

David Shumway

PhD Student

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Professional Experience

Research & Teaching Assistant, *University of Illinois at Chicago* (Chicago, IL) 2018-Present

- Worked with state-of-the-art methods related to knowledge graphs, ontologies, AI, GIS, ETL, data science, visual analytics, SWfMSs, community web portals, machine learning, transfer learning, domain adaptation, LLMs, and spatiotemporal datasets towards solving real-world problems.
- As a teaching assistant for Languages & Automata, Soft. Dev. for Mobile, Data & Web Semantics, Big Data Mining, Digital Literacy, Soft. Eng. I, and Soft. Design, taught curriculum to 5-250 students per semester (11 semesters), and led weekly discussions with 60-90 students per semester (4 semesters).
- Instructed 15 students in the graduate course Data & Web Semantics (Fall 2021).

Co-Owner & Lead Developer, *Finger Lakes Business Systems* (Plattsburgh, NY) 2011-2018

- Collaborated with hundreds of clients through Amazon MTurk, a competitive fast-paced on-demand marketplace, completing thousands of unique jobs and millions of microtasks across various industries, with a 99.9% task approval rating; and performed long-term work outside of the site with select clients.
- Designed LAMP-based solutions with a focus on web scraping, workflow optimization, distributed systems, and data management, writing 375K+ lines of in-house JS/HTML/CSS, PHP, SQL, and Python, including various custom API tools to manage the Amazon MTurk worker interface.

Summer Intern, *École Polytechnique Fédérale de Lausanne, DSIL* (Switzerland) Summer 2017

- Helped to build out a Neo4j language translation database for Kamusi.org by integrating new datasets.

Editor & Tech. Specialist, *Paul Brunton Philosophic Foundation* (Burdett, NY) 2010-2014

- Aided in curating 200K+ scanned documents, while providing LAMP, shell, and C# backed solutions.

Retail Associate, Delivery Driver, Library Clerk, & Tech. Freelancer, *Various companies* 2000-2010

Education

Ph.D. in Computer Science, *University of Illinois at Chicago* (expected May 2025) 2018-Present

- Advisors: Isabel Cruz (in memoriam), Cornelia Caragea.
- Completed PhD coursework requirement (Spring 2021) and PhD qualifier exam (2020, *Storage & Querying Provenance in Scientific Workflow Management Systems*).
- Notebook Reviewer: 2nd and 3rd Annual EarthCube Call for Notebooks (2021, 2022).

B.S. in Computer Science, *State University of New York at Plattsburgh* 2015-2017

- SUNY Plattsburgh Dean's List (Fall '15, Spring '16, Fall '16, Spring '17, Fall '17).
- SUNY Plattsburgh Annual CS Department Academic Excellence Award (2015-2016).

Publications: Knowledge Graph for Water Quality and Health Risks, Gautam et al. (2023, co-author).

Example Projects

★ *Microbial Risks to Divers at Coastal Locations*. 2021-. Developed an ontology in Protégé to assess scuba diving risk from microbial hazards, and aided in use of LLMs toward ontology learning. Used tools such as Python, Jupyter, Pandas, GeoPandas, Matplotlib, Scikit-Learn, PyTorch, and TF for spatiotemporal dataset ETL, to build and evaluate baseline and transfer learning time series regression models (e.g. RF, LSTM, GNN) to predict microbial concentrations, to analyze data and results, and to experiment with state-of-the-art methods in this domain.

★ *MALDI-DB*. 2020-2021. Built a Django web portal hosted on Mass Open Cloud and served via Nginx with PostgreSQL database for hosting and analysis of bacteria and small molecules from MALDI-TOF mass spectrometry data, built D3.js visualizations, and integrated an R library built for spectra processing via RPlumber. The database, web server, R libraries, and Django were each run from separate Docker containers and the system was initialized using Docker-Compose.

★ *Zoomie: Round-robin breakout scheduling in Zoom*. 2020- (Firefox, Chrome, JS). Designed simple extension utilizing Zoom's web client for groups interested in round-robin scheduled breakout rooms.

★ *Chicago Schools App*. Team, 2018 (D3.js, Leaflet.js, HTML/CSS). Developed 3 out of 5 visualizations, search functionality, and tied the app together into a single page with linked views.

★ *Tools for Amazon's Mechanical Turk*. 2013- (Firefox, Chrome, JS). Developed and maintained a browser extension to improve worker productivity on the Amazon MTurk website.

Tech. Skills: Python, Java, PHP, HTML/CSS, JavaScript, C++/C#, R, PostgreSQL/MySQL, Android, Shell, Linux, Fedora, Git, Pandas, GeoPandas, Matplotlib, Scikit-Learn, PyTorch, TensorFlow, ADAPT, Django, Flask, Scrapy, LaTeX, OSS, Protégé, RDF/OWL, JSON, AJAX, Browser Extensions, Greasemonkey, Cloud tools (Docker, OpenShift, VMware, CloudLab, Mass Open Cloud), REST API development, cURL.