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**, Anima Anandkumar, Houman Owhadi
  Competitive Mirror Descent, 2020
  https://arxiv.org/abs/2006.10179

- **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   *October 2019, Egmond aan Zee, Netherlands*
  Randomized algorithms and parametrized PDE
- "SciCADE 2019" Minisymposium on   *July 2019, Innsbruck, Austria*
  Machine Learning and Multiscale Methods
- 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   *January 2018, Tsinghua Sanya Int.*
  Science and Biology: Analysis and Computation"   *Math. Forum, Sanya, China*
- Topical Workshop: "Probabilistic Scientific Computing: *June 2017, ICERM, Providence*
  Statistical inference approaches to numerical analysis and algorithm design"

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