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LIANGZU PENG

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EDUCATION

University of Pennsylvania, Philadelphia, USA — August 2023 – Now
Ph.D. in Electrical and Systems Engineering
Advisor: Dr. René Vidal

Johns Hopkins Univerisity, Baltimore, USA — August 2021 – May 2023
Ph.D. in Electrical and Computer Engineering
(Transferred to UPenn)

ShanghaiTech Univerisity, Shanghai, China — September 2017 – June 2021
M.S. in Computer Science
Thesis: From Linear Regression Without Correspondences to Homomorphic Sensing

Zhejiang University, Hangzhou, China — September 2013 – June 2017
B.Eng. in Measurement Control Technology and Instruments
Thesis: Image Measurement Software for Visual Detection

WORK EXPERIENCE

Research Intern, Alibaba DAMO Academy, Bellevue, WA, USA — May 2023 – August 2023
Mentors: Dr. Xinshang Wang, Dr. Wotao Yin

Teaching Associate, NYU Shanghai, China — September 2020 – May 2021
Instructor: Dr. Siyao Guo

Intern, NYU Shanghai, China — February 2020 – June 2020
Instructor: Dr. Irith Hartman

PUBLICATIONS

(Co-)First Author Papers.

1. Block Acceleration Without Momentum: On Optimal Stepsizes of Block Gradient Descent for Least-Squares
   LP and Wotao Yin
   [ICML 2024]

2. Scalable 3D Registration via Truncated Entry-wise Absolute Residuals
   Tianyu Huang*, ***LP****, René Vidal, and Yun-Hui Liu — [*: Equal Contribution]
   [CVPR 2024] [arXiv]

3. HARD: Hyperplane ARangement Descent
   Tianjiao Ding*, ***LP****, and René Vidal — [*: Equal Contribution]
   [CPAL 2024, Oral Presentation]

4. Block Coordinate Descent on Smooth Manifolds: Convergence Theory and Twenty-One Examples
   LP and René Vidal
   [arXiv]

5. The Ideal Continual Learner: An Agent That Never Forgets

LP, Paris V. Giampouras, and René Vidal
[ICML 2023] [OpenReview] [CIVision Workshop 2023] [arXiv] [poster]

6. On the Convergence of IRLS and Its Variants in Outlier-Robust Estimation
   Highlight, 235/9155≈2.5% Acceptance Rate
   LP, Christian Kümmerle, and René Vidal
   [CVPR 2023] [pdf] [talk video] [slides] [poster]

7. Global Linear and Local Superlinear Convergence of IRLS for Non-Smooth Robust Regression
   LP, Christian Kümmerle, and René Vidal
   [NeurIPS 2022] [OpenReview] [arXiv] [code] [slides] [poster]

8. Semidefinite Relaxations of Truncated Least-Squares in Robust Rotation Search: Tight or Not
   Oral Presentation, 158/5803≈2.7% Acceptance Rate
   LP, Mahyar Fazlyab, and René Vidal
   [ECCV 2022] [arXiv] [slides] [talk video] [poster]

9. ARCS: Accurate Rotation and Correspondence Search
   Oral Presentation, 342/8161≈4.2% Acceptance Rate
   LP, Manolis C. Tsakiris, and René Vidal
   [CVPR 2022] [arXiv] [code] [slides] [talk video] [poster]

10. Homomorphic Sensing: Sparsity and Noise
    LP, Boshi Wang, and Manolis C. Tsakiris
    [ICML 2021] [pdf] [talk video]

11. Algebraically-Initialized Expectation Maximization for Header-Free Communication
    LP, Xuming Song, Manolis C. Tsakiris, Hayoung Choi, Laurent Kneip, and Yuanming Shi
    [ICASSP 2019] [pdf]

12. Homomorphic Sensing of Subspace Arrangements
    Applied and Computational Harmonic Analysis, 2021
    LP and Manolis C. Tsakiris
    [arXiv]

13. Linear Regression Without Correspondences via Concave Minimization
    IEEE Signal Processing Letters, 2020
    LP and Manolis C. Tsakiris
    [arXiv] [code]

Other Papers.

1. Efficient and Robust Point Cloud Registration via Heuristics-based Parameter Search
   Tianyu Huang, Haoang Li, ***LP***, Yinlong Liu, and Yun-Hui Liu
   IEEE Transactions on Pattern Analysis and Machine Intelligence, 2024
   [arXiv]

2. Unlabeled Principal Component Analysis and Matrix Completion
   Yunzhen Yao, ***LP***, and Manolis C. Tsakiris
   Journal of Machine Learning Research, 2024
   [JMLR Site] [arXiv]

3. Accelerating Globally Optimal Consensus Maximization in Geometric Vision
   Xinyue Zhang, ***LP***, Wanting Xu, and Laurent Kneip
   IEEE Transactions on Pattern Analysis and Machine Intelligence, 2024
   [arXiv]

4. Unlabeled Principal Component Analysis
   Yunzhen Yao, ***LP***, and Manolis C. Tsakiris
   [NeurIPS 2021] [OpenReview] [arXiv] [code]

5. Unsigned Matrix Completion
   Yunzhen Yao, ***LP***, and Manolis C. Tsakiris
   [ISIT 2021] [pdf]

6. An Algebraic-Geometric Approach to Linear Regression Without Correspondences
   IEEE Transactions on Information Theory, 2020
   Manolis C. Tsakiris, ***LP***, Aldo Conca, Laurent Kneip, Yuanming Shi, and Hayoung Choi
   [arXiv] [code]

7. Homomorphic Sensing
   Manolis C. Tsakiris and ***LP***
   [ICML 2019] [arXiv] [code]

Honors and Awards

Top Reviewer @NeurIPS 2022	2022
Highlighted Reviewer @ICLR 2022	2022
The Dean's Fellowship @UPenn	August 2023 – Now
GRO Conference Grants @JHU	June 2022
MINDS PhD Fellowship @JHU	Spring 2022

Talks

Low-rank Matrix Recovery From Unlabeled Data With Missing Entries
@INFORMS Annual Meeting, Phoenix, Arizona [slides] — October 2023

The Ideal Continual Learner: An Agent That Never Forgets
@AI TIME (Youth PhD Talk), Virtual [slides] — June 15, 2023

Fantastic Iteratively Reweighted Algorithms and Where to Find Them
@SIAM Conference on Optimization, Seattle, Washington [slides] — June 1, 2023

A Tale of Two Villains: Bandit, Procrustes, and Their Regrets
TheoriNet Retreat @Flatiron Institute, New York City [slides] — September 28, 2022

Rotation Search: Optimization Theory and Algorithms
@AI TIME (Youth PhD Talk), Virtual [slides v4] — December 8, 2022
@Center for Applied Mathematics of Henan Province, China, Virtual [slides v3] — September 23, 2022
@Vision Lab Retreat, Johns Hopkins University [slides v2] — September 9, 2022
@VITA, University of Texas at Austin, Virtual [slides v1] — August 17, 2022

Semidefinite Relaxations in Robust Rotation Search: Tight or Not
@ECCV, Virtual [slides] October 2022
@ICCOPT, Bethlehem, Pennsylvania [slides] July 2022

ARCS: Accurate Rotation and Correspondence Search
@CVPR, New Orleans, Louisiana [slides] [talk video] June 2022

Professional Service

Organzer:

Mini-Symposium @SIAM Conference on Optimization May 2023
with Christian Kümmerle and René Vidal
"Iteratively Reweighted Algorithms in Data Science: From Convexity to Nonconvexity"

Reviewer:

Conference on Uncertainty in Artificial Intelligence (2023)
International Conference on Computer Vision (2023)
IEEE International Conference on Acoustics, Speech and Signal Processing (2023)
International Conference on Artificial Intelligence and Statistics (2023, 2024)
Learning on Graphs Conference (2022)
European Conference on Computer Vision (2022, 2024)
Computer Vision and Pattern Recognition (2022 – 2024)
International Conference on Learning Representations (2022 – 2024)
Neural Information Processing Systems (2021 – 2023)
International Conference on Machine Learning (2021 – 2024)
zbMATH Open (2021 - 2023)
IEEE Transactions on Pattern Analysis and Machine Intelligence
IEEE Transactions on Signal Processing
IEEE Robotics and Automation Letters
Transactions on Machine Learning Research
Journal of Machine Learning Research

Teaching

Recitation Instructor:

CSCI-SHU 220, Algorithms Spring 2021, NYU-Shanghai
CSCI-SHU 220, Algorithms Fall 2020, NYU-Shanghai
CSCI-SHU 2314, Discrete Mathematics Spring 2020, NYU-Shanghai

Teaching Assistant:

SI 232, Subspace Learning Fall 2020, ShanghaiTech
CSCI-SHU 220, Algorithms Spring 2020, NYU-Shanghai
MATH 2111, Topological Data Analysis Spring 2020, ShanghaiTech
SI 232, Subspace Learning Fall 2019, ShanghaiTech
CS 133, Advanced C++ Programming Spring 2019, ShanghaiTech
SI 192, Applied Algebraic Geometry Spring 2019, ShanghaiTech
SI 112, Advanced Geometry Spring 2018, ShanghaiTech