Fateme GHAYEM

Research scientist

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

Statistical signal and image processing, Bayesian modeling, Machine learning, Numerical optimization, Dictionary learning, Optimal sensor placement for source extraction, Independent component analysis (ICA) and independent vector analysis (IVA) for multi-subject resting-state fMRI study, and Graph neural net (GNN).

RESEARCH EXPERIENCES

- **Postdoctoral researcher** (August 2021–August 2022), MLSP-Lab, University of Maryland, Baltimore County (UMBC), Maryland, USA.
  - Advisor: Prof. Tulay Adali
  - Research topic:
    - 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 - static and dynamic study
    - Brain graph neural net (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.

Summer School PRAIRIE artificial intelligence summer school (PAISS),July 2018, Grenoble, France.

Google Scholar profile

Preprints

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", submitted to *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 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", submitted to *International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2023.

Refereed Journal Publications

1. **F. Ghayem**, B. Rivet, Ch. 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. 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.
2. **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.
3. **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.
4. 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.
5. **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.
6. **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:

- Interpretable brain graph neural net (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 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 Proccessing 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 (NODET) as high school and pre-university school student. 2005

Computer skills

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

Community services

Reviewer for the following journals and conferences:

- IEEE Transactions on Signal Processing 2019–2022
- IEEE Signal Processing Letters 2019
- International Conf. on Acoustics, Speech, and Signal Proc. (ICASSP) 2023
- European Signal Processing Conference (EUSIPCO) 2019–2021
- eNeuro 2022
- Machines 2022

Language Proficiency

- Persian (Native)
- English (Fluent)
- French (Intermediate)

Hobbies and Interests

Playing the violin
Running, hiking, biking

References

- Prof. Massoud Babaie-Zadeh mbzadeh@sharif.edu
- Prof. Christian Jutten christian.jutten@gipsa-lab.grenoble-inp.fr
- Dr. Bertrand Rivet bertrand.rivet@gipsa-lab.grenoble-inp.fr
- Prof. Tulay Adali Adali@umbc.edu