

# 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](#)

**Shanghai Jiao Tong University (SJTU)**

*Institute of Image Processing and Pattern Recognition*

- Free Research Assistant

*Jun. 2019- Sept. 2019*

*Shanghai, China*

## 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)

### Preprints and submitted papers

1. **Fanghui Liu**, Xiaolin Huang, Yudong Chen, and Johan A.K. Suykens. *Random features for kernel approximation: A survey on algorithms, theory, and beyond*, submitted to *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, [arXiv:2004.11154](#).
2. **Fanghui Liu\***, Lei Shi\*, Xiaolin Huang, Jie Yang, and Johan A.K. Suykens. *Regularized regression problem in hyper-RKHS for learning kernels*, submitted to *Journal of Machine Learning Research (JMLR)*, [arXiv:1809.09910](#).
3. **Fanghui Liu**, Xiaolin Huang, Yudong Chen, and Johan A.K. Suykens. *Towards a unified quadrature framework for large scale kernel methods*, submitted to *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, [arXiv:2011.01668](#).

## Published or accepted papers

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

1. **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. [also available on arXiv:2006.01073](#).
2. **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. [also available on arXiv:2010.02681](#)
3. **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. [also available on arXiv:2006.00247](#)
4. **Fanghui Liu**, Xiaolin Huang, Chen Gong, Jie Yang, and Li Li: *Learning data-adaptive nonparametric kernels*, Journal of Machine Learning Research (JMLR), 2020. [also available on arXiv:1808.10724](#)
5. **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. [also available on arXiv:1911.09158](#)
6. **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 (TNLS), 2019.
7. **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](#)
8. **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 (TNLS), 2018. [also available on arXiv:1707.01826](#)
9. **Fanghui Liu**, Chen Gong, Xiaolin Huang, Tao Zhou, Jie Yang, and Dacheng Tao: *Robust visual tracking revisited: from correlation filter to template matching*. IEEE Transactions on Image Processing (TIP), 2018. [also available on arXiv:1904.06842](#)
10. **Fanghui Liu**, Chen Gong, Tao Zhou, Keren Fu, Xiangjian He, and Jie Yang: *Robust visual tracking via nonnegative multiple linear coding*. IEEE Transactions on Multimedia (TMM), 2017.
11. **Fanghui Liu**, Tao Zhou, Chen Gong, Keren Fu, Li Bai and Jie Yang: *Incremental inverse nonnegative local coordinate factorization for visual tracking*. IEEE Transactions on Circuits and Systems for Video Technology (TCSVT), 2017.
12. **Fanghui Liu**, Xiaolin Huang and Jie Yang: *Indefinite kernel logistic regression*. ACM Multimedia (ACM MM), 2017.

## Academic services

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- Program Committee/Conference Reviewers
  - ◇ *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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<b>Excellent Doctoral Dissertation Award</b>	<i>2019</i>
<i>awarded by China Society of Image and Graphics (CSIG) (only ten graduates in China)</i>	
<b>The “Academic Star” in Shanghai Jiao Tong University</b>	<i>2018</i>
<i>awarded by Shanghai Jiao Tong University (only ten graduates in SJTU)</i>	
<b>AAAI student travel award</b>	<i>2018</i>
<b>China National Scholarship for Doctoral Students</b>	<i>2016,2017,2018</i>
<i>awarded by Ministry of Education of China for research performance</i>	