i.e. Vxworks 653 and Integrity and Pike OS and Researched on international standard on this subject at university avionics center.

- Distributed Processing using Grid Processing
  - Researched as a research assistant on Grid scheduling algorithms i.e. multi objective genetic algorithms NSGA II and simulating environments.

- Researched on basic concepts of parallel processing using OpenMP and Multi-Threading with shared memory.
- Researched on features of Mach OS and Different scheduling algorithms provided by RT Mach OS, RT Mach OS architecture and environment.
- Researched and presented concepts discussed by TA-942 standard and considerations on building a data center.

PEER-REVIEWED
JOURNAL
PUBLICATIONS

[1] Huang, A., Derakhshan, S., Madrid-Carvajal, J., Nosrat Nezami, F., Wächter, M. A., Pipa, G., König, P. (2024). Enhancing Safety in Autonomous Vehicles: The Impact of Auditory and Visual Warning Signals on Driver Behavior and Situational Awareness. Vehicles, 6(3), 1613-1636.
doi:10.3390/vehicles6030076

[2] Derakhshan, S., Nosrat Nezami, F., Wächter, M. A., Stephan, A., Pipa, G., König, P. (2024). A Situated Inspection of Autonomous Vehicle Acceptance–A Population Study in Virtual Reality. International Journal of Human–Computer Interaction, 1-20.
doi:10.1080/10447318.2024.2358577

[3] Keshava, A., Gottschewsky, N., Balle, S., Nezami, F. N., Schüler, T., König, P. (2023). Action affordance affects proximal and distal goal-oriented planning. European Journal of Neuroscience, 57(9), 1546-1560.
doi:10.1111/ejn.15963

[4] Keshava, A., Gottschewsky, N., Balle, S., Nezami, F. N., Schüler, T., König, P. (2023). Action affordance affects proximal and distal goal-oriented planning. European Journal of Neuroscience, 57(9), 1546-1560.
doi:10.1111/ejn.15963

[5] Nezami, F. N., Derakhshan, S., Wächter, M. A., Czeszumski, A., Keshava, A., Lukanov, H., ... König, P. (2022). Talking cars, doubtful users—A population study in virtual reality. IEEE Transactions on Human-Machine Systems, 52(4), 602-612.
doi:10.1109/THMS.2022.3168437

[6] Nezami, F. N., Wächter, M. A., Maleki, N., Spaniol, P., Kühne, L. M., Haas, A., ... Pipa, G. (2021). Westdrive X LoopAR: An open-access virtual reality project in unity for evaluating user interaction methods during takeover requests. Sensors, 21(5), 1879.
doi:10.3390/s21051879

[7] Nezami, F. N., Wächter, M. A., Pipa, G., König, P. (2020). Project westdrive: Unity city with self-driving cars and pedestrians for virtual reality studies. Frontiers in ICT, 7, 1.
doi:10.3389/fict.2020.00001

[8] Kallioinen, N., Pershina, M., Zeiser, J., Nosrat Nezami, F., Pipa, G., Stephan, A., König, P. (2019). Moral judgments on the actions of self-driving cars and human drivers in dilemma situations from different perspectives. Frontiers in psychology, 10, 2415.
doi:10.3389/fpsyg.2019.02415

PREPRINT PAPERS

[9] Walter, J.L., Zerbe, J.A., Schmidt, V., Tiemann, L., Mildt, M., Pätzold, F., Nezami, F.N., König, P. and Czeszumski, A., 2022. LightNet: a networking library to perform multi-participant experiments in Virtual Reality.
doi:10.31234/osf.io/6a8t3

[10] Keshava, A., Nezami, F.N., Neumann, H., Izdebski, K., Schüler, T. and König, P., 2021. Low-level action schemas support gaze guidance behavior for action planning and execution in novel tasks. bioRxiv, pp.2021-01.
doi:10.1101/2021.01.29.428782

[11] Keshava, A., Gottschewsky, N., Balle, S., Nezami, F.N., Schueler, T. and Koenig, P., 2021. Realism Matters. Eye movements in VR reveal prior tool knowledge, intended interaction, and end-state comfort planning. bioRxiv.
doi:10.1101/2021.07.27.454022

CONFERENCE POSTERS	[12] Farbod N. Nezami, P. Nieters, M. J. Yang and G. Pipa. Event-Driven Memory: A Neuro-morphic Approach to Variable Timing, ICNCE Conference,June 3–6, 2024. ,Aachen, Germany.
	[13] Nezami, F. N., Zemliak, V., Nieters, P., and Pipa, G. Time scale-plasticity learning rule for dendritic neuron model to achieve online time-invariant sequence processing, NNPC Conference, October 25–27, 2023. ,Hannover, Germany. Poster Abstract
	[14] Powell, P., Jung, B., Kalcher, M. and Nezami, F.N., Neuromorphic Computing: History, Current Status, and Future, NNPC Conference, October 25–27, 2023. ,Hannover, Germany. Poster Abstract
	[15] Maleki, N., Mildt, M., Pätzold, F., Schmidt, V., Tiemann, L., Walter, J.L., Zerbe, J.A., Gütlin, D.C., Haas, A., Lang, A. and Nezami, F.N., A framework for low-level joint action in VR., NEC2021, 2021, 2023.,Online. Poster Abstract
	[16] Keshava, A., Nezami, F.N., Maleki, N., Tiemann, L. and König, P., 2021. Stress testing VR Eye-tracking System Performance. In Neuroergonomics Conference (Vol. 11). NEC2021, 2021, 2023.,Online. Poster Abstract
	[17] Nezami, F. N., Wächter, M. and König P. Talking cars, doubtful users a population study in virtual reality, MindBrain Conference, 2020. ,Berlin, Germany.
	[18] Nezami, F. N., Wächter, M. and König P. Project Westdrive: Unity City With Self-Driving Cars and Pedestrians for Virtual Reality Studies, 2019. CompCo Conference ,Osnabrück, Germany.
WORKSHOPS	[19] Nosrat Nezami, F. Virtual Reality for behavioral research. A unity workshop. 3rd Neuroergonimic Conference. 2021, Online.
	[20] Workshop for the profile line 1 "Digitale Gesellschaft - Innovation Regulierung", Innovation and Regulation regarding Self-Driving Cars., 2018, Osnabrück, Germany.
NON CONFERENCE INVITED TALKS	[21] Nosrat Nezami, F. Virtual Reality for behavioral research. USC, 2023, Santiago de Compostella, Spain.
	[22] Nosrat Nezami, F. Immersiorama, immersive, yet controlled. TU Chemnitz, 2023, Chemnitz, Germany.
	[23] Nosrat Nezami, F. and Wächter, M. Virtual Reality - Von menschlichen Ver-halten bis zur Städteplanung. OSNAHack, 2021, Osnabrück, Germany.
	[24] Nosrat Nezami, F. and Wächter, M. Selbsterklärende künstliche Intelligenzund virtuelle Autos: Ein Forschungprojekt der Uni Osnabrück und der Stiftung Stahlwerk Georgsmarienhütte. IdeenExpo, 2019, Hannover, Germany.
	[25] Nosrat Nezami, F. and Wächter, M. Projekt Westdrive: Mensch-Maschine Interaktion in der virtuellen Realität. BMBF KarliczekImpulse, 2019, Berlin, Germany.
OTHER PUBLICATIONS	[26] Nezami, F. N. (2022). Immersiorama immersive, yet controlled: cognitive science in virtual world, an argument for virtual reality as an improvement to laboratory (Doctoral dissertation, Osnabrück). doi:10.48693/171
GRANTS	**Awarded**
	[1] Co-Principal Investigator, "MemDance", DFG SPP2662, 600.000€, February 2024 to February 2027.
	[2] Author, "Intel Loihi implementation project", Intel, Access to Intel Liohi system in cloud, March 2022 to present.

Graduate Students

- **Sönke Lüft**, on going, Master Thesis, First Supervisor, Cognitive Science
  Scientific evaluation of physics engines for reinforcement learning.

- **Hendrik Alexander Timm**, 2024, Master Thesis, First Supervisor, Cognitive Science
  Enhancing District Heating System Localization of Underground Heating Pipes through an Augmented Reality Application: A case study.

- **Piper N. Powell**, 2023, Master Thesis, First Supervisor, Cognitive Science
  Do You See What I See? Applying a Spiking Neural Network to Visual Data Classification.

- **Till Holzapfel**, 2023, Master Thesis, First Supervisor, Cognitive Science
  e-merge - Engineering Android Compatible Semi-Corporeal Avatars using Liminal Molecular Somaesthetics in Unity.

- **Manushaqe Berisha**, 2023, Master Thesis, First Supervisor, Cognitive Science
  Studie zur Akzeptanz von Pflegerobotern in der virtuellen Realität anhand eines Experimentes und Literaturrecherche.

- **Ivan Polivanov**, 2023, Master Thesis, First Supervisor, Cognitive Science
  Virtual Reality as a Tool for Improving Study Performance: A Comparison of Familiar and Novel Classroom Environments.

- **Elisa Percolla**, 2023, Master Thesis, Second Supervisor, Cognitive Science
  Tactile Oddball for the Detection of Attention Impairments in Parkinson's Disease: an ERP analysis.

- **Sangah Lee**, 2022, Master Thesis, First Supervisor, Cognitive Science
  Literature Review on Diagnoses and Treatments of Psychological Disorders Using Virtual Reality.

Undergraduate Theses Supervision

- **Adriane Pelikan**, on going, Bachelor Thesis, First Supervisor, Cognitive Science
  To be decided.

- **Lea Friedemann**, 2024, Bachelor Thesis, First Supervisor, Cognitive Science
  Can the Somato-Dendritic Mismatch be useful in solving the Credit Assignment Problem in Spiking Neural Networks?

- **Benedikt Jung**, 2024, Bachelor Thesis, Second Supervisor, Cognitive Science
  Possibility of integrating a limited language model into a large language model.

- **Wookyung Lee**, 2024, Bachelor Student, Second Supervisor, Cognitive Science
  Thesis topic: Kernel Selection for Support Vector Machines: Mathematical Foundations and Empirical Insights.

- **Lisa Golla**, 2024, Bachelor Student, First Supervisor ,Cognitive Science
  Thesis topic: Timing distributions of sequence elements for dendritic sequence processing.

- **Esma Sakalli**, 2024, Bachelor Student, First Supervisor ,Cognitive Science
  In what way do immersive VR environments effectively mitigate social anxiety in individuals by providing exposure therapy.

- **Imogen Hüusing**, 2024, Bachelor Student, First Supervisor ,Cognitive Science
  Robot vs. Human - A Study comparing the Impact of Vendor Appearance on Spending Behavior in a Virtual Reality Market Place.

- **Alina Krause**, 2023, Bachelor Student, Second Supervisor, Cognitive Science
  Thesis topic: Do Deep Neural Networks learn Representation Compression?

- **Jule Margarete Körner**, 2023, Bachelor Student, Second Supervisor, Cognitive Science
  Can Social Robots Improve People's Attitudes Towards Individuals Who Stutter? A Co-Design Study

- **Rabia Dilawar**, 2023, Bachelor Student, Second Supervisor, Cognitive Science
  Comparing Visual and Tactile Oddball Paradigm on the basis of N200 and P300 components.

- **Pia Schröter**, 2023, Bachelor Student, First Supervisor, Cognitive Science
  Accessibility in Video Games: Designing and Developing a Concept for Accessibility in Mobile Games for Blind and Visually Impaired People.

- **Shari Hiltner**, 2023, Bachelor Student, Second Supervisor, Cognitive Science
  Hyperscanning: A Method to Study Brain and Physiological Signals during Social Interaction in the Chilean Perspective.

- **Jana Valentina Stefan**, 2023, Bachelor Student, First Supervisor, Cognitive Science
  entitled Interaction with neurons: a pilot study for a VR-based learning element used in schools.

- **Manushaqe Berisha**, 2020, Bachelor Student, First Supervisor, Cognitive Science
  Eine Literaturrecherche über die Kombination von Eye Tracking und Virtual Reality.

- **Lea M. Kühne**, 2020, Bachelor Student, First Supervisor, Cognitive Science, *Thesis is awarded the prize for best bachelor thesis in Niedersachsen*
  High-risk traffic scenarios on a country road in virtual reality for highly automated vehicle simulations in take-over situations.

Undergraduate Research

- **Tim Bax, Nora Maleki, Linus Tiemann, Philip Spaniol, Johannes Maximilian Pingle, Sumin Kim, Lynn Keller, Anke Haas, Frederik Nienhaus**
  Undergraduate student in Cognitive Science, Osnabrück University.

PROFESSIONAL
SERVICE

Referee Service
- *journal, Ethics and Information Technology*
- *Ethics and information technology*
- *IEEE transactions on human-machine systems*
- *CompCo Conference 2023 Osnabrück*

Conference Service
- Organizer and poster chair for: "3rd International Neuroergonomics Conference", 2021, Online, September 11–16, 2021.

PROFESSIONAL
EXPERIENCE

Osnabrück University, Osnabrück, Germany

Postdoctoral researcher	**December 2021**
Laboratoy Manager	**September 2018 to December 2021**

- Managing, organizing and maintaining the equipments, hardware and software of the VR Lab

Research Assistant **September 2018 to December 2021**

- Built Project Westdrive
- Built Project Westdrive LoopAR
- Built and Managed project Westdrive exhibition experiment at German ministry of research and education
- Built and Managed project Westdrive exhibition experiment at MS-Wissenschaft 2019

Student Assistant **March 2018 to August 2018**

- Designed and Developed new hardware for the mobile EEG recording device "Traumschreiber"

Paya Communication Industries Co. Ltd., Tehran, Iran

Linux Driver Developer **April 2014 - October 2014**
- Developing Linux driver for E1/T1 16 link PCI express cards based on Digium's DAHDI Drivers

Linux System Developer **April 2014 - October 2014**

- Developing ITC V5.2 protocol stack for asterisk VoIP systems as a library on Linux systems

Developer **September 2012 - March 2014**

- Designed and Developed a Ticketing System for the company and Mobinnet communications

LANGUAGE SKILLS

Persian **Native**

German **Fluent C2**

English **Fluent C2**

Mandarin Chinese **Functional B1/2**

HARDWARE AND SOFTWARE SKILLS

Analog and Digital Electronics:
- Basics of Bipolar and FET implementation
- SPICE

Hardware design:
- Software and hardware development with several micro-controllers and DSP platforms (for example Texas Instruments DSP's, Atmel ATmega MCU's)
- Digital circuit and processor design using Verilog on Xilinx FPGAs

Computer Programming:
- C, C++, C#, Java, JavaScript, PHP, Verilog, R, Python, Julia, UNIX shell scripting, GNU make, SQL, MySQL, and others

Numerical Analysis:
- MATLAB, R

Version Control and Software Configuration Management:
- Git, SVN

Mathematical skill set using Python and R:
- Linear algebra, Fourier transforms, dynamical systems simulation, polynomials, statistics, visualization, signal processing, TensorFlow

Information/Internet Technology:
- Basic Networking (UDP, TCP, ARP, DNS, Dynamic routing), Services (Apache, SQL, POP, IMAP, SMTP, etc.)

Desktop Editing and Productivity Software:
- Vim,
- TEX (LATEX, BIBTEX),
- Microsoft Office, OpenOffice.org, LibreOffice, Google Docs
- Microsoft PowerPoint, Google Slides
- GIMP, Ink-scape, Photoshop, Affinity Publisher, Affinity Photos
- OBS Studio and basic video editing for educational content creation

Operating Systems:
- Microsoft Windows family, Apple OS X, Linux, BSD

EXPERTISE Mathematics:
- Applied Mathematics, Dynamical Systems and Bifurcation/Fix point analysis, Frequentist Statistics and tests, Bayes theorem.
- Probability, Random Variables, Information Theory, Signals and Systems theory (Fourier and Wavelet transform, Sampling theory)

Computer Science and Engineering:
- algorithm design, computer architecture, Assembly and machine language, VLSI, digital circuit design

Natural and Social Sciences (Neuroscience, Psychology):
- Cognitive Psychology, EEG and neuroimaging techniques and analysis, eye tracking, Language Evolution, neuromodeling, neurodynamics

Machine learning:
- Classical Machine learning algorithms and method (such as regression, decision trees, clustering methods, etc) and classical computer vision.
- Artificial neural network (Convolution, Recurrent, Auto-encoders)
- Spiking neural networks and plasticity algorithms (LIF, Izhikevich neuron, STDP, RSTDP, Oja and BCM learning)

AWARDS Hans Mühlenhoff Nachwushpreis
- Nominated for best academic teaching, 2022
- Nominated for best academic teaching, 2020

Nomination documents are available in attachments

- VR Hacketon Best Prototype Winner Hannover 2017
- VR Hacketon Winner, VR Days Amsterdam, 2017
- VR Hacketon Best App by hacker choice, Hannover, 2017

REFERENCES
AVAILABLE TO
CONTACT

Dr. Gordon Pipa (e-mail: gpipa@uos.de; phone: +49541 969-2390)
- Professor, Institute of Cognitive Science, Osnabrück University
- ◇ Wachsbleiche 27, 49090 Osnabrück, Germany
- ⋆ *Dr. Pipa is my current postdoctoral supervisor.*

Dr. Peter König (e-mail: pkoenig@uos.de; phone: +49541 969-2399)
- Professor, Institute of Cognitive Science, Osnabrück University
- ◇ Wachsbleiche 27, 49090 Osnabrück, Germany
- ⋆ *Dr. König was my doctoral supervisor.*

Dr. Lewis L. Chuang (e-mail: lewis.chuang@phil.tu-chemnitz.de; phone: +49 371 531-31638)
- Professor, Institute for Media Research, University of Technology Chemniz
- ◇ Straße der Nationen 12, 09111 Chemnitz, Germany
- ⋆ *Dr. Chuang was external doctoral refere and mentor.*

NON ACADEMIC
ACTIVITY

- Board member of DIAR e.V. (Deutschiranischer Austauschraum)
- Board member of Forró do bom e.V.
- Former member of AEGEE Osnabrück
- Former member of Campus ohne Grenzen Osnabrück
- Organized AEGEE Osnabrück summer school 2016

NON ACADEMIC
INTERESTS

- Board Games and TTRPG games
- Bouldering
- Hiking

MORE
INFORMATION

http://www.farbodnezami.me/.