

# Tianyi Liu (刘添翼) | Dr.-Ing.

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## Education

<b>Technical University of Darmstadt</b>	<b>Darmstadt, Germany</b>
<i>Dr.-Ing. Electrical Engineering and Information Technology, with distinction</i>	2018–2024
<i>Thesis: A Parallel Successive Convex Approximation Framework with Smoothing Majorization for Phase Retrieval</i>	
<i>Advisor: Prof. Marius Pesavento</i>	
<b>Technical University of Darmstadt</b>	<b>Darmstadt, Germany</b>
<i>M.Sc. Electrical Engineering and Information Technology, with distinction</i>	2016–2018
Erasmus Double Degree Program between Technical University of Darmstadt and Politecnico di Torino	
<i>Thesis: A Scalable Graph-based Mixed-Integer Linear Programming Approach for the Examination Timetabling Problem</i>	
<b>Politecnico di Torino</b>	<b>Turin, Italy</b>
<i>M.Sc. Communications and Computer Networks Engineering, cum laude</i>	2015–2018
<b>Politecnico di Torino</b>	<b>Turin, Italy</b>
<i>B.Sc. Telecommunications Engineering</i>	2014–2015
Double Degree Program PoliTong between Politecnico di Torino and Tongji University	
<b>Tongji University</b>	<b>Shanghai, China</b>
<i>B.Eng. Electronics and Information Engineering</i>	2011–2015

## Research Experience

<b>Communication Systems Group, TU Darmstadt</b>	<b>Darmstadt, Germany</b>
<i>Postdoctoral Research Associate</i>	2024–present
<b>Communication Systems Group, TU Darmstadt</b>	<b>Darmstadt, Germany</b>
<i>Doctoral Research Associate</i>	2018–2024

## Teaching Experience

## Research Interests

- Sparse Signal Processing
- Parallel Optimization Methods
- Sensor Array Signal Processing
- Graph Topology Inference

## Honors and Awards

*Finalist of the IEEE SAM 2024 Best Student Paper Contest* 2024

## Publications

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### Theses.....

- [T1] T. Liu, "A parallel successive convex approximation framework with smoothing majorization for phase retrieval," Ph.D. dissertation, Technische Universität Darmstadt, Darmstadt, Oct. 2024. DOI: 10.26083/tuprints-00028201.
- [T2] T. Liu, "A scalable graph-based mixed-integer linear programming approach for the examination timetabling problem," M.S. thesis, Politecnico di Torino, Jul. 2018.

### Book Chapters.....

- [B1] K. Ardah, M. Haardt, T. Liu, F. Matter, M. Pesavento, and M. E. Pfetsch, "Recovery under side constraints," in *Compressed sensing in information processing*, G. Kutyniok, H. Rauhut, and R. J. Kunsch, Eds., Cham: Springer International Publishing, 2022, pp. 213–246, ISBN: 978-3-031-09745-4.

### Preprints.....

- [P1] T. Liu, S. P. Deram, K. Ardah, M. Haardt, M. E. Pfetsch, and M. Pesavento, *Gridless parameter estimation in partly calibrated rectangular arrays*, Jun. 2024. DOI: 10.48550/arXiv.2406.16041. arXiv: 2406.16041 [eess].
- [P2] T. Liu, F. Matter, A. Sorg, M. E. Pfetsch, M. Haardt, and M. Pesavento, *Maximum a posteriori direction-of-arrival estimation via mixed-integer semidefinite programming*, Oct. 2024. DOI: 10.48550/arXiv.2311.03501. arXiv: 2311.03501.

### Journal Articles.....

- [J1] R. Müller *et al.*, "A tensor model for the calibration of air-coupled ultrasonic sensor arrays in 3D imaging," *Signal Processing*, p. 109 812, Nov. 2024, ISSN: 0165-1684. DOI: 10.1016/j.sigpro.2024.109812.
- [J2] T. Liu, A. M. Tillmann, Y. Yang, Y. C. Eldar, and M. Pesavento, "Extended successive convex approximation for phase retrieval with dictionary learning," *IEEE Transactions on Signal Processing*, vol. 70, pp. 6300–6315, 2022, ISSN: 1941-0476. DOI: 10.1109/TSP.2022.3233253.

### Conference Proceedings.....

- [C1] T. Liu, S. P. Deram, K. Ardah, M. Haardt, M. E. Pfetsch, and M. Pesavento, "Gridless parameter estimation in partly calibrated rectangular arrays," in *ICASSP 2024 - 2024 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Apr. 2024, pp. 8796–8800. DOI: 10.1109/ICASSP48485.2024.10446959.
- [C2] T. Liu and M. Pesavento, "Blind phase-offset estimation in sparse partly calibrated arrays," in *2024 IEEE 13rd Sensor Array and Multichannel Signal Processing Workshop (SAM)*, Jul. 2024, pp. 1–5. DOI: 10.1109/SAM60225.2024.10636507.

- [C3] T. Liu, F. Matter, A. Sorg, M. E. Pfetsch, M. Haardt, and M. Pesavento, "Joint sparse estimation with cardinality constraint via mixed-integer semidefinite programming," in *2023 IEEE 9th International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, Herradura, Costa Rica, Dec. 2023, pp. 106–110. DOI: 10.1109/CAMSAP58249.2023.10403415.
- [C4] Y. Zhang, T. Liu, and M. Pesavento, "Direction-of-arrival estimation for correlated sources and low sample size," in *2023 31st European Signal Processing Conference (EUSIPCO)*, Sep. 2023, pp. 1559–1563. DOI: 10.23919/EUSIPCO58844.2023.10290019.
- [C5] T. Liu, A. M. Tillmann, Y. Yang, Y. C. Eldar, and M. Pesavento, "A parallel algorithm for phase retrieval with dictionary learning," in *IEEE International Conference on Acoustics, Speech and Signal Processing*, Jun. 2021, pp. 5619–5623. DOI: 10.1109/ICASSP39728.2021.9413991.
- [C6] X. Wang, T. Liu, M. Trinh-Hoang, and M. Pesavento, "GPU-accelerated parallel optimization for sparse regularization," in *2020 IEEE 11th Sensor Array and Multichannel Signal Processing Workshop (SAM)*, Jun. 2020, pp. 1–5. DOI: 10.1109/SAM48682.2020.9104328.
- [C7] T. Liu, M. Trinh-Hoang, Y. Yang, and M. Pesavento, "A block coordinate descent algorithm for sparse Gaussian graphical model inference with laplacian constraints," in *IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing*, Dec. 2019, pp. 236–240. DOI: 10.1109/CAMSAP45676.2019.9022643.
- [C8] T. Liu, M. Trinh-Hoang, Y. Yang, and M. Pesavento, "A parallel optimization approach on the infinity norm minimization problem," in *2019 27th European Signal Processing Conference (EUSIPCO)*, A Coruna, Spain: IEEE, Sep. 2019, pp. 1–5, ISBN: 978-90-827970-3-9. DOI: 10.23919/EUSIPCO.2019.8902548.