

Fateme GHAYEM

2023–Now Postdoctoral research fellow
MIND team, Inria, Paris-Saclay, France

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EDUCATION **Université Grenoble Alpes**, Grenoble, France

Ph.D. in Signal, Image, Parole, and Télécoms, GIPSA-lab, Oct 2017 – Nov 2020

- Thesis topic: *Optimal sensor placement for source extraction*
- Advisor: Prof. Christian JUTTEN, Dr. Bertrand RIVET

Sharif University of Technology, Tehran, Iran

M.Sc., *Electrical Engineering*, Sept 2013 – Sept 2015 GPA: 17.06/20

- Thesis topic: *MR image reconstruction from highly partial Fourier samples*
- Advisor: Prof. Farokh Marvasti

Shiraz University, Shiraz, Iran

B.Sc., *Electrical Engineering*, Sept 2009 – Sept 2013 GPA: 17.85/20

National Organization for Development of Exceptional Talents, Shiraz, Iran

Diploma, *Mathematics and Physics*, Sept 2005 – Sept 2009 GPA: 19.60/20

RESEARCH Knowledge and representation integration on the brain, statistical signal & image processing,
INTERESTS Bayesian modeling, machine learning, numerical optimization, dictionary learning, optimal
sensor placement for source extraction, and independent component/vector analysis
(ICA/IVA) for multi-subject resting-state fMRI study.

RESEARCH • **Postdoctoral researcher** (March 2023–Now), MIND, Inria Paris-Saclay, France.
EXPERIENCES

- Advisor: Dr. Bertrand Thirion
- Co-advisor: Dr. Demian Wassermann
- Research topic: Knowledge and representation integration on the brain
- Summary:
The project aims to develop a novel approach for image representation in the context of brain imaging, enabling a more nuanced and flexible assessment of the associations between images and arbitrary queries, unconstrained by traditional “bag of words” limitations. In other words, we want to:
 - * Provide reliable knowledge from diverse brain studies;
 - * Address challenges such as lack of statistical power in individual studies, reproducibility, and terminology inconsistency;
 - * Provide insights into the relationship between brain structure and behavior.

• **Postdoctoral researcher** (August 2021–August 2022), MLSP-Lab, University of Maryland, Baltimore County (UMBC), Maryland, USA.

- Advisor: Prof. Tulay Adali
- Research topics:

- Dictionary learning for the identification of new interpretable patterns and discriminative features from brain functional network connectivity (FNC) obtained from ICA decomposition of multi-subject resting-state fMRI data for static and dynamic studies.
- Brain graph neural networks (Brain-GNN) for the classification of healthy control and patients with different brain disorders, *e.g.*, Schizophrenia.
- Constrained ICA and IVA for subgroup identification from multisubject fMRI Data.
- Reproducibility and replicability in neuroimaging data analysis.
- **Research assistant** (2015–2017), DSP-lab, EE Department, Sharif University of Technology, Tehran, Iran.
 - Advisor: Prof. Massoud Babaie-Zadeh
 - Research topics: Dictionary learning for sparse representation, convex/non-convex optimization.

WORKSHOP COGBASES workshop on open science methods for analyzing brain imaging data, Paris, France, October 2023.

SUMMER SCHOOL PRAIRIE artificial intelligence summer school (PAISS), Grenoble, France, July 2018.

TALKS

- **Exploring brain function and structure: From sparse coding to multimodal meta-analysis**, *Laboratoire de Physique de l'ENS de Lyon*, Lyon, France, February 2024.
- **New Interpretable Patterns and Discriminative Features from Brain Functional Network Connectivity using Dictionary Learning**, *MIND team, Inria-Saclay*, Paris, France, September 2023.
- **Optimal Sensor Placement for Source Extraction**, *MIND team, Inria-Saclay*, Paris, France, June 2023.
- **Optimal Sensor Placement for Source Extraction**, *Diagnostic and Interventional Adaptive Imaging (IADI)*, Nancy, France, January 2023.
- **Optimal Sensor Placement for Source Extraction**, *Centre de Recherche en Automatique de Nancy (CRAN), Department of Biology, Signals and Systems*, January 2021.

[Google Scholar profile](#)

UNDER PREPARATION

1. **F. Ghayem**, R. Meudec, J. Dockès, D. Wassermann, B. Thirion, “Efficient Representation Learning Framework for the Association of Neuroscientific Text and Brain Activation”, to be submitted to *International Conference on Medical Image Computing And Computer Assisted Intervention (MICCAI)*, March 2024.
2. R. Meudec, J. Dockès, **F. Ghayem**, D. Wassermann, B. Thirion, “Peaks2Image: Enriching neuroscientific publications through fMRI statistical image reconstruction from stereotactic coordinates”, to be submitted to *PLOS Computational Biology*, March 2024.
3. **F. Ghayem**, H. Yang, F. Kantar, S-J. Kim, V. D. Calhoun, T. Adali, “Dynamic Brain Network Analysis: Interpretable and Discriminative Patterns via Dictionary Learning”, to be submitted to *Sensors*, March 2024.

REFEREED
JOURNAL
PUBLICATIONS

1. **F. Ghayem**, B. Rivet, C. Jutten, R. Cabral Farias, “Robust sensor placement for signal extraction”, *IEEE Transactions on Signal Processing*, vol. 69, pp. 4513-4528, 2021.
2. **F. Ghayem**, M. Sadeghi, M. Babaie-Zadeh, S. Chatterjee, M. Skoglund, and C. Jutten, “Sparse signal recovery using iterative proximal projection”, *IEEE Transactions on Signal Processing*, vol. 66, no. 4, pp. 879–894, February 2018.

CONFERENCE
PUBLICATIONS

1. **F. Ghayem**, H. Yang, F. Kantar, S-J. Kim, V. D. Calhoun, T. Adali, “New Interpretable Patterns and Discriminative Features from Brain Functional Network Connectivity Using Dictionary Learning”, *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Rhodes island, June 2023.
2. H. Yang, **F. Ghayem**, B. Gabrielson, M. A. B. S. Akhonda, V. D. Calhoun, T. Adali, “Constrained independent component analysis based on entropy bound minimization for subgroup identification from multisubject fMRI data”, *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, June 2023.
3. H. Yang, MABS. Akhonda, **F. Ghayem**, Q. Long, VD. Calhoun, T Adali, “Independent Vector Analysis Based Subgroup Identification from Multisubject fMRI Data”, in *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, May 2022.
4. **F. Ghayem**, B. Rivet, Ch. Jutten, R. Cabral Farias, “Gradient-based algorithm with spatial regularization for optimal sensor placement”, in *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, May 2020.
5. **F. Ghayem**, B. Rivet, Ch. Jutten, R. Cabral Farias, “Optimal sensor placement for signal extraction”, in *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, May 2019.
6. M. Sadeghi, **F. Ghayem**, M. Babaie-Zadeh, S. Chatterjee, M. Skoglund, and C. Jutten, “L0Soft: ℓ_0 Minimization via Soft Thresholding”, in *Proceedings of the 27th European Signal Processing Conference (EUSIPCO)*, 2-6 September 2019.
7. **F. Ghayem**, M. Sadeghi, M. Babaie-Zadeh, and C. Jutten, “Accelerated dictionary learning for sparse signal representation”, in *13th International Conference on Latent Variable Analysis and Signal Separation, LVA/ICA*, Grenoble, France, 2017.
8. **F. Ghayem** and F. Rassaie, “Helical antenna to measure radiated power density around a BTS; Design and implementation”, in *third Asia-Pacific Conference on Antennas and Propagation (APCAP)*, July 2014.

CO-SUPERVISION

I have been co-supervising three Ph.D. students in collaboration with Prof. Tulay Adali (University of Maryland, Baltimore County, USA), Prof. Jean-Christophe Pesquet (CentraleSupélec, Université Paris-Saclay, France), Prof. Vince D. Calhoun (Translational Research in Neuroimaging and Data Science, USA), and Dr. Seung-Jun Kim (University of Maryland, Baltimore County, USA) on the following projects:

- Brain graph neural networks (Brain-GNN) for the classification of healthy control and patients with different brain disorders, e.g. Schizophrenia.
- ICA and IVA for subgroup identification from multisubject resting state fMRI Data.
- Reproducibility and replicability in neuroimaging data analysis.

TEACHING ASSISTANTSHIP	Signals and Systems 2015 - Responsible: Prof. M. Babaei-Zadeh, Sharif University of Technology Digital Signal Processing II 2014 - Responsible: Prof. F. Marvasti, Sharif University of Technology Signals and Systems 2013 - Responsible: Dr. M. Derakhtian, Shiraz University Electromagnetics 2012 - Responsible: Dr. M. Derakhtian, Shiraz University Electrical Circuit II 2011 - Responsible: Prof. M. A. Masnadi-Shirazi, Shiraz University
HONORS & AWARDS	- Ph.D. scholarship (ranked 2), Université Grenoble Alpes, Grenoble, France. 2017 - Full travel grant (CHESS project), LVA/ICA workshop, Grenoble, France. 2017 - Bronze award in math competition among high school students, Sharif University of Technology. 2008 - Admitted to National Organization for Development of Exceptional Talents 2005 (NODET) as high school and pre-university school student.
COMPUTER SKILLS	<ul style="list-style-type: none"> • <i>Programming Languages and Softwares:</i> Python, PyTorch, MATLAB • <i>Typesetting:</i> L^AT_EX • <i>Toolbox:</i> GIFT
COMMUNITY SERVICES	Reviewer for the following journals and conferences: - IEEE Transactions on Medical Imaging 2023 - IEEE Transactions on Signal Processing 2019–2022 - IEEE Signal Processing Letters 2019, 2021, 2023 - International Conf. on Acoustics, Speech, and Signal Proc. (ICASSP) 2023 - European Signal Processing Conference (EUSIPCO) 2019–2021 - eNeuro 2022 - Machines 2022–2023
LANGUAGE PROFICIENCY	- English (Fluent) - French (Intermediate) - Persian (Native)
HOBBIES AND INTERESTS	Playing the violin, running, hiking, biking
REFERENCES	<ul style="list-style-type: none"> • Prof. Christian Jutten christian.jutten@gipsa-lab.grenoble-inp.fr • Prof. Massoud Babaie-Zadeh mbzadeh@sharif.edu • Dr. Bertrand Thirion bertrand.thirion@inria.fr • Dr. Demian Wassermann demian.wassermann@inria.fr • Dr. Bertrand Rivet bertrand.rivet@gipsa-lab.grenoble-inp.fr • Prof. Tulay Adali Adali@umbc.edu