Naomi Alterman

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Education

Stanford University
MS, EE (Computer Networking Concentration) // Conferred January 2014
BS, EE (Computer Software Concentration) // Conferred June 2012

A word about this CV's organization:
I have professional experience as both a college-level instructor *and* a computer engineer. These two threads of my career are separated into serial sections of this document, even though they cover roles that are often interleaved or overlapping in time.

Academic Experience

Technical Education Specialist, Data Science Fellow
University of Washington, eScience Institute
January 2021 – Present

Teaching and mentorship duties:

- **Data Science for Social Good** – Teach introductory Git and coding style workshops, as well as a 5-class series on "project TLC" teaching best practices for code and data hygiene. Serve as the "data scientist at large" supporting student fellows developing real-world data science applications.
- **Humanities Data Science Summer Institute** – Teach introductory workshops in Python and Git. Hold technical office hours and advise on research project design. Serving departments including English, the iSchool, Geography, American Ethnic Studies, and Political Science
- **Software Carpentries** – Teach a quarterly workshop series covering UNIX shells, Git, Python and R. Mentor workshop volunteers and develop open source tools to improve learning outcomes.
- **UW Libraries Community Fellows program** – Mentor graduate students from underrepresented communities in their fields create educational workshops showcasing their expertise. Worked in collaboration with the UW Libraries' Open Scholarship Commons.
- **Hackweeks train-the-trainers program** – Teach pedagogical techniques and technical mentorship skills to volunteer instructors organizing discipline-specific scientific "hackweeks" (for example, for snow scientists focused on data from a new NASA satellite). Content includes strategies for interactive instruction and peer learning opportunities.

- **Cloud outreach seminars** – Created and led cloud computing workshops for various community events including Neurohackademy, High-Performance Seismology CyberTraining, and the SDSC HPC and Data Science Summer Institute.

Guest lectures and course modules:

- **MSE 544: Big Data for Materials Scientists** – Developed and taught a 3-week learning module focused on software containerization and cloud computing for class offered by Professors Luna Huang and Ting Cao.
- **DATA 590: Data Science Capstone I** – Guest seminar for MSDS program's capstone project course focused on engineering soft skills and best practices for technical group work. Collaborated with Dr. Megan Hazen.
- **BIOST 505: Writing, Presentation, and Collaboration Skills for Biostatistics** – Guest seminar for Biostatistics writing course focused on engineering soft skills and best practices for scientific collaboration. Collaborated with Professor Amy Willis.

Administration and service duties:

- **eScience Office Hours** – Developed and supported drop-in office hour program for UW's interdisciplinary data science institute. Duties involved program design, staff scheduling, marketing, and collecting reporting metrics to show program efficacy.
- **CloudBank** – Developed learning materials and provided user support for a nationally utilized cloud access entity. Reviewed and provided feedback for hundreds of cloud resource requests from NSF researchers. Organized and hosted RRoCCET 21, a conference dedicated to researchers using cloud computing.
- **Cloud ReproHack** – Designed and implemented event bringing together UW students and industry cloud experts to reproduce scientific work using cloud computing resources. One exemplary project from this event lead to a research publication (DOI:10.26443/seismica.v2i2.979)
- **Application review** – Reviewed participant applications for annual eScience programs including our Winter Research Incubator, Data Science for Social Good, and Azure credits program
- **Hiring interview support** – Designed and performed hiring evaluations to test potential research scientist candidates on their pedagogical and mentorship skills
- **RCC hackathons** – Collaborated with student research computing club (RCC) to design and run "research computing" hackathon designed to make students aware of university computational resources.

Adjunct Lecturer
University of Illinois at Urbana-Champaign, School of Information Sciences
October 2020 – December 2021

- IS407: **Intro to Data Science**
  Taught intro course to MLIS students covering data exploration and analysis, linear modeling and programming/data visualization in R. Adapted from (and contributed back to) Dr. Mine Çetinkaya-Rundel's open source *Data Science in a Box* course materials.

Assistant Adjunct Professor
Mills College
January 2019 – April 2019

- **CS180G: Applied Machine Learning**
  Offered in conjunction with Google's EngEDU team, helped design and co-teach pilot for 35 hr/week, 10-week bootcamp program introducing students from a variety of majors to machine learning and data science.
  Responsibilities included:
  - Classroom design: to make an inspiring, safe and productive space for everyone to learn, regardless of background
  - Scheduling and pacing: building varied learning activities to vary the long 7 hour days and make sure content was moving at a good speed for both our advanced students and our struggling learners
  - Student feedback: Experimenting with different ways to get honest, timely, and actionable feedback from our cohort

Assistant Adjunct Professor
Mills College
August 2017 – December 2017

- **CS180C/280C: Computer Graphics**
  Built interdisciplinary computer graphics elective built from scratch, teaching students both rigorous technical rendering algorithms and fundamentals of digital art.
  - Created and scoped syllabus, produced lecture slides and designed homework assignments
  - Topics covered included image rasterization, 3D projection, GPU architecture, OpenGL and GLSL shaders
  - Graduate level component included readings and analysis of historical and cutting edge research literature
  - Students were responsible for an end-of-semester digital art project based on the skills they learned, which they demoed in a critique circle inspired environment

Teaching Assistant
Stanford University

September 2011 – December 2013

- **EE108A: Intro to Digital Systems**
  Served two quarters as an undergraduate section leader and three quarters as head TA for core EE course required for undergraduates
  - Wrote and administered new FPGA-based lab assignments
  - Taught weekly review sessions tailored to small groups of students
  - Developed curriculum changes with professor based on continued experiences teaching course
  - Supervised junior course staff
  - Provided substitute lectures when professor was absent

Engineering Experience

Freelance Software Engineer
May 2017 – Present
Major clients and projects include:

- **Byteswap Labs** (2024-present) – Consulting engineer for restoration and porting of Nintendo 64 video game engines to modern platforms
- **Ouster** (2018-2020) – Developing firmware and manufacturing tools for cutting edge LIDAR hardware
- **Expo** (2017-2019) – Developing native OpenGL implementation of the W3C's 2D Canvas drawing API

Apple Inc
Software Engineer, Core OS Networking
January 2016 – May 2017

- Rearchitected TCP/IP stack in Apple's XNU kernel, running on all Apple hardware including Apple Watches, iPhones and Macbooks
- Contributed Python-based build tools and LLDB debugger plug-ins to XNU kernel project
- Wrote a man page (more proud of this than I should be)

Barefoot Networks
Software Engineer, Compiler Team
November 2013 – December 2015

- Second software employee building innovative SDN startup
- Co-designed "P4," a domain-specific programming language for innovative high-performance programmable networking hardware
- Principal engineer for multiple components of P4 compiler including packet parser, deparser and backend IR

Arista Networks
Hardware Engineer Intern
June – September 2013

- Built Verilog testbench infrastructure for embedded CPLDs

- Designed loopback fabric card PCBs for testing modular switch chassis

Nicira (acquired by VMware)
Software Engineer Intern
June – September 2012
- Implemented MPLS protocol support in Linux kernel module for open source Open vSwitch project (http://www.openvswitch.org)

DSSD (acquired by EMC)
Hardware Design Intern
June – September 2011
- Built embedded system for bring-up and debugging of a prototype high-density flash storage device, including a custom FPGA-based MIPS core and OLED display

Open Source Software

livecode-streamer // https://github.com/naclomi/livecode-streamer/
- Teaching tool for instructors live-coding in front of an audience to facilitate content review and user accessibility
- Project included development of plugins for multiple terminal emulators that allow logging of screen buffer to HTML files
- Adopted for use in UW's Software Carpentry workshops and featured in a talk at CarpentryCon 2022

Expo-2D-Context // https://github.com/expo/expo-2d-context/
- Principal engineer for a pure-Javascript implementation of the W3C's Canvas 2D Context graphical API on top of WebGL
- Specialized for use in React Native environments on mobile devices

N64 Reverse Engineering
- Built modding and asset modding tools for Nintendo 64 game "Glover" (pubslished 1999 by Hasbro Interactive)
- Utilized Ghidra and custom python tools to perform differential analysis on and reverse engineer program binary
- Re-implemented game engine using Typescript and WebGL for online level viewer (https://noclip.website/#gv/07;)

Python Gameboy Emulator // https://github.com/naclomi/pygb
- Implemented an emulator to run Gameboy games while bored in an airport
- Written in pure Python using pygame for input and framebuffer
- Highly object oriented hardware architecture allows use of vanilla Python REPL as a powerful machine code debugger

Open vSwitch // http://openvswitch.org/

- Virtual networking switch at the core of many SDN systems
- Contributed MPLS protocol support to Linux kernel module

Service and Talks

Data Science For Good Educator's Meeting
ADSA Conference, Ann Arbor MI
October 28th 2024

- Day-long workshop for college educators running "Data Science for Social Good" programs at their home institutions
- Designed and facilitated interactive sessions focussed on mapping and articulating participants' institutional contexts and ethical values

Data science careers talk
Applied Analytics Club @ UW
February 7th 2024

- Invited by undergraduate student club to give talk about careers in data science and data science ethics

Live streaming your live coding to static web pages *(for audience joy and pedagogical profit)*
CarpentryCon 2022

- Lightning talk at CarpentryCon teaching convention outlining pedagogical method and associated open-source tools I developed in the process of teaching Software Carpentries workshops at UW
- Recording: https://www.youtube.com/watch?v=a3uJj7Eqwzg

Cloud Computing Workshop
Texas LEARN
June 2023

- Invited by professional association of IT professionals and CIOs of Texas colleges and universities to hold a day-long workshop focused on cloud computing
- Topics included virtual machines, Kubernetes, and virtualized networking

Roots, Stems and Leaves
West Valley College
November 2020

- Guest talk for West Valley College's lecture series about career paths in STEM
- Slides at: https://docs.google.com/presentation/d/1MSiDZ1UGucnqGiD4HCylJ_yOGY45MqddOjA75AwtoE8/edit?usp=sharing

Instructor // Bay Area Tutoring Association
July 2020 – December 2020

- Teach computer science camps over Zoom to cohorts of 8-16 year-olds, focusing on foundational coding skills
- Curriculum utilizes lessons from Code.org and projects based in MIT's Scratch environment
- Manage student feedback and coach junior instructors

Volunteer Section Leader // Stanford University
April 2020 - May 2020

- Part of a teaching team for "*Code in Place*", offered by Stanford during COVID-19 pandemic, with 10,000 global students and 900 volunteer teachers participating from around the world.
- Prepared and taught a weekly online discussion section to 10 students in a 5-week introductory Python programming course.
- Continued professional mentoring relationship with several students post-course to guide them in their skill development.

Instructional Fellow
Upperline Code
July 2019

- Co-taught one-week bootcamp for rising high school sophomores in the SEO Scholars program
- Introduced students to building web apps using HTML, CSS, Javascript, and the Materialize CSS library

Peer Group Facilitator
San Mateo Pride Center
February 2019 – December 2020

- Facilitate biweekly discussion group for transgender and gender-nonconforming individuals over the age of 18
- Perform conflict mediation and provide peer support where necessary
- Collaborate with other Pride Center staff to reevaluate and restructure the group as attendance grows

Invited talk: Fantastic Bits and Where to Find Them
Mills College
October 2018

- Guest talk for a computer architecture class focused on applying computer engineering principles to other facets of life
- Slides at: https://docs.google.com/presentation/d/1LAnJYcKBnMxu2eBb1sUuqyMqyoC8-t1Qv4LBcZR8Zug/edit?usp=sharing

Invited talk: Computer Graphics, or: How I Learned to Stop Worrying and Love The Matrix
Mills College
March 2017

- Guest talk on the subject of computer graphics, geared towards students without a heavy math or CS background
- Slides at: https://docs.google.com/presentation/d/1Lr6uwenBQiTG3ohgLp-bZ7ZvNkVtWY-cZ8IGitInirw/edit?usp=sharing

Publications

RIP Twitter API: A eulogy to its vast research contributions.
Ryan Murtfeldt, Naomi Alterman, Ihsan Kahveci, & Jevin D. West.
In *CoRR 2024*.
DOI: https://doi.org/10.48550/arXiv.2404.07340

An Object Storage for Distributed Acoustic Sensing.
Yiyu Ni, Marine A. Denolle, Rob Fatland, Naomi Alterman, Bradley P. Lipovsky, Friedrich Knuth
In *Seismological Research Letters* 2023;; 95 (1): 499–511.
DOI: https://doi.org/10.1785/0220230172

Software Engineering Practices in Academia: Promoting the 3Rs—Readability, Resilience, and Reuse.
Andy Connolly, Joseph Hellerstein, Naomi Alterman, David Beck, Rob Fatland, Ed Lazowska, Vani Mandava, & Sarah Stone. 2023.
In *Harvard Data Science Review, 5(2)*.
DOI: https://doi.org/10.1162/99608f92.018bf012

CloudBank: Managed Services to Simplify Cloud Access for Computer Science Research and Education.
Michael Norman, Vince Kellen, Shava Smallen, Brian DeMeulle, Shawn Strande, Ed Lazowska, Naomi Alterman, Rob Fatland, Sarah Stone, Amanda Tan, Katherine Yelick, Eric Van Dusen, and James Mitchell. 2021.
In *Practice and Experience in Advanced Research Computing* (*PEARC '21*). Association for Computing Machinery, New York, NY, USA, Article 45, 1–4.
DOI: https://doi.org/10.1145/3437359.3465586

Ethical Storyboarding for Machine Learning
(https://towardsdatascience.com/ethical-storyboarding-for-machine-learning-7c5b5a031173)
Author of case study about integrating ethics education within an introductory machine learning curriculum