

Fang Bai (Dr/He)

Postdoctoral Researcher in Vision

Surgical augmented reality (SURGAR), Clermont-Ferrand, France

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Ph.D. in Robotics

University of Technology Sydney, Sydney, Australia. 2016 – 2020

M.S. in System Analysis and Integration

Northeastern University, Shenyang, China. 2013 – 2015

B.S. in Computer Science and Technology

Nankai University, Tianjin, China. 2006 – 2010

Research Experience

- 3D Gaussian Splatting based camera self-calibration. (to be released soon)
- Procrustes analysis with deformations. IJCV2022, RSS2022, IJRR2023
- Proxy step-size for regularized optimization on the sphere manifold. T-PAMI2022
- Rolling shutter camera. CVPR2022
- Pose graph optimization. T-RO2021, RA-L2018, RA-L2023
- Change of optimal values. ICRA2020, IROS2018, RA-L2018
- Deformation graph and deformable SLAM. ICRA2020

Selected Publication

- Fang Bai, Kanzhi Wu, and Adrien Bartoli. KernelGPA: A globally optimal solution to deformable SLAM in closed-form. *International Journal of Robotics Research (IJRR)*, vol. 43, no. 4, pp. 456-484, 2024.
- Fang Bai, and Adrien Bartoli. The Proxy Step-size Technique for Regularized Optimization on the Sphere Manifold. *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, 45(5):6428-6444, 2022.
- Fang Bai, and Adrien Bartoli. Procrustes Analysis with Deformations: A Closed-Form Solution by Eigenvalue Decomposition. *International Journal of Computer Vision (IJCV)*, 130(2):567-593, 2022.
- Fang Bai, Teresa Vidal-Calleja, and Giorgio Grisetti. Sparse Pose Graph Optimization in Cycle Space. *IEEE Transactions on Robotics (T-RO)*, 37(5):1381-1400, 2021.

Occupation

- Visiting researcher 10/02/2024 — 25/04/2024
South China University of Technology, Guangzhou, China
- Visiting research fellow 07/11/2023 — 05/02/2023
Delta-NTU laboratory, Nanyang Technology University, Singapore

- Visiting researcher 31/10/2022 — 31/10/2023
Tongji University, Shanghai, China
I finalized the initial draft of my IJRR paper on KernelGPA (invited from RSS 2022) in Tongji, thanks to the hosting of Prof. Yi Dong. In Tongji, I advised Shaoran Yang (PhD) and Xin Hong (Master).
- Visiting researcher 24/03/2022 — 23/08/2022
Université Clermont Auvergne, Clermont-Ferrand, France
From April 2022, I finalized my TPAMI paper in UCA-EnCov France when applying for a visa to Australia. I flied back to China on September 28, 2022.
- Postdoctoral researcher 24/09/2020 — 23/03/2022
Université Clermont Auvergne, Clermont-Ferrand, France
I worked with Prof. Adrien Bartoli. I submitted my PhD thesis on Jan 27, 2020 and received my PhD degree on Nov 5, 2022. During the COVID lockdown, I revised my TRO paper in China.
- Visiting researcher 01/03/2019 — 30/06/2019
Sapienza University of Rome, Rome, Italy
- Visiting researcher 25/05/2017 — 12/06/2017
Zhejiang University, Hangzhou, China
PhD interns supported by UTS-ZJU joint research center.
- Junior Ph.D. candidate 12/03/2017 — 17/03/2017
Australia National University, Kioloa, Australia
Attending the Robotic Vision Summer School (RVSS) as a Junior Ph.D. candidate.

Practical Skill

- Programming: C++, Python, Matlab
- Library: GTSAM, OpenCV, SLAM++, PyTorch, Open3D
- Tool: Inkscape, LaTeX, Keynote, Ubuntu, CMAKE
- Language: English, Chinese

Review Service

- T-RO, IJRR, IJCV, RA-L, ICRA, IROS

Reference

- Teresa A. Vidal Calleja University of Technology Sydney, Sydney, Australia
Email: teresa.vidalcalleja@uts.edu.au
- Shoudong Huang (黄守东) University of Technology Sydney, Sydney, Australia
Email: shoudong.huang@uts.edu.au
- Giorgio Grisetti Sapienza University of Rome, Rome, Italy
Email: grisetti@diag.uniroma1.it
- Adrien Bartoli University Clermont Auvergne, Clermont-Ferrand, France
Email: adrien.bartoli@gmail.com

Publication List

Journals

- Keyu Chen, **Fang Bai**, Shoudong Huang, and Yuxiang Sun. “iMCB-PGO: Incremental Minimum Cycle Basis Construction and Application to Online Pose Graph Optimization”. *IEEE Robotics and Automation Letters (RA-L)*, vol. 9, no. 11, pp. 10185-10192, 2024.
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- **Fang Bai**, Kanzhi Wu, and Adrien Bartoli. “KernelGPA: A globally optimal solution to deformable SLAM in closed-form”. *International Journal of Robotics Research (IJRR)*, vol. 43, no. 4, pp. 456-484, 2024.
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- **Fang Bai**, and Adrien Bartoli. “The Proxy Step-size Technique for Regularized Optimization on the Sphere Manifold”. *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, vol. 45, no. 5, pp. 6428-6444, 2022.
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- **Fang Bai**, and Adrien Bartoli. “Procrustes analysis with deformations: A closed-form solution by eigenvalue decomposition”. *International Journal of Computer Vision (IJCV)*, vol. 130, no. 2, pp. 567-593, 2022.
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- **Fang Bai**, Teresa Vidal-Calleja, and Giorgio Grisetti. “Sparse pose graph optimization in cycle space”. *IEEE Transactions on Robotics (T-RO)*, vol. 37, no. 5, pp. 1381-1400, 2021.
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- **Fang Bai**, Teresa Vidal-Calleja, and Shoudong Huang. “Robust incremental SLAM under constrained optimization formulation”. *IEEE Robotics and Automation Letters (RA-L)*, vol. 3, no. 2, pp. 1207-1214, 2018.
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Proceedings

- **Fang Bai**, and Adrien Bartoli. “KernelGPA: A Deformable SLAM Back-end”. *Robotics: Science and Systems (RSS)*, XVIII.002, New York, 2022.
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- **Fang Bai***, Agniva Sengupta*, and Adrien Bartoli*. “Scanline homographies for rolling-shutter plane absolute pose”. *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 8993-9002, New Orleans, 2022.
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- **Fang Bai**. “Change of optimal values: A pre-calculated metric”. *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 8295-8301, Paris, 2020.
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- Jingwei Song, **Fang Bai**, Liang Zhao, Shoudong Huang and Rong Xiong. “Efficient two step optimization for large embedded deformation graph based SLAM.” *2020 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 9419-9425, Paris, 2020.
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- **Fang Bai**, Teresa Vidal-Calleja, Shoudong Huang, and Rong Xiong. “Predicting objective function change in pose-graph optimization”. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 145-152, Madrid, 2018.
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- **Fang Bai**, Shoudong Huang, Teresa Vidal-Calleja, and Qingling Zhang. “Incremental SQP method for constrained optimization formulation in SLAM”. *14th International Conference on Control, Automation, Robotics and Vision (ICARCV)*, pp. 1-6, Phuket, 2016. (Best paper award).
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PhD Thesis

- **Fang Bai**. “Two novel techniques for graph optimization -- cycle based formulation and change of optimal values”. University of Technology Sydney, Sydney, Australia. *Ph.D. Dissertation*, 27 Jan, 2020.
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