

# FANGHUI LIU

ESAT-STADIUS, KU Leuven

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## Education Experience

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### Shanghai Jiao Tong University (SJTU)

Department of Automation

- Ph.D. in Pattern Recognition and Intelligent Systems

Sept. 2014 - Jun. 2019

Shanghai, China

Supervisor: [Prof. Jie Yang](#)

### Harbin Institute of Technology (HIT)

Department of Automation

- B.Eng. in Automation

Sept. 2010- Jun. 2014

Harbin, China

## Work Experience

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### KU Leuven

Department of Electrical Engineering (ESAT-STADIUS)

- Postdoctoral researcher
  - involved in Project: [ERC Advanced Grant E-DUALITY](#)

Oct. 2019- present

Leuven, Belgium

Hosted by [Prof. Johan A.K. Suykens](#)

## Research Interest

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I'm generally interested in statistical machine learning, mainly on **kernel methods** including kernel learning, random features for large scale kernel approximation, and indefinite kernels (real, symmetric, but not positive definite). Besides, my research interest also includes **learning theory** in an approximation theory view to understand the generalization properties of kernel methods and over-parameterized models in high dimensions. Previously, during the early stage of my doctoral period, I focused on visual tracking, a computer vision topic.

## Selected Publications

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[xxx\* indicates equal contribution; xxx indicates corresponding author(s)]

### Preprints and submitted papers

1. **Fanghai Liu**, Xiaolin Huang, Yudong Chen, and Johan A.K. Suykens. *Towards a unified quadrature framework for large scale kernel methods*, [arXiv:2011.01668](#).

### Published or accepted papers

(More publications can be found in my [Google Scholar](#))

1. **Fanghai Liu**, Xiaolin Huang, Yudong Chen, and Johan A.K. Suykens. *Random features for kernel approximation: A survey on algorithms, theory, and beyond*, *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2021. [arXiv:2004.11154](#).
2. **Fanghai Liu\***, Lei Shi\*, Xiaolin Huang, Jie Yang, and Johan A.K. Suykens. *Generalization properties of hyper-RKHS and its applications*, *Journal of Machine Learning Research (JMLR)*, 2021. [arXiv:1809.09910](#).

3. **Fanghui Liu\***, Lei Shi\*, Xiaolin Huang, Jie Yang, and Johan A.K. Suykens. *Analysis of regularized least squares in reproducing kernel Kreĭn spaces*, Machine Learning, 2021. [arXiv:2006.01073](#).
4. **Fanghui Liu**, Zhenyu Liao, and Johan A.K. Suykens. *Kernel regression in high dimensions: Refined analysis beyond double descent*, The 24th International Conference on Artificial Intelligence and Statistics (AISTATS), 2021. [arXiv:2010.02681](#)
5. **Fanghui Liu**, Xiaolin Huang, Yingyi Chen, and Johan A.K. Suykens. *Fast learning in reproducing kernel Kreĭn spaces via generalized measures*, The 24th International Conference on Artificial Intelligence and Statistics (AISTATS), 2021. [arXiv:2006.00247](#)
6. **Fanghui Liu**, Xiaolin Huang, Chen Gong, Jie Yang, and Li Li: *Learning data-adaptive nonparametric kernels*, Journal of Machine Learning Research (JMLR), 2020. [arXiv:1808.10724](#)
7. **Fanghui Liu**, Xiaolin Huang, Yudong Chen, Jie Yang, and Johan A.K. Suykens: *Random Fourier features via fast surrogate leverage weighted sampling*. The Thirty-Fourth AAAI Conference on Artificial Intelligence (AAAI), 2020. [arXiv:1911.09158](#)
8. **Fanghui Liu**, Xiaolin Huang, Lei Shi, Jie Yang, and Johan A.K. Suykens: *A double-variational Bayesian framework in random features for indefinite kernels*. IEEE Transactions on Neural Networks and Learning Systems (TNNLS), 2019.
9. **Fanghui Liu**, Xiaolin Huang, Chen Gong, Jie Yang, and Li Li: *Nonlinear pairwise layer and its training for kernel learning*. The Thirty-Second AAAI Conference on Artificial Intelligence (AAAI), 2018. [link](#)
10. **Fanghui Liu**, Xiaolin Huang, Chen Gong, Jie Yang, and Johan A.K. Suykens: *Indefinite kernel logistic regression with Concave-inexact-convex procedure*. IEEE Transactions on Neural Networks and Learning Systems (TNNLS), 2018. [arXiv:1707.01826](#)

## Academic services

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- Program Committee/Conference Reviewers

- ◇ *International Conference on Learning Representations (ICLR)* 2022
- ◇ *International Conference on Machine Learning (ICML)* 2021
- ◇ *International Conference on Artificial Intelligence and Statistics (AISTATS)* 2021
- ◇ *Neural Information Processing Systems (NeurIPS)* 2020, 2021
- ◇ *AAAI Conference on Artificial Intelligence (AAAI)* 2020, 2021
- ◇ *International Conference on Data Mining (ICDM)* 2017

- Journal Reviewers

- ◇ *IEEE Transactions on Neural Networks and Learning Systems* (2018-)
- ◇ *IEEE Transactions on Image Processing* (2018-)
- ◇ *IEEE Transactions on Cybernetics* (2018-)
- ◇ *IEEE Transactions on Multimedia* (2018-)
- ◇ *Neurocomputing* (2018-) (Outstanding Reviewer Award)
- ◇ *IEEE Signal Processing Letters* (2018-)
- ◇ *Pattern Recognition Letters* (2018-) (Outstanding Reviewer Award)
- ◇ *Pattern Recognition* (2017-) (Outstanding Reviewer Award)
- ◇ *IEEE Transactions on Circuits and Systems for Video Technology* (2016-)

## Selected Honors, Awards and Fellowships

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**Excellent Doctoral Dissertation Award**

*2019*

*awarded by China Society of Image and Graphics (CSIG) (only ten graduates in China)*

**AAAI student travel award**

*2018*

**China National Scholarship for Doctoral Students**

*2016,2017,2018*

*awarded by Ministry of Education of China for research performance*