Jonathan S. Zingale

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CURRICULUM VITAE

Skills

TECHNICAL: Python, Haskell, Tensor Flow, Django, React, Ruby on Rails, Linux, Git, SQL, Jupyter Notebook, LaTeX, REST, PureData/Max MSP, Processing, Rspec, QuickCheck and Unit testing. Familiarity with server maintenance, parallel processing, continuous delivery, and the Amazon AWS cloud platform. Talent for writing and editing accurate, robust and efficient code.

SOFT: Focused, organized, and highly productive work habits. Strong resource management and project coordination aptitude. Deadline driven. Clear, patient, and concise communication habits. Strong interests in machine learning, formal verification, cryptography, and mathematical modeling. Autodidact with a strong will for personal, professional, and intellectual development. Proven adaptability and breadth.

Experience

LEAD DEVELOPER/PROJECT MANAGER, SANTA FE INSTITUTE; SANTA FE, NM. 2017 — PRESENT.

Develop and maintain two full-stack web environments for the Santa Fe Institute. Manage projects outsourced to software contractors. Work with data scientists to design, build and refine new data processing technologies. Write algorithms designed for the Santa Fe Institute's multicore server clusters.

- Full Stack Web Developer, August 2017 — present. Responsible for developing and maintaining the Santa Fe
- Institute's *santafe.edu* web domain. Write new models, views and controllers in a Django/React development stack. Develop React components facilitating users' web interactions with the institute.
- Scientific Software Developer, November 2017 — present: Worked on a feature-finding algorithm involving satellite imagery, Simple Linear Iterative Clustering (SLIC) and TensorFlow.

CONSULTANT, SELF-EMPLOYED; SANTA FE, NM. 2012 — PRESENT.

- Developed ray-tracing software for visualizing experimental data for a LANL plasma research group.
- Contributed to a plasma physics paper entitled Shock driven vortex evolution on a high-Atwood number oblique interface published in the journal *Physics of Plasmas*.
- Coach pre-Doc Biologist on applying statistical methods to the problem of species-area relations.
- Assisted SBIR grantee with applying the Gauss-Seidel method to an industrial cooling model.

LEAD DEVELOPER, JACKRABBIT SYSTEMS; SANTA FE, NM. 2013 — 2017.

Write generalized web crawlers and unit tests. Maintain and contribute to a large-scale Rails bidding application mediating between hotel DMOs and large search engine clients. Have contributed 5,912,164++/5,103,017-- lines of Ruby in 651 Git commits. Tremendously increased computational efficiency of applications through development of space- and time-complexity reductions. Build Soap interfaces according to OTA and Restful specifications. Schedule tasks and create workers with Resque. Responsible for database accuracy and deadline adherence. Collaborator and resource for QA, Ops, and junior staff as well as leads on related projects.

- Machine Learning Lead Developer, May 2017 — August 2017. Proposed ML enhancements to business scope and services drawing from a 180M+ historical records on an Amazon Redshift database.
- DevOps Lead Developer, October 2016 — May 2017. Responsible for analysis, repair, and extension of a critical Rails app with SQL backend. Designed and produced new features in collaboration with Ops partner.
- Lead Developer, Fall 2015 — October 2016: Strengthened data reliability and code robustness by refining data mining applications. Monitored test coverage and deployment.
- Junior Developer, December 2013 — Fall 2015. Designed generalized web crawlers. Responsible for debugging, testing, and optimization. Wrote entity-relationship-diagram software to map codebase.
- Data Entry, August 2013 — December 2013. Automated data-entry tasks.

Independent Study

- Machine learning techniques: SVM, supervised/unsupervised, feed-forward, regression
- Factorization algorithms related to discrete dynamical systems and elliptic curve algorithms
- Connections between Levine's markov chain models and Lotka-Volterra predator-prey models
- Study group participant: Gauge Fields, Knots, and Gravity, John Baez
- Application of graph theory and smooth manifolds to dynamical systems
- Extensive study in formal logic via category, topos and type theories

Projects

- Coded reconstruction of the Lorenz manifold from a single dimensional time-series via Taken's Method. 2017
- Created Processing visualizer for plotting phase spaces of dynamical systems. 2014 — Present
- Wrote library for calculating trophic levels in food webs, based on Levine's markov chain model
- Built a multi-threaded fractal rendering engine with Zeke Ricci. 2015 — 2016
- Wrote an apartment finder by web-crawling Craigslist and using the Google geocoder api, natural language parsing, and various mathematical methods to calculate geofences. 2015
- Weather Currents: Built infrastructure for an installation piece intended for Currents New Media Festival: 'live' weather data drives a cellular automata, which modifies an image landscape. Meanwhile AI 'foragers' with distinct metrics and search algorithms comb for resources, altering the landscape in their paths. 2015
- Wrote a weather visualizer for US cities of interest, drawing data from the National Weather Service api. 2015
- Built a player-piano based on cellular automata, aperiodic LFOs based on the discrete logistic equation, and a vocoder for triggering frequency-specific multimedia events. 2012
- Studied comonadic data structures, useful for implementing type-safe parallel computations. Wrote a comonadic prime sieve, cellular automata. Researched comonadic shuffling and sorting algorithms. 2010
- Builds modular analog and digital synthesizers: 1996 — Present

Associations/Conferences

Participant, FRIAM complexity theory group; Santa Fe, NM. 2016 — present.

Attendee, Oregon Programming Languages Summer School: Types, Semantics and Verification; Eugene, OR. 2011.

Attendee, International Conference on Functional Programming; Portland, OR. 2006.

Education

Mathematics; University of Texas; Austin, TX. 2009 — 2012.

Certification in Audio Recording Engineering, Recording Workshop; Chillicothe, OH. 2002 — 2003.

Recording Engineering and Music Composition, Cleveland State University, Cleveland, OH. 2000 — 2002.

Physics and Electrical Engineering, Ohio State University; Columbus, OH. 1998 — 2000.