# Trung Vu, Ph.D.


**Contact Information**

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**Education**

**Oregon State University (OSU)**, Corvallis, OR 97330, USA 2016-2022
Ph.D., Computer Science Advisor: Raviv Raich
Dissertation: Convergence Analysis Framework for Fixed-Point Algorithms in Machine Learning and Signal Processing

**Hanoi University of Science and Technology (HUST)**, Hanoi, Vietnam 2009 - 2014
B.Eng., Computer Science, *Honors program*: Talented Engineers

**Research Interest**

Optimization methods, convergence analysis, independent component/vector analysis, blind source separation, machine learning for signal processing

**Work Experiences**

**Postdoctoral Research Associate at UMBC** 2023–now
- Supervisor: Tülay Adalı
- Description:
  - Developing efficient data-driven methods for fMRI data analysis, with a focus on independent component/vector analysis (ICA/IVA) for joint blind source separation (BSS) — authored in 1 journal paper and 2 conference papers; co-authored 1 journal paper and 3 conference papers
  - Writing 1 grant proposal, mentoring 3 graduate students in the MLSP lab at UMBC, giving 2 guest lectures in ENEE 718 (optimization methods) and being co-instructor in ENEE 620 (probability and random processes)

**Teaching Assistant (TA) at OSU** 2016–2022
- Supervisor: Eric Ianni
- Courses: CS 290 - Web Development (8 quarters), CS 362 Software Engineering II (1 quarter), ECE 464/564 - Digital Signal Processing (1 quarter), CS 261 - Data Structures (1 quarter), CS 271 - Computer Architecture and Assembly Language (2 quarters)
- Description: Grading homework assignments and exams, holding weekly office hours and review sessions, revising course materials (improving structure and strengthening assessments)

**Head TA at OSU** 2022
- Courses: CS 290 - Web Development (2 quarters)
- Description: Leading a group of 6 TAs to ensure the service quality of a class of 200 students, communicating with both instructors and TAs about weekly duties and grading progress, setting an example for other TAs to follow

**Selected Publications**

## Journals

1. **Trung Vu**, Francisco Laport, and Hanlu Yang, Vince D. Calhoun, and Tülay Adalı, "Constrained Independent Vector Analysis with Reference for Multi-Subject fMRI Analysis", 2023 (Under review)

2. **Trung Vu**, Raviv Raich, and Xiao Fu, "On Local Linear Convergence of Gradient Projection for Unit-Modulus Least Squares", IEEE Transactions on Signal Processing, vol. 71, pp. 3883–3897, 2023

3. Hanlu Yang, **Trung Vu**, Qunfang Long, Vince Calhoun, and Tülay Adali. "Identification of Homogeneous Subgroups from Resting-State fMRI Data", Sensors, no. 6, vol. 23, pp. 3264, 2023

4. **Trung Vu**, Evgenia Chunikhina, and Raviv Raich, "On Asymptotic Linear Convergence Rate of Iterative Hard Thresholding for Matrix Completion", IEEE Transactions on Signal Processing, vol. 70, pp. 5940–5953, 2022

5. **Trung Vu** and Raviv Raich, "On Asymptotic Linear Convergence of Projected Gradient Descent for Constrained Least Squares", IEEE Transactions on Signal Processing, vol. 70, pp. 4061–4076, 2022

6. **Trung Vu** and Raviv Raich, "A Closed-Form Bound on the Asymptotic Linear Convergence of Iterative Methods via Fixed Point Analysis", Optimization Letters, vol. 1, pp. 1–14, 2022

7. **Trung Vu**, Evgenia Chunikhina, and Raviv Raich, "Perturbation Expansions and Error Bounds for the Truncated Singular Value Decomposition", Linear Algebra and Its Applications, vol. 627, pp. 94–139, 2021.

8. **Trung Vu**, Phung Lai, Raviv Raich, Anh Pham, Xiaoli Z. Fern and UK Arvind Rao, "A Novel Attribute-based Symmetric Multiple Instance Learning for Histopathological Image Analysis", IEEE Transactions on Medical Imaging, vol. 39, no. 10, pp. 3125–3136, 2020

## Conference papers

1. **Trung Vu**, Hanlu Yang, Francisco Laport, Ben Gabrielson, Vince D. Calhoun, and Tülay Adalı, "A Robust and Scalable Method with an Analytic Solution for Multi-Subject fMRI Data Analysis", In Proceedings of IEEE International Conference on Acoustics Speech and Signal Processing (ICASSP). IEEE, 2024 (Under review)

2. **Trung Vu**, Francisco Laport, Hanlu Yang, and Tülay Adalı, "Constrained Independent Vector Analysis with References: Algorithms and Performance Evaluation", In Asilomar Conference on Signals, Systems, and Computers. IEEE, 2023

3. Francisco Laport, **Trung Vu**, Hanlu Yang, Vince Calhoun, and Tülay Adalı, "Reproducibility in Joint Blind Source Separation: Application to fMRI Analysis", In Asilomar Conference on Signals, Systems, and Computers. IEEE, 2023

4. **Trung Vu** and Raviv Raich, "On the Asymptotic Linear Convergence of Gradient Descent for Nonsymmetric Matrix Completion", In Asilomar Conference on Signals, Systems, and Computers. IEEE, 2023

5. **Trung Vu** and Raviv Raich, "Exact Linear Convergence Rate Analysis for Low-Rank Symmetric Matrix Completion via Gradient Descent", In Proceedings of IEEE International Conference on Acoustics Speech and Signal Processing (ICASSP), pp. 3240–3244. IEEE, 2021

6. **Trung Vu**, Raviv Raich, and Xiao Fu, "On Convergence of Projected Gradient Descent for Minimizing a Large-scale Quadratic over the Unit Sphere", In Proceedings of IEEE International Workshop on Machine Learning for Signal Processing (MLSP), pp. 1–6. IEEE, 2019 — **Student Paper Award!**

7. **Trung Vu** and Raviv Raich, "Local Convergence of the Heavy Ball method in Iterative Hard Thresholding for Low-Rank Matrix Completion", In Proceedings of IEEE International Conference on Acoustics Speech and Signal Processing (ICASSP), pp. 3417–3421. IEEE, 2019

8. **Trung Vu** and Raviv Raich, "Accelerating Iterative Hard Thresholding for Low-Rank Matrix Completion via Adaptive Restart", In Proceedings of IEEE International Conference on Acoustics Speech and Signal Processing (ICASSP), pp. 2917–2921. IEEE, 2019

9. **Trung Vu**, Raviv Raich, "Adaptive Step Size Momentum Method For Deconvolution", In Proceedings of IEEE Statistical Signal Processing Workshop (SSP), pp. 438–442. IEEE, 2018

# Professional Services

## Reviewer for journals and conferences

ICASSP 2018-2023 — 34 papers; MLSP 2018-2023 — 8 papers; IEEE Transactions on Signal Processing — 1 journal; Numerical Mathematics 2022 — 1 journal; IEEE Transactions on Medical Imaging 2022 — 1 journal; Signal Processing 2023 — 1 journal

## Talks

- Constrained Independent Vector Analysis with Reference for Multi-Subject fMRI Analysis, *IEEE Brain Discovery and Neurotechnology Workshop 2023*, Nov 9-10, Washington DC, USA (Poster)
- Constrained Independent Vector Analysis with References: Algorithms and Performance Evaluation, *ASILOMAR 2023*, Oct 28-31, California, USA (Poster)
- On Asymptotic Linear Convergence of Projected Gradient Descent for Constrained Least Squares, *IEEE SPS Technical Seminar 2022*, July 12, Oregon, USA (Presentation)
- On Convergence of Projected Gradient Descent for Minimizing a Large-scale Quadratic over the Unit Sphere, *MLSP 2019*, October 13-16, Pennsylvania, USA (Presentation)
- Accelerating Iterative Hard Thresholding for Low-Rank Matrix Completion via Adaptive Restart, *ICASSP 2019*, May 11-17, Brighton, UK (Presentation)
- Local Convergence of the Heavy Ball method in Iterative Hard Thresholding for Low-Rank Matrix Completion, *ICASSP 2019*, May 11-17, Brighton, UK (Poster)
- Adaptive Step Size Momentum Method for Deconvolution, *SSP 2018*, June 10-13, Freiburg, Germany (Poster)
- Accelerating Iterative Hard Thresholding for Low-Rank Matrix Completion via Adaptive Restart, *Signal Processing group*, March 1, 2019, Oregon, USA (Departmental Talk)

## References

**Dr. Raviv Raich**
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Oregon State University, Corvallis, Oregon

**Dr. Tulay Adali**
Distinguished Professor — E-mail: adali@umbc.edu
Department of Computer Science and Electrical Engineering
University of Maryland, Baltimore County, Baltimore, Maryland

**Dr. Xiao Fu**
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