MATTHEW ZIEGLER

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Software engineer · Biologist · UI+UX designer

EDUCATION

University of Wisconsin – Madison GPA: 3.77 *(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

Matt Ziegler, Mark Craven, Sid Kiblawi. (2016). GADGET: A tool for identifying associations between biomedical concepts, genes, and metabolites. [In submission]

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*

EXPERIENCE

Menstrupedia
Volunteer Contributor *(May – June 2016, ongoing)*

- Main developer on a prototype period-tracking app for women in India, with a goal of providing menstrual health information. Our working prototype targets computers and smartphones, but we're exploring SMS-based interfaces to reach women with lower-powered devices. Tentatively planning another development cycle in spring 2017.
- Debugged and contributed some finishing touches for an online audio-visual comic book about menstruation and menstrual health.

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.
- Planning a series of press releases and publicity for winter 2016.
- Began work to translate the website into Spanish to reach Central American audiences.

Center for Predictive Computational Phenotyping – University of Wisconsin

Associated Information Processing Consultant *(November 2015 – January 2016)*
+ (September – November 2016)

- 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.

Hill Hacks 2016 + 2015, Dharamsala India

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

- Volunteered with the Hill Hacks 2016 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 2016:
  - Round-table discussion: Is sustainable long-distance travel possible?

  - Presentation: How to Be A Monkey: Intro to primate behavioral ecology
  - Presentation: Ants, Bees, and Wasps
  - Workshop: Let's make a map! Open-source geospatial tools
- Gave 2 flashtalks at Hill Hacks 2015: *DIY Usability Testing,* and *Wasp Genetics*

Okinawa Institute of Science and Technology – Biodiversity & Biocomplexity Unit
Visiting Researcher *(March-April 2015)*
- 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
- Returning this November-January for another development cycle, to add new features and create a data-access API and complementary R package.

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 μRNA 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.
- Worked on software projects through their entire lifecycles, from initial design, to prototyping, development, deployment, maintenance, and upgrades.
- Experienced both working both independently and in teams.

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 website user interfaces; with an affinity for simple, clean aesthetics.
- Formal and informal user testing – individually and with classrooms.
- Prototyped several game designs for *How to Be A Monkey*.
- 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.
- Conducted focal follows to collect behavioral data.
- 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 (clunky but conversational), Norwegian (conversational), Chinese (beginner.)
- Vegetarian cooking.
- Bicycle maintenance, tune-ups, and basic repairs.