

MATTHEW ZIEGLER

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Software engineer · Biologist · UI+UX designer

EDUCATION

University of Washington (*starting Fall 2018*)

Enrolled PhD Student in Computer Science and Engineering

University of Wisconsin – Madison GPA: 3.785 (*Fall 2009 – Spring 2013*)

BS with double major in Computer Science and Biological Aspects of Conservation

Summer Institute for Training in Biostatistics (*Summer 2011*)

Department of Biostatistics and Medical Informatics, University of Wisconsin

Høgskolen I Telemark – Bø, Norway (*Fall 2011*)

Alpine Ecology and Environmental Management program

James Madison Memorial High School GPA: 3.7 (*Fall 2005 – Spring 2009*)

National Merit Finalist, Advanced Placement Scholar with Distinction

PUBLICATIONS

Julia Janicki, Nitish Narula, Matt Ziegler, Benoit Guénard, Evan P. Economo. (2016). Visualizing and interacting with large-volume biodiversity data using client-server web-mapping applications: The design and implementation of antmaps.org. *Ecological Informatics*. 32, 185-193 <http://dx.doi.org/10.1016/j.ecoinf.2016.02.006>

Matt Ziegler, Mark Craven, Sid Kiblawi. (2018). GADGET: A tool for identifying associations between biomedical concepts, genes, and metabolites. [In preparation/revision]

Matthew Bernstein, Matt Ziegler, Anhai Doan and Colin Dewey (2018). MetaSRA: Normalized human sample-specific metadata for the Sequence Read Archive. [In submission]

FELLOWSHIPS

National Science Foundation Graduate Student Research Fellowship 2018: \$138,000

Hilldale Fellowship for Undergraduate Research 2013: \$3,500

EXPERIENCE

Digital Green – Loop

Research Intern (*January – May 2018*)

- Field research to understand farmers' needs around market information; and iteratively developed and tested paper prototypes of a market information mobile app, to present market information to farmers in ways that are useful and understandable.
- Field research on direct farmer engagement, developed and tested prototypes of “farmer profile” features, studied engagement models of similar services.
- Visual research on mobile app design, prototyping and user-testing interfaces for rural farmers who are new smartphone users, developing a style guide for the mobile app.

Menstrupedia

Volunteer Contributor (*May – June 2016, April – July 2017, ongoing*)

- Market researcher, designer, and main developer on a prototype period-tracking app targeted towards women in India, with a goal of providing menstrual health information. Conducted surveys and interviews about period-tracking needs, researched designs of existing period-tracking apps and related projects, designed mock-ups. Currently developing a working prototype using React Native.
- Debugging and development for an online audio-visual comic book about menstruation and menstrual health.

Center for Predictive Computational Phenotyping – University of Wisconsin

Associated Information Processing Consultant (*November 2015 – January 2016*),
(*September – November 2016*), (*August – November 2017*)

- Designed and developed a web application for MetaSRA, a project allowing researchers to more easily search for sequence-read data. Conducted user research with interviews, developed and tested design concepts and prototypes, developed the app using Python+Angular+MongoDB, and deployed. <http://metasra.biostat.wisc.edu>
- Designed and developed a search-engine for molecular biologists to find associations between genes, metabolites, and concepts in the biomedical literature; building on my undergraduate work. Built using Python+Django, and MySQL. Conducted several rounds of user-testing. <http://gadget.biostat.wisc.edu>
- Programmed and helped design a user interface for an active machine learning application – providing the user with predictions of experimental results from biomedical papers, and asking the user for corrections to improve the accuracy of the learning algorithm. Built with Python+Bottle, MongoDB, and Angular.

Okinawa Institute of Science and Technology – Biodiversity & Biocomplexity Unit

Visiting Researcher (*March-April 2015*)

Consultant (*December 2016 – February 2017*)

- Lead software developer on AntMaps.org web application, to help researchers visualize a geospatial database of species occurrences. Contributed to user interface design and conducted usability testing. Built with Python/Django/Apache and a Javascript/D3 client, connected to a PostgreSQL database. (Featured in [The Guardian](#) and [Science Magazine](#).) <http://antmaps.org>
- Created tools for researchers to access and analyze species occurrence data from the GABI biodiversity database, as a RESTful API and R package.

How To Be a Monkey <http://howtobeamonkey.org>

Independent project, with the Wild Capuchin Foundation (*Spring 2014 – ongoing*)

- Developing an educational, interactive web app to illustrate concepts in primate behavioral ecology, using pictures, videos, and real observational data from the Lomas Barbudal Monkey Project. (Desktop + Tablet + Mobile.) The project has been through several iterations based on feedback from user tests and classroom trials, and is now in its third major version.
- Developing and testing classroom activities for middle schools, designed to fit within the Next Generation Science Standards. *How To Be a Monkey* has also been used in undergraduate classes at UCLA and UC Davis, and professor Susan Perry is working on a module for undergraduate primatology classes that we plan to eventually publish.
- Presented as a poster at Games+Learning+Society 2015, as a map gallery selection at FOSS4G 2014, an exhibit at the Wisconsin Science Festival 2016, and a presentation at Hill Hacks 2016.
- Began work to translate the website into Spanish to reach Central American audiences.

Hill Hacks 2017, 2016, 2015; Dharamsala India

Volunteer and Hacker Camp Attendee (*May-June 2015, May-June 2016, May-June 2017*)

- Volunteered with the Hill Hacks school program, conducting hands-on science workshops at 5 different schools in the Dharamsala area. Led workshops on iterative game design; and assisted with workshops about soldering, constructing solar-powered toy cars, and solving Rubik's cubes.
- Presented sessions at Hill Hacks conference, including "Is sustainable long-distance travel possible?", "How to Be A Monkey: Intro to primate behavioral ecology," "Ants, Bees, and Wasps," "Let's make a map! Open-source geospatial tools," "DIY Usability Testing," "Wasp Genetics," and "A Whirlwind Tour of the Insect Family Tree."

Education Analytics Inc.

Programmer – Limited Term (*August 2014-December 2014*)

- Designed and developed UI prototypes for delivery of value-added results to teachers and administrators. <http://demo-edanalytics.rhcloud.com>
- Created a system for batch PDF report generation.
- Worked on a secure system for delivery of sensitive evaluation data to teachers.
- Conducted formal usability testing.

Lomas Barbudal Capuchin Monkey Project

Field Assistant (*November 2013 – January 2014*)

- Followed groups of habituated, wild capuchin monkeys in the Lomas Barbudal Biological Reserve, Costa Rica, to collect behavioral observational data.
- Contributed to the project's database, and wrote software for data collection in the field, data transcription, and data retrieval.

UW Department of Biostatistics and Medical Informatics – Mark Craven Group

Computer Programmer (*May 2011 – May 2013*),

Associate Systems Programmer (*May – August 2013*)

- Prototyped interfaces for searching and visualizing gene interactions predicted by machine learning systems.
- Prototyped a website for finding genes related to a topics in the biomedical literature.
- Web application development – Django + Python + Apache + Javascript.
- Collaborated with Jamie Thomson of the Center for Regenerative Biology at the Morgridge Institute for Research.

Survey of Primitive Weevils in Wisconsin

Volunteer Field Assistant, supervised by Julia Janicki (*Summer 2013*)

- Accompanied an entomology grad student for 1-3 days each week, collecting weevils at field sites around Wisconsin.
- Learned collection techniques, insect identification, and plant identification.

UW Center for Limnology – Paul Hanson Lab

Software Developer (*October 2010 – May 2011*)

- Contributed code to Lakebase, a platform for limnology research organizations to store and share research data.
- Provided technical assistance on a project to model loon habitat conditions under

hypothetical climate scenarios, using distributed computing and systems of differential equations.

- IT assistance to research staff.

Wisconsin Center for Educational Research – Value Added Research Center

Student Hourly Research Assistant (*July 2009 – October 2010*)

- Data quality assessment, troubleshooting an ETL system for Milwaukee Public Schools district-wide student-level data warehouse with millions of records.
- Extraction and preparation of data from school districts for researchers.

Undergraduate For-Credit Research (*2011-2013*)

Awarded Hilldale Fellowship for Undergraduate Research (2013)

- *Supervised Learning to Infer Gene Regulatory Networks*: Advised by Mark Craven, Ron Stewart (Morgridge Institute) and Scott Swanson (Morgridge Institute). A multiple-instance machine learning framework to model gene regulation during differentiation of embryonic stem cells, using predictions of transcription factor binding sites, enhancer locations, and μ RNA binding sites.
- *Pattern Identification in Gene-Expression Time Series Data*: Advised by Mark Craven. Analysis and comparison of the ARSER and COSOPT algorithms to identify genes expressed following circadian rhythms in mice, and clustering of the identified genes.

Programming Tutor (*June 2012 – August 2013*)

Taught a bright 13-year-old how to program in Java and Python, went through college-level material, and worked on an Android game.

SKILLS

Software Development

- Programming languages: Javascript, Python, C, Java, R, SQL, HTML, CSS, PHP, Visual BASIC, Unix shell, Haskell, MATLAB (able to quickly pick up more.)
- Hundreds of hours experience designing, managing, and querying SQL and NoSQL databases. SQLite, Postgres, MongoDB, MySQL, Oracle, MS Access.
- Several thousand hours experience with full-stack web development.
 - Front-end frameworks: Angular, D3, JQuery, Emberjs, Bootstrap, Leaflet
 - Back-end frameworks: Node.js, Laravel, Django, Web2Py, Bottle.

- Experience designing and implementing RESTful API's.
- Experienced with web-payment API's like Instamojo.
- Worked with sensitive data and web application security.

Design

- Experience working for clients with ambiguous goals and design ideas, leading them through the design process to clarify objectives and create prototypes.
- UI prototyping/mockups with software like Inkscape, and basic graphic design skills.
- Experience designing and implementing several mobile app and website user interfaces; with an affinity for simple, clean aesthetics.
- Formal and informal user testing – individually and with classrooms.
- Portfolio of biology-inspired art: <http://mziegler.github.io/drawings.html>

Scientific Computing

- Experienced with scientific programming in Python+Numpy+Scipy, R, and MATLAB
- Designing and implementing interactive data visualizations in D3, and static visualizations with Matplotlib and R.
- Machine learning – experience with several clustering algorithms, decision trees, and SVM's; using machine-learning software suites like Weka; and evaluation with methods like precision-recall and SNR curves.
- Natural Language Processing and Sequence Analysis – experience using HMM-based models, for tasks including information extraction and sentence alignment.
- Distributed, high-throughput computing experience with HTCondor.
- Cloud computing experience with OpenShift, RedisCloud, and HTCondor.
- Productive in Linux/Unix, Windows, and OS X environments.

Field Work

- Proficient with taxonomic keys for insect and plant identification.
- Experience prototyping and piloting new technical solutions for data collection in the field, created software for primate data collection on Android tablets.
- Experience working in remote locations, long-term camping in close quarters, and working under hazardous field conditions with poisonous snakes, killer wasps, etc.

Miscellaneous

- Languages: English (primary), Spanish (rusty but conversational), Norwegian (conversational), Hindi (beginner.)
- Vegetarian cooking.
- Bicycle maintenance, tune-ups, and basic repairs.