Curriculum Vitæ

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Personal Information

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Education

- **University of California, Santa Barbara** — Santa Barbara, CA
  MS Mechanical Engineering — *Dec 2014*
  - Thesis: *Experimental apparatus for the study of Faraday waves on time-varying domains*
- **Northwestern University** — Evanston, IL
  Physics PhD Candidate — *Sep 2010–Mar 2012*
- **University of California, Santa Barbara** — Santa Barbara, CA
  BS Physics & BS Mechanical Engineering — *Jun 2010*
  - Thesis: *Experimental and theoretical study of pattern identification in physical systems with circular symmetry*

Awards and Honors

- Graduated with honor in both undergraduate degrees, cumulative GPA: 3.7/4.0
- Dean's List 11/12 quarters
- Member: Tau Beta Pi engineering honor society

Skills

Languages: Python, MATLAB, C++
Machine Learning: TensorFlow, Keras, XGBoost, scikit-learn
Data: SQL, Postgres, HDF5
Dev Tools: Git, Heroku, PyCharm, AWS
Python Stack: Conda, IPython, Jupyter, matplotlib, NumPy, Pandas, PyTables, SQLAlchemy
Beautiful Typesetting: LaTeX

Work Experience

- **Startup.ML** — San Francisco, CA
  Machine Learning Fellow — *Dec 2015–Apr 2016*
  - Developed a production FinTech data pipeline for currency trading using industry-standard machine learning methods
  - Investigating how Reinforcement Learning can be leveraged for improved algorithmic trading
- **Harold Washington College** — Chicago, IL
  Adjunct Faculty — *Feb 2015–May 2015*
  - Gave 2 lectures a week for a descriptive astronomy course
  - Incorporated the latest discoveries in astronomy and the new *Cosmos* into my lessons

- Presented topics in Astrophysics and Cosmology at the level of the general public and explained concepts without relying on mathematical or scientific constructs

- **University of California, Santa Barbara** Santa Barbara, CA
  Teaching Assistant *Dec 2012–Jun 2014*
  - Introduced machining concepts on the mill and lathe to students in the engineering machine shop
  - Supervised students as they built parts for the class project with zero accidents
- **Northwestern University** Evanston, IL
  Teaching Assistant *Sept 2010–Mar 2012*
  - Prepared quizzes and held office hours to answer questions one-on-one for introductory physics

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Projects

- **Kaggle** *May 2015–Present*
  - Coded a deep residual convolution network in Keras/TensorFlow for multi-label classification for the Yelp Kaggle competition [yelp_kaggle repository]
- **Software Development** *May 2015–Present*
  - Currently working through *Bayesian Methods for Hackers*
  - Learned object-oriented programming and wrote code using OO principles
  - Deployed a Twitter clone in Rails on Heroku by following the *Ruby on Rails Tutorial*
- **Master's Thesis: Faraday Waves** Santa Barbara, CA
  Krechetnikov Fluid Physics Lab *Dec 2013–Jun 2014*
  - Designed and built a new experiment to study the surface patterns of vibrating containers of water (Faraday waves)
  - Incorporated a recent image processing technique for cheap 3D high speed mm-resolution measurement over a surface area of $225\,\mathrm{cm}^2$ [profilometry repository]
  - Sourced $20k in lab equipment including a Labworks 75lb shaker, 2 accelerometers, and 2 Parker actuators all interfacing with a NI PCIe DAQ and LabVIEW VI running on a dedicated computer
  - Designed a bespoke experimental apparatus using SolidWorks to study Faraday Waves and produced a set of engineering drawings, validation tests, and documentation as part of my thesis
  - Personally fabricated a prototype in the college machine shop and had the final design parts CNC machined
- **X-Ray Microscopy** Argonne National Lab
  Bionanoprobe, Advanced Photon Source, Sector 21 *Nov 2011*
  - Measured the thermal drift of the optics stage of the BioNanoProbe using simple image correlation with Matlab
- **Arctic Sea Ice Modeling** Northwestern University
  Prof. Mary Silber, Dept. of Applied Mathematics *Sep 2011–Jan 2012*
  - Derived from first principles and coded arctic sea ice models in Matlab for the study of climate change
- **Programmable Flow Generator** Goleta, CA
  LaunchPoint Technologies *Sep 2009–Jun 2010*
  - Contributed modeling expertise on team of fellow engineering students working on a fluidic loop
- **Bachelor's Thesis: Drop Splash Experiment** Santa Barbara, CA
  Krechetnikov Fluid Physics Lab, Dept. of Mechanical Engineering *Jul 2009–Oct 2010*
  - Investigated the physics of splashes that occur when a liquid droplet impacts a wetted surface
  - Performed stereo triangulation in MATLAB, reduced the the 3D data, and searched for patterns using my theory of pattern identification [drop_splash repository]
  - Published a peer-reviewed article[3] on the experimental and theoretical advances I developed that may have solved a 100-year puzzle in fluid dynamics
- **Transient Optical Sky Survey** Santa Barbara, CA
  Lubin Lab, Dept. of Physics *Sep 2008–Jun 2009*

– Collaborated on the MATLAB/C data pipeline that processed 1GB of images per night

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Publications

1. R. Hartong-Redden. *Experimental apparatus for the study of Farady waves on time-dependent domains.* Master's thesis, University of California, Santa Barbara, 2014.
2. E. Hadjiyska, G. Hughes, P. Lubin, S. Taylor, R. Hartong-Redden, and J. Zierten. *The transient optical sky survey data pipeline.* New Astronomy, 2013.
3. R. Hartong-Redden and R. Krechetnikov. *Pattern identification in systems with S(1) symmetry.* Physical Review E, 2011.
4. R. Hartong-Redden and R. Krechetnikov. *Experimental and theoretical study of pattern identification in physical systems on circular domains.* Annual Meeting of the APS Division of Fluid Dynamics, 2010.
5. R. Hartong-Redden. *Experimental and theoretical study of pattern identification in systems with O(2) symmetry.* Bachelor's thesis, University of California, Santa Barbara, 2010.
