Gregory Schare

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EDUCATION

Columbia University, New York, NY   May 2024
B.A. in Computer Science and Mathematics. (Current GPA: 3.93)
<u>Relevant coursework:</u> Advanced Programming (*Unix, C*). Data Structures (*Java*). Computer Systems. Abstract Algebra. Multivariable Calculus and Linear Algebra (Honors). Discrete Mathematics. Readings in Analysis of Boolean Functions and Property Testing (with Shivam Nadimpalli); Cryptography (with Joseph Lee); Representation Theory (with Micah Gay). Macro and Microeconomics.

SKILLS

Programming languages: Proficient in C, Java, Python, Haskell, Racket, Scheme. Experienced in Javascript, HTML, CSS, MATLAB.
Technologies: Proficient in Git, UNIX, SQL, Three.js, Processing, Jekyll, Photoshop. Experienced in AWS, Digital Ocean, spaCy, Node, React, Next.js.

PROFESSIONAL EXPERIENCE

Programmer, Making and Knowing Project, Columbia University. New York, NY   June 2020 – present
- Achieved 77x speedup of project pipeline by parsing XML using lxml in Python instead of regex patterns
- Rendered dataset generation more convenient and accessible for non-technical researchers by leading refactor of legacy code from the ground up, implementing optional filters, and providing three additional data metrics
- Led archiving, data cleanup, and web presentation of student lab reports and essays using Google Drive API, Pandoc, and GNU tools while adhering to the minimal computing principles outlined by Ed and GO::DH
- Generated static sites exhibiting ongoing projects and archiving scholarly editorial discussion by augmenting Pandoc and Jekyll with custom content management and templating systems written in Haskell and JavaScript

Software Developer, Columbia Butlers (*student startup*). New York, NY   September 2021 – present
- Enable realtors to easily and intuitively view LIDAR scans on the web by implementing Three.js browser interface for freely navigating uploaded 3D spaces without preset viewpoints
- Simplify process of obtaining 3D scan of a space by designing iOS 14 mobile app that utilizes built-in LIDAR scanner hardware to generate high-fidelity compressed .OBJ or .PLY files
- Build minimum viable product as main developer collaborating with product designer and product manager

Research Assistant, Joint Quantum Institute, Univ. of Maryland. College Park, MD   June – August 2019
- Assisted in ongoing quantum computing research under the supervision of Dr. Bruce Kane
- Analyzed optimal electron beam power for increasing charge of 100nm liquid gold particle levitated in quadrupole ion trap by scattering outer electrons; computations performed using Python and simulation software CASINO
- Streamlined colleague's experiment by building laser apparatus to measure solution concentration, entirely eliminating need for 1-hour centrifuge following each test

PROJECTS

Model of Cognitive Analogy-Making in Racket, *Artificial Intelligence Honors* with Dan Anderson.
Modern functional programming implementation of Douglas Hofstadter's *Copycat* in Racket. Led eight other students and managed cooperative coding of a large project. Generated visualizations of simple character-string analogies using Racket's functional graphics library 2htdp/image. Results published in arXiv; see arXiv:1811.04747 [cs.AI].

Open-source Next.js website. *Gallformers*, led by Jeff Clark.
Contributed to open-source site for identifying and researching plant galls and gallformers. Site is built using Next.js written in TypeScript as the main framework, SQLite3 for storing the database, AWS S3 for hosting the images, and deployed on a Digital Ocean droplet. Database currently accounts for 2172 species of gallformers and 1187 species of plants that host galls, using 389 different sources. See github.com/jeffdc/gallformers and gallformers.org.

Programming Challenge in Haskell. *Advent of Code 2020.*
Solved 25 days of programming challenges. 78% pure functionally programmed in Haskell. Highlights: comonads, functional caching using lazy evaluation of infinite data structures, Chinese Remainder Theorem, parsers and domain-specific language implementations. Solutions available at github.com/gschare/aco2020.

LEADERSHIP AND ACTIVITIES

Instructor, *Mastery Learning Hour.* Tutor K-12 students one-on-one in mathematics with a drop-in session format.
Webmaster, *Columbia Space Initiative.* Maintain statically-generated (Jekyll) club website. See columbiaspace.org.
Treasurer, *Columbia Platypus.* Manage club finances and guest speaker honorariums. Lead weekly reading group.