Megan E. Dolan

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CAREER PROFILE

Computational biologist with 3 years of experience developing, creating, and implementing applications for universities,students, and scientists in genetics. Translated biology needs into code and web applications by conceptualizing and managing multiple full-stack development lifecycles to bridge the gap between computer science and biology.

Core competencies include database management, object-oriented programming, web development, effective communication in oral presentations and grant writing, analytical problem solving, self-learning, and self-motivation.

TECHNICAL SKILLS

Languages: R, Python, JavaScript, C/C++, Perl, SQL, Git, BASH shell scripting

Web Development Technologies: HTML, CSS, Flaskr, Django, Heroku

File Formats: FASTA, FASTQ, SAM, BAM

DBMS: MongoDB, MySQL, SQLite

Operating Systems: Linux, Unix, OS X

RELEVANT EXPERIENCE

Master's Thesis Researcher
2019-Present

Washington State University, **Advisor: Dr. Omar Cornejo***, Project Link*

- Utilized new methods to detect patterns in host-microbe relationships by using R scripts for data analysis, such as t-SNE for non-linear dimensionality reduction analysis of the chocolate plant's microbiome
- Accessed and manipulated 200 Illumina sequencing files on HPC clusters using BASH scripting and conducted quality control by filtering based on parameters, such as read count thresholds
- Compared accuracy of data analyses based on normalization techniques, such as TPM and default normalization parameters for R bioinformatics packages DESeq2 and edgeR

Software Developer, Bacteriophage Database
2018 - 2019

Illinois Wesleyan University, Project Link

- Designed, developed, and maintained two full-stack web-based softwares as a solution to student data management concerns, allowing scientists to efficiently track novel bacteriophage data for research
- Implemented SQL queries to accurately sift through sequencing records for analysis and extraction of data
- Utilized various technical and software development tools such as Django, Flask, SQL, NodeJS, Cloud9, MongoDB, MySQL, GitHub, Git, PyCharm, and Heroku to create customized web-based software solution

- Effectively communicated software relevancy to front-end users (biologists) at an annual research conference

Software Developer, Student Personal Planner
Fall 2018

Illinois Wesleyan University, [Project Link](#)

- Designed, developed, and maintained two full-stack web-based softwares as a solution to student data management concerns, allowing scientists to efficiently track novel bacteriophage data for research

- Implemented SQL queries to accurately sift through sequencing records for analysis and extraction of data

- Utilized various technical and software development tools such as Django, Flask, SQL, NodeJS, Cloud9, MongoDB, MySQL, GitHub, Git, PyCharm, and Heroku to create customized web-based software solution

- Effectively communicated software relevancy to front-end users (biologists) at an annual research conference

Research Assistant, Annotation of Potential Helicase Gene
Summer 2018

Illinois Wesleyan University, **Advisor: Dr. David Bollivar**

- Conducted analysis of potential ATP-dependent helicase gene in recently discovered bacteriophage "MrWorf" and annotated genomes within host Rhodobacter capsulatus bacteriophage cluster for genetic similarity.

- Presented written report summarizing research to biology faculty, staff, and students.

Biofortification Research Intern
Summer 2017

International Rice Research Institute, **Advisor: Dr. Mallikarjuna Swamy**

- Studied biofortification of high zinc rice varieties in the Plant Breeding Division.

- Conducted activities related to rice hybridization, element concentration measurements, phenotyping and genotyping, data gathering, analysis, and QTL mapping.

- Prepared written and oral report summarizing experience and presented among Plant Breeding research team.

Research Assistant, SEA-PHAGES Program
2015–2016

Illinois Wesleyan University, **Advisors: Dr. Richard Alvey and Dr. David Bollivar**

- Worked for the Science Education Alliance Program: Phage Hunters Advancing Genomics and Evolutionary Science (also known as SEA-PHAGES).

- Isolated, purified, sequenced, and analyzed newly discovered bacteriophages.

- Presented relevance research at the John Wesley Powell Research Conference in the spring.

EDUCATION

MS Biology
2019-Present

Washington State University
    Certificate: Bioinformatics

BS Biology
2015-2019

Illinois Wesleyan University
    Minor: Computer Science

TEACHING EXPERIENCE

Mentor for Undergraduate Researcher
Present
Washington State University, **Biological Sciences**

- Responsible for organizing and instructing undergraduate mentee in contribution to the cacao project.
- Hold biweekly meetings for open discussions regarding research objectives, related journal articles and reviews, troubleshooting concerns, and general professional advice.

Principles of Organic Evolution (BIOL 405), Teaching Assistant
Present
Washington State University, **Biological Sciences**

- Taught an average of 25 undergraduate students per section, with one section per semester.
- Taught hour long introduction lectures each week, actively led class discussions, and assisted with answering questions that covered a range of introductory concepts in evolutionary biology.

Organismal Biology (BIOL 106), Teaching Assistant
2019
Washington State University, **Biological Sciences**

- Taught an average of 35 undergraduate students per section, with three sections per semester.
- The course covered a range of topics pertaining to plant and animal anatomy/physiology.

Plant and Fungal Diversity (BIOL 306), Teaching Assistant
2017-2018
Illinois Wesleyan University, **Biological Sciences**

- Taught an average of 35 undergraduate students per semester.
- Assisted students with classifying and identifying specimen in taxonomic ordering, such as: fungi, slime molds, cyanobacteria, algae, bryophytes, eusporangiate and leptosporangiate gymnosperms, and angiosperms.

Plant Anatomy and Physiology (BIOL 375), Teaching Assistant
2018
Illinois Wesleyan University, **Biological Sciences**

- Taught an average of 25 undergraduate students per semester
- The course covered the following topics: plant cell structures, vegetative and reproductive plant body structure in angiosperms, pollination syndromes, sporogenesis, gametogenesis, fruit and flower morphologies, and plant tissue types.

PUBLICATIONS

3. **Dolan, M.** and Cornejo, O. (2020) *Diverse endophyte composition across highly divergent populations of the chocolate tree, Theobroma cacao L.* Manuscript in preparation, School of Biological Sciences, Washington State University.

2. **Dolan, M.** (2020) *A Web-Based Application for Efficient Organization of Microbial Genomic Data.* Manuscript in preparation, Department of Biological Sciences, Illinois Wesleyan University.

1. **Dolan, M.** (2020) *Web-Based Bacteriophage Organization System.* Department of Biological Sciences, Illinois Wesleyan University. DOI: 10.5281/zenodo.3625228.

PRESENTATIONS

Dolan, M. (2018). *Development of a* Rhodobacter capsulatus *Bacteriophage Database Application.* Oral presentation given at the IWU Criley Research Conference.

Dolan, M. (2017). *Zinc Biofortification Research Conducted at the International Rice Research Institute.* Oral presentation given at the IWU Biology Internship Conference.

Braun, M., **Dolan, M.**, Lennon, J. Lane, S., and Alvey, R. (2016). *Genetic Analyses and Annotations of Three Newly Discovered C1 Mycobacteriophages.* Poster session presented at the John Wesley Powell Research Conference.

GRANTS, AWARDS, AND HONORS   TOTAL: $8,531.46

Carl H. Elling Travel Endowment   Spring 2020
Washington State University - $1,500.00

Carl H. Elling Travel Endowment   Fall 2019
Washington State University - $531.46

Undergraduate Dean's List   2018, 2019
Illinois Wesleyan

Criley Research Fellowship Grant   Summer 2018
Illinois Wesleyan University - $4,000.00

Freeman Asia Internship Grant   Summer 2017
Illinois Wesleyan University - $2,500.00

PROFESSIONAL AFFILIATIONS

Graduate Women in Science (GWIS)   2020-Present
Active Member

Biology Graduate Student Association   2019-Present
Active Member, Community Outreach Chair

The National Society of Leadership and Success   2018-Present
Inducted/Active Member

The National FFA Organization   2013-Present
Student Advisor, Secretary, and Alumni

ADDITIONAL EXPERIENCE

Website Builder   Summer 2020
Washington State University, **Project Link**

- Assisted a faculty member in implementing, updating, and regulating an independent party WordPress template for a research lab webpage

- Developed and modified specific page formats, ensuring a user-friendly experience

Greenhouse Assistant Manager   2017-2019
Illinois Wesleyan University, ***Advisor: Prof. Bethany Evans-Campbell***

- Maintained a diverse collection of plant species, including: bryophytes, eusporangiate and leptosporangiate gymnosperms, and angiosperms.

- Attended to daily greenhouse up-keeping.

COMMUNITY SERVICE/ADDITIONAL AFFILIATIONS

Million Women Mentors (MWM)   2020-Present
Volunteer Mentor
Palouse Science (Children's) Discovery Center   2019-Present
Volunteer Member
Alpha Phi Omega – Professional Service Fraternity   2018-Present
Inducted Member
IWU Peace Garden   2016 - 2019
Community Volunteer Member