Henry Kvinge

Office Address: Mathematics Department
Colorado State University
Fort Collins, CO 80523-1874

Email Address: henry.kvinge@colostate.edu
Homepage: https://hkvinge.github.io
Date of Resume: December 2018

in: https://www.linkedin.com/in/henry-kvinge/
: https://github.com/hkvinge

PROFESSIONAL EXPERIENCES

- **Postdoctoral fellow**, *June 2017-Present*
  Pattern Analysis Lab, Colorado State University
  - Collaborated with industrial partner Physical Sciences Inc. to develop innovative single pixel cameras for low-cost hyperspectral and LIDAR imaging.
  - Developed and implemented compressive sensing algorithms for fast, GPU-based reconstruction of images from a very small number of samples.
  - Produced a software package in CUDA/C++ to run these algorithms on a device in the field.
  - Discovered a new class of light-weight *secant-based* dimensionality reduction algorithms for fast extraction of information from very large data sets.
  - Discovered a new data-driven statistic, the κ-profile, for understanding the state of large, constantly changing data-sets.
  - Taught and mentored students seeking to enter data science.
- **Consultant**, *September 2018-Present*
  Clapp Virtual Reality Lab, Colorado State
  - Devised image processing algorithms to remove distracting artifacts in VR environments.
  - Introduced new algorithms to make virtual environments more informative to physicians.
- **Project participant** *July 2016*
  Revon Systems, Inc.
  - Built a machine learning model to predict physician triage decisions for asthma patients as part of a math-to-industry bootcamp capstone project.

EDUCATION

University of California, Davis (June 2017) GPA: 4.00
PhD, Mathematics

University of Washington, Seattle (March 2010) GPA: 3.90
BS, Mathematics, BA, Biochemistry
Magna Cum Laude

TECHNICAL SKILLS

Languages: Python, C++, CUDA, Matlab, Git, LaTeX.
Technical tools: Machine learning, deep learning, dimensionality reduction, data visualization, anomaly detection, image processing, compressive sensing, GPU-computing, hyperspectral imaging, virtual reality.

SELECTED PUBLICATIONS AND PREPRINTS

- Henry Kvinge and Mark Blumstein, ***Letting symmetry guide visualization: multidimensional scaling on groups***, submitted CVPR 2019, arXiv:1812.03362 (2018).
- Henry Kvinge, Elin Farnell, Michael Kirby and Chris Peterson, ***Monitoring the shape of weather, soundscapes, and dynamical systems: a new statistic for dimension-driven data analysis on large data sets***, accepted to IEEE International Conference on Big Data, Seattle 2018. arXiv:1810.11562
- Henry Kvinge, Elin Farnell, Michael Kirby, and Chris Peterson, ***Too many secants: a hierarchical approach to secant-based dimensionality reduction on large data sets***, 2018 IEEE High Performances Extreme Computing Conference (HPEC), Waltham, MA, USA, 2018, pp. 1-7. doi: 10.1109/HPEC.2018.8547515

- Henry Kvinge, Elin Farnell, Michael Kirby and Chris Peterson, ***A GPU-Oriented Algorithm Design for Secant-Based Dimensionality Reduction***, 2018 17th International Symposium on Parallel and Distributed Computing (ISPDC), Geneva, Switzerland, 2018, pp. 69-76. doi: 10.1109/ISPDC2018.2018.00019. arXiv:1807.03425
- Elin Farnell, Henry Kvinge, Michael Kirby and Chris Peterson, ***Endmember Extraction on the Grassmannian***, 2018 IEEE Data Science Workshop (DSW), Lausanne, Switzerland, 2018, pp. 71-75. doi: 10.1109/DSW.2018.8439109. arXiv:1807.01401

OTHER EXPERIENCES

Commercial fisherman, Bristol Bay, AK (1999-2015): Worked as a deckhand on the commercial salmon fishing vessel *Anny Joy* for 6 weeks each summer.
Associate instructor, UC Davis (2015-2016): Prepared and delivered lectures, wrote exams, and assigned grades for *Calculus for Biology and Medicine* and *Combinatorics*.
Assistant language teacher, Izuhara High School (2010-2011): Created and implemented lesson plans for English language courses on Tsushima Island, Japan.

Volunteer

Mentor (2013-2016): Women in Science and Engineering Mentoring Program at UC Davis.
Mentor (2011-2016): STEM Café, a tutoring center at UC Davis that serves women and other underrepresented groups in math.