Florian Schäfer

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EDUCATION

California Institute of Technology (Caltech), Pasadena CA

- Ph.D. in Applied and Computational Mathematics
  Advisor: Prof. Houman Owhadi — expected *June 2021*

Rheinische Friedrich-Wilhelms Universität, Bonn, Germany

- M.S. in Mathematics — *fall 2015*
  Thesis title: The Time Discrete Exponential Map in the Space of Images
  Advisor: Prof. Martin Rumpf
- B.S. in Mathematics, with Physics as secondary subject (*Nebenfach*) — *fall 2013*
  Thesis title: Gibbs-Young Measures
  Advisor: Prof. Stefan Müller

University of Paris VI *Pierre et Marie Curie*, Paris, France

- Exchange student in Mathematics, via the Erasmus Programme — *2013-2014*

FELLOWSHIPS AND AWARDS

Inaugural IST/Amazon Fellow in Artificial Intelligence — *November 2017*

- $ 40,000 fellowship awarded to five Caltech graduate students or postdocs annually.

Linde Institute research grant — *November 2019*

- $ 10,000 grant for research at the interface of deep learning and mechanism design.

PUBLICATIONS

** indicates equal contribution*

Preprints

- **Florian Schäfer**, Matthias Katzfuss, and Houman Owhadi,
  Sparse Cholesky factorization by Kullback-Leibler minimization, 2020
  `https://arxiv.org/abs/2004.14455`

- **Florian Schäfer***, Hongkai Zheng*, and Anima Anandkumar,
  Implicit competitive regularization in GANs, 2019
  To appear in **ICML 2020**
  `https://arxiv.org/abs/1910.05852`

- **Florian Schäfer**, T. J. Sullivan, and Houman Owhadi,
  Compression, inversion, and approximate PCA of dense kernel matrices at near-linear computational complexity, 2017
  `http://arxiv.org/abs/1706.02205`

Journal Publications

- Houman Owhadi, Clint Scovel, **Florian Schäfer**,
  Statistical Numerical Approximation
  Notices of the AMS
  `https://www.ams.org/journals/notices/201910/rnoti-p1608.pdf`

- A.Effland, M. Rumpf, and **F. Schäfer**,
  Image extrapolation for the time discrete metamorphosis model - existence and applications, 2017.
  SIAM J. Imaging Sci., 11(1), 834862.
  https://doi.org/10.1137/17M1129544

In Conference Proceedings

- **Florian Schäfer** and Anima Anandkumar,
  Competitive Gradient Descent, 2019
  https://arxiv.org/abs/1905.12103
  NeurIPS 2019
  https://papers.nips.cc/paper/8979-competitive-gradient-descent

- A.Effland, M. Rumpf, and **F. Schäfer**,
  Time discrete extrapolation in a Riemannian space of images.
  In Proc. of International Conference on Scale Space and Variational Methods in Computer Vision, volume 10302, pages 473-485. Springer, Cham, 2017. Lecture Notes in Computer Science.

SELECTED TALKS AND PRESENTATIONS

"Competitive Gradient Descent"

- NVIDIA *July 2019, Santa Clara, California*
- Ford Motor Company *August 2019, Palo Alto, California*

"A probabilistic view on sparse Cholesky factorization"

- "EnuMath 2019" Minisymposium on Randomized algorithms and parametrized PDE *October 2019, Egmond aan Zee, Netherlands*
- "SciCADE 2019" Minisymposium on Machine Learning and Multiscale Methods *July 2019, Innsbruck, Austria*
- Aerospace Computational Design Laboratory Seminar *April 2019, MIT*

"Compression, inversion, and approximate PCA of dense kernel matrices at near-linear computational complexity"

- Research Semnar: "Mathematical Statistics" *May 2018, Weierstrass Institute, Berlin, Germany*
- "SIAM Conference on Uncertainty Quantification" *April 2018, Garden Grove, California*
- Conference: "Multiscale Problems in Materials Science and Biology: Analysis and Computation" *January 2018, Tsinghua Sanya Int. Math. Forum, Sanya, China*
- Topical Workshop: "Probabilistic Scientific Computing: Statistical inference approaches to numerical analysis and algorithm design" *June 2017, ICERM, Providence*

TEACHING EXPERIENCE

Workshops and Tutorials

- "An algebraic view on numerical homogenization"
  Lecture given as part of the Oberwolfach Seminar: "Beyond Numerical Homogenization"

Teaching Assistant at Caltech *four terms from fall 2016 to present*

- ACM 118 (Stochastic Processes and Regression)
- ACM201 (Partial Differential Equations)
- ACM216 (Markov Chains, Discrete Stochastic Processes and Applications)
- ACM95/100b (Introductory Methods of Applied Mathematics)

- ACM104 (Applied Linear Algebra)

German Language Assistant at a High School in Stara Zagora, Bulgaria *2009-2010*

- As part of the "Kulturweit" proframme of the German UNESCO-Comission.
  I assisted in high school-level German classes, ran a conversation group and a math circle.

SERVICE

At Caltech

- Keller Colloquium Committee *fall 2017 to present*

Referee service

- SIAM Multiscale Modeling and Simulation
- Statistics and Computing
- Journal of Machine Learning Research

SOFTWARE AND PROGRAMMING SKILLS

Julia, Matlab, LATEX: high proficiency
C, C++, Python, Pytorch, UNIX: intermediate proficiency

LANGUAGE SKILLS

English: fluent German:native French: high proficiency
Spanish, Bulgarian: intermediate proficiency Polish, Finnish: basic proficiency