Fateme GHAYEM

2023–Now — Postdoctoral research fellow
TANGRAM team, Inria, Nancy, France

Contact Information

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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 Interests

- Machine learning and statistical signal processing in medical applications
- Bayesian modeling, numerical optimization, and dictionary learning
- Aneurysm detection with deep learning
- Brain meta-analysis with large language models (LLM)
- Independent component/vector analysis (ICA/IVA) for multi-subject fMRI study
- Optimal sensor placement for source extraction

Research Experiences

- **Postdoctoral researcher** (2025–Now), TANGRAM, Inria Nancy, France.
  - Advisor: Dr. Erwan Kerrien
  - Research topic: Deep learning methods for aneurysm detection.
  - Summary:
  The project focuses on developing deep learning approaches for reliable aneurysm detection from MRA and related modalities. The objectives are to:
    * Improve accuracy and robustness of aneurysm detection using advanced neural architectures;
    * Improve weakly annotated datasets for model training, as well as apply data augmentation techniques and multi-modal data analysis to address the data size limitation.

- **Postdoctoral researcher** (March 2023–2025), MIND, Inria Paris-Saclay, France.
  - 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.

Posters

"NeuroConText: Contrastive Text-to-Brain Mapping for Neuroscientific Literature", Organization for Human Brain Mapping (OHBM), Brisbane, Australia, 2025.

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

- **NeuroConText: Contrastive Learning for Neuroscience Meta-Analysis with Rich Text Representation**, *The British Council in Paris*, Paris, France, September 2025.
- **Exploring Brain Function and Structure: From Sparse Coding to Multimodal Meta-Analysis**, *TANGRAM team, Inria-Nancy*, Nancy, France, March 2025.
- **Exploring Brain Function and Structure: From Sparse Coding to Multimodal Meta-Analysis**, *Laboratoire de Physique de l'ENS de Lyon*, Lyon, France, February 2024.

- **Multi-subject fMRI Analysis for Brain Pattern Discovery and Subgroup Identification**, *MIND team, Inria-Saclay*, Paris, France, June 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*, Nancy, France, January 2021.

Google Scholar profile

Preprints

1. **F. Ghayem**, R. Meudec, J. Dockès, B. Thirion, D. Wassermann, "NeuroConText: Contrastive Learning for Neuroscience Meta-Analysis with Rich Text Representation," submitted to *Imaging Neuroscience*, July 2025. [Paper] [Codes]
2. R. Meudec, J. Dockès, **F. Ghayem**, D. Wassermann, B. Thirion, "Peaks2Image: Reconstructing fMRI Maps from Stereotactic Coordinates to Enhance Cognitive Meta-Analysis," submitted to *Imaging Neuroscience*, August 2025. [Paper]

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. R. Meudec*, **F. Ghayem***, J. Dockès, D. Wassermann, B. Thirion, "NeuroConText: Contrastive Text-to-Brain Mapping for Neuroscientific Literature", *International Conference on Medical Image Computing And Computer Assisted Intervention (MICCAI)*, October 2024.
   *** Equal contribution**
2. **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.
3. 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.
4. 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.

5. **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.

6. **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.

7. 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.

8. **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.

9. **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 co-supervised 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

Signal Processing 2024-2025
- 12 hours lectures + 24 hours practical sessions
- Université de Lorraine

Signals and Systems 2015
- 10 hours practical sessions
- Responsible: Prof. M. Babaei-Zadeh, Sharif University of Technology

Digital Signal Proccessing II 2014
- 10 hours practical sessions
- Responsible: Prof. F. Marvasti, Sharif University of Technology

Signals and Systems 2013
- 20 hours practical sessions
- Responsible: Dr. M. Derakhtian, Shiraz University

Electromagnetics 2012
- 20 hours practical sessions
- Responsible: Dr. M. Derakhtian, Shiraz University

Electrical Circuit II 2011
- 20 hours practical sessions
- Responsible: Prof. M. A. Masnadi-Shirazi, Shiraz University

Qualifications

I am qualified to serve as Maître de Conférences, Section 26 – Mathématiques appliquées et applications des mathématiques.

Honors & Awards

- IEEE TMI Distinguished Reviewer Silver Level 2023 – 2024 — 2024
- 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 (NODET) as high school and pre-university school student. — 2005

Computer skills

- *Programming Languages and Softwares:* Python, PyTorch, MATLAB
- *Typesetting:* LaTeX
- *Toolbox:* Nilearn, GIFT

Community services

Reviewer for the following journals and conferences:

- AAAI — 2026
- ICML — 2025
- NeurIPS — 2024-2025
- Journal of Machine Learning Research — 2024-2025
- IEEE Transactions on Machine Learning Research — 2024-2025
- IEEE Transactions on Medical Imaging — 2023–2026
- 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

- 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