

EMILY PARRISH

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EXPERIENCE

SEPTEMBER 2015 – PRESENT

RESEARCH ASSOCIATE, INSTITUTE FOR DEFENSE ANALYSES

CLEARANCE: DOD INTERIM TOP SECRET//SCI

- Work on various science/technology defense-related research tasks sponsored by federal defense organizations such as the DoD and DTRA.
- Program extensive web-based interfaces to display content and analyses using HTML, PHP, and Javascript to utilizing data visualization libraries such as D3.
- Program and debug analysis tools in Python and Matlab for internal use.
- Collect and determine utility of validation data for CBRN modeling and simulation codes in addition to performing validation analyses on some codes.
- Aid in the testing and evaluation of vehicular and robot-mounted counter-IED sensors. Oversaw data collection in a variety of environments. Additionally, wrote scripts and processing tools to extract and reformat data in order to run existing analysis software.
- With internal funding, conducted a literature search on the applications of Convolutional Neural Networks on human locomotion. Additionally, ran simple sensitivity studies on training data set and algorithm itself to evaluate the quality of the algorithm and the training data.
- Recently began a project writing Python scripts to process and organize a large tagged data set. Currently preparing the data for a topic modeling algorithm to evaluate the quality of the manually assigned tags and write an unsupervised classifier to tag additional data points.

DECEMBER 2013 – MAY 2015

ENGLISH-STONEHOUSE RESEARCH FELLOW, COLLEGE OF WILLIAM AND MARY

- Conducted instrumental and computational analysis of bacteria protein samples for proteomics studies.
- Troubleshoot instrumentation issues and edited experimental conditions for better chromatogram resolution.
- Used HPLC-MS (ion trap mass spectrometry) to identify proteins from wild type and mutant strains of *Helicobacter pylori*.
- Aided in the completion of a flowing afterglow mass spectrometer including installing a pump, updating plumbing, and editing software to interpret outputs from the detector.
- Worked on computational theoretical calculations of proton affinity for peptides by writing batch Perl scripts for both collaborators and other projects in the laboratory.

SUMMER (MAY-AUGUST) 2013

UNDERGRADUATE RESEARCHER, VIRGINIA COMMONWEALTH UNIVERSITY

- Participated in research testing azo-linked polymers in the context of their utility for carbon dioxide capture.

- Used knowledge of organic synthesis to polymerize monomers used directly for testing and data analysis.
- Worked underneath/collaborated with a graduate student for their research project.
- Created poster for formal poster presentation halfway through the program.
- Delivered final presentation of research to peers and department faculty.

EDUCATION

MAY 2015

BACHELOR OF SCIENCE, THE COLLEGE OF WILLIAM AND MARY

[**MAJOR**: CHEMISTRY] [**MINOR**: COMPUTER SCIENCE]

GPA: 3.30

RELAVENT COURSEWORK

- Programming in Python
- Data Structures (in Python)
- Discrete Mathematics
- Software Development (in Java)
- Algorithms (in C and C++)
- Principles of Programming Languages

COMPUTING SKILLS

- **Proficient**: C, C++, R, SQL, Matlab, HTCondor
- **Expert**: Python, Java, Javascript, PHP, HTML/CSS

COMPUTING PROJECTS

- **Web Development**: I designed and built a web interface using HTML, CSS, Javascript, and PHP. In this effort I created a web template for a variety of page types to allow those unfamiliar with HTML an easy way to create content. We are currently implementing a “one-source” feature where the site queries a SQL database when it needs to print out any numbers or data that is stored there and will use the database to allow the user to access and download the associated data needed for their analysis.
- **Geolocation Scripting**: I wrote a script that takes thousands of instrument stations UTM coordinates from the 1950's and performed a datum shift calculation using a 13th order polynomial. Then after calculating the modern WGS84 components, I added descriptions to each station and sorted them by experiment in a KMZ format for better visualization.
- **Meteorological Data Decoder**: Using documentation of the encoding of radiosonde data digitized from micro film (rules that varied over the course of 10-15 years), I took the coded measurements and decoded them. The program recognized the year it was created based on filename, confirmed that year based on some features in the encoding and used that year's rules to decode the measurement. In addition, I wrote checks that would sort through and find potential errors (problems with the encoding, transcription errors, etc.) and present them for manual review.
- **Data Visualization Tools**: I used Python and Javascript libraries such as D3 and bokeh to process data and create interactive web visualizations for a variety of projects. These projects varied from visualizing a taxonomy to organizing a catalog of projects with resources and lists of challenges.

- **Social Media (in progress):** Using an open source data set, I am using Latent Dirichlet allocation to model topics and validate the hand labelling of topic categories that accompanied the data set. Future efforts over the next few months will include using these labels to program a supervised classifier for the purpose of tagging additional data that may be published.

PUBLICATIONS

P. Arab, E. Parrish, T. Islamoglu and H. M. El-Kaderi. "Synthesis and Evaluation of Porous Azo-Linked Polymers for Carbon Dioxide Capture and Separation." *J. Mater. Chem. A*, 2015, DOI: 10.1039/C5TA04308E.

UNDERGRADUATE ACTIVITIES

Registration Director, William and Mary Middle School Model UN Secretariat

- Served as a secretariat member spending nine months facilitating communication to sponsors, running online registration, and creating/managing a budget of roughly \$40,000 for William and Mary's annual Middle School Model UN conference (which attracts about 750 delegates).

Alpha Phi Omega Service

Alma Mater Productions (Publicity and Outreach, Late Nite)

Member, William and Mary International Relations Club

- Travelled to universities including UVA, Yale, and McGill to participate in simulations of UN General Assemblies and Specialized Agencies to develop skills such as collaboration with other delegates, resolution writing, and reacting to crises with a particular researched position.
- Participated in raising money for IRCares, an organization internal to the club that put on events to raise money for international organizations such as Charity Water and KIVA.

HONORS AND AWARDS

- English-Stonehouse Fellowship, The College of William and Mary Charles Center (2013-2015)
- Research Experience for Undergraduates, National Science Foundation (2013)
- International Baccalaureate Diploma (2011)
- Gold Award, Girl Scouts of America (2010)