Ashley Mae Conard

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Education

Brown University: Master's Computer Science (2018), Ph.D. Computational Biology, Computer Science track (August 2021)
DePauw University: B.A. (2014), Major: Computer Science (specialized in Biochemistry), Minor: French, GPA: 3.7

Computing & Technology Internship Experience (selected)

Computational Biology Researcher, Brown University, Dr. Erica Larschan and Dr. Charles Lawrence, RI *Current*

Developing RNA structure and time series models from multi-omics data to infer critical mechanisms in dosage compensation.

Machine Learning Scholar, Department of Health, Stephen Morris, RI *Fall 2018*

Built algorithm for predictive model for a need in Rhode Island's hospital systems. Hope is to form state legislation based on findings.

Cancer Genomics Researcher, Brown and Princeton University, Dr. Benjamin Raphael, RI, NJ *2015-2017*

Created deep learning method to improve DNA single-cell sequencing data for large region mutation (copy-number) inference. Developed pipeline to identify subclonal driver mutations in cancer bulk sequencing tumor samples across 9 cancer types.

Game Theory & Bioinformatics Researcher, Université Libre Bruxelles, Fulbright/BAEF Scholar, Dr. Tom Lenaerts, Belgium *2015-2016*

Utilized machine learning, cooperative game theory, structural bioinformatics, and parallel computing to uncover binding specificities in SH3 protein domain. Successfully developed method which is now being prepared for publication.

Bioinformatics Parallel Computing Researcher, MIT Lincoln Laboratory, Dr. Jeremy Kepner & Dr. Darrell Ricke, MA *Summers 2013, 2014*

Developed a fast protein analysis algorithm, using Dynamic Distributed Dimensional Data Model (D4M-by Dr. Jeremy Kepner), merging sparse algebra, associative and distributed arrays, and triplestore/NoSQL databases (Accumulo) for fast Big Data analysis.

Google Cambridge Arduino Workshop Creator, Google, Computer Science Summer Institute, Chelsea Pollen, MA *Summers 2013, 2014*

Created, recruited, implemented, and led Arduino workshop for 40 students at Summer Institute. github.com/oakljon/cssi-2014

Chemical Inventory Database Creator (Senior Project), DePauw University, Dr. David Roberts, IN *Spring 2014*

Designed, built, deployed database (Parse) & front end (HTML, CSS). ±2000 users to catalog and distribute chemicals for classes.

Bioinformatics Research & Tutor, DePauw University, Dr. Chester Fornari, IN *2012-2014*

Devised labs & tutored Bioinformatics and Cells & Genes. Research: Integrated MEGA and Chimera to analyze TP53.

Structural Biology & Drug Discovery Researcher, Vanderbilt University, Dr. Jens Meiler, TN *January 2013*

Method development assistant for new structure prediction algorithms in RosettaLigand program (simulations and design of macromolecules) and new machine learning techniques in Biochemical Library (BCL) drug discovery project.

DePauw *Alumni Office* Technology Associate, DePauw University, Mrs. Holly Enneking, IN *2011-2012*

Provided IT solutions and built video presentations for award lectures and conducted interviews for alumni networking.

Quality Control & Technology Researcher, Elanco (Eli Lilly and Company), Mr. Scott Burd, IN *Summer 2012*

Designed, tested and implemented two software programs for deviation documentation and instrument control. The former went GLOBAL for Elanco plants in Nov. 2012, the latter runs automatically daily. Worked in lab with GC, AA, HPLC.

Computational Biology & Machine Learning Researcher, Université Libre Bruxelles (ULB), Dr. Tom Lenaerts, Belgium *Spring 2012*

Created a program utilizing machine learning, cooperative game theory and structural bioinformatics techniques to analyze the role of core amino acids in a FYN SH3 protein domain (involved in cell growth).

Technology Associate, ITAP, DePauw University, Mrs. Angie Smock, IN *2010-2011*

Project manager for team of 10 for IT solutions. Projects: virtual flashcard program, website, tech brochure, IT solutions.

Technology Sales & Marketing Associate, JDS Uniphase, Mr. William DeWeese, TX, NY *Summer 2011*

Researched, tested, taught, and marketed communication software, services, and solutions for Verizon, AT&T.

Inorganic Chemistry Researcher, Ionogel Analysis and Application, DePauw University, Dr. Hillary Eppley, IN *Fall 2010*

Synthesized ionogel and determined chemical and physical properties to use as a catalyst for biosensing, optics, electrolytes.

Organic Chemistry Researcher, Eli Lilly and Company, Dr. David Bender, IN *Summer 2008*

Assessed hydrolytic stability of cyclopropanecarboxylic acid esters as potential prodrugs. Synthesized an acyclovir prodrug and worked with a ghrelin O-acyltransferase inhibitor. This is viewed as a potential therapeutic target to treat obesity and diabetes.

Technology Skills

Languages: Bash, C++, CSS, HTML, Java, Julia, MATLAB, pMatlab, Python, R, Scala, SQL, Visual Basic.net
Development Tools / Environments: BlueJ, Eclipse, Java SDKs, Jupyter Lab, Markdown, Putty, Tensorflow, Visual Studio Code, Xcode
Big Data Tools: Apache Hadoop, Apache Acculumo, MPI, OpenMP, Slurm

Application Programs/Platforms: Arduino, ArcGIS, Audacity, Biomall, Business Objects, Camtasia, Canary, Chimera, Discoverant, Dreamweaver, Final Cut Pro, GIMP, Infopath, Makerbot, MSA tools, Photoshop, Raspberry Pie, Raven, Rosetta Ligand

Relevant Coursework & Skills

Chemistry and Biochemistry Skills: Nuclear Magnetic Resonance Spectroscopy (^{11}C and ^{1}H), Mass Spectroscopy, Infrared Spectroscopy, Chromatography, Polymerase Chain Reaction methods, Gel Electrophoresis, familiar with Microwave Acid Digestion Bomb methods, Gas Chromatography, High Performance Liquid Chromatography (HPLC), Atomic Absorption Spectrometry.

Relevant Coursework: Computer Science: Advanced Probabilistic Methods, Inference in Genomics & Molecular Biology, Systems, Computational Molecular Biology, Advanced Algorithms in Computational Biology, Topics in Computational Linguistics, Coalescent Theory, Statistical Inference, Bioinformatics, Object Oriented Software Development, Data Structures, Algorithm Dev. & Graphics. Biochemistry/Biology.: Genetics, Function & Structure Biomolecules, Ecology & Evolution, Cells & Genes, Enzyme Mechanisms.

Foreign Languages

French (fluent), Spanish (fluent), Portuguese (beginner), Mandarin (beginner), Dutch (beginner)

Awards & Honors

NSF Graduate Research Fellowship: Machine Learning and Computational Biology (2014-Current)
Fulbright Research Scholar & Belgian American Education Foundation Fellowship: Computational Biology, Belgium 2014-2015
DePauw: Dean's List (each semester), Alpha Lambda Delta Award (2010), and Old Gold Award for academic excellence (2014)
Grace Hopper Int'l Celebration of Women in Computing: Poster Award 2013, (scholarships: **NSF** 2010, **Xerox** 2012, **Intel** 2013)
Honors Societies: Mortar Board (VP '14), Chi Alpha Sigma, Phi Eta Sigma, Order of Omega, National Society for Collegiate Scholars

Leadership & Activities (selected)

Professional Organizations & Positions:

Fulbright Board of Trustees: young professional board member (Finance and Conference Committee, Strategic Task Force) *Current*
Science Writer: Today's Science, providing science news especially for students *Current*
AAAS, NSPN, Fulbright, ASBMB, ACS, SIAM member, made Chemistry Day Workshop ('10), ushered IEEE Computing WKSH ('13) *Current*
Ambassador to France (to return every 5 yrs): selected to represent US for D-Day Embarkation Commemoration *2004-Current*
Finance Chair for International Society of Computational Biology Student Symposium *2016-2018*
Princeton Citizen Scientists executive team: group of scientists interested in policy, mobilizing at Princeton and beyond. *2016-2017*
AnitaB.org Board of Trustees: student board member working on program and strategies committees *2015-2017*
US-EU-NATO Affairs Delegate: Fulbright grantee to engage in EU Seminar in int'l diplomacy with EU Commission *February 2015*
Venture Crew President (2010), Vice President (2009), Venture Crew 1121, Boy Scouts of America, IN *2008-2013*

DePauw University Organizations:

Co-founder & Vice President of Robotics Club: Arduino project and outreach to local high schools *2011-2014*
DePauw Environmental Policy Program: testified scientific bills, IN Statehouse, created website: https://bit.ly/2ChiJBS *Jan. 2011*
Information Technology Associates Program (ITAP), **Science Research Fellows** (SRF): highly selective honors programs *2010-2014*
Tutor: Chemistry, Computer Science, Biology, French and Spanish **Mentor**: ITAP 1st and 2nd year students *2010-2014*
University Athletics: Soccer (2010-2012) and Women's Track (2013-2014) *2010-2014*
Co-founder of DePauw Farm: 2-acre farm, 25% produce given to local Greencastle IN food pantry https://bit.ly/2yifZ4D *2010-2014*

Research Presentations & Publications (selected)

Paper: "Transcription Factor Alters Brain Structure and Neuron Projections in Development " **Ashley Mae Conard,** Maria Tsarli, Erica Larschan *Current*
Master's Thesis: "Identification of Subclonal Drivers and Copy-Number Variants from Bulk and Single-Cell DNA Sequencing of Tumors" 2018
Paper: "Determining the winning SH3 coalition using game theory" publication preparation, **Ashley Mae Conard**, Elisa Cilia, Tom Lenaerts *Current*
Paper: Highlights from the ISCB Student Council Symposia. B. Cuypers, A. Jacobsen, B. Siranosian, K. Schwahn, **A. Conard**…, F1000Research *Dec.* 2016
Won Int'l RCSB PDB Prize (flash talk & poster): "Determining the winning SH3 Coalition with Game Theory," https://bit.ly/2Ac0qNg, ISMB *July 2015*
Invited talks: "Determining the winning SH3 Coalition with Game Theory," Regional Student Group Belgium, ExaScience Lab IMEC, Belgium *June 2015*
Poster: "Using a Big Data Database to Identify Pathogens in Protein Data Space," New England Database Day '15, MA *January 2015*
Paper: Using a Big Data Database to Identify Pathogens in Protein Data Space. **A. Conard**, S. Dodson, J. Kepner, and D. Ricke, arXiv *January* 2015
Talk & Poster: "Determining winning SH3 coalition using Game Theory," Benelux Bioinformatics Conference, Belgium *December 2014*
Workshop & Presentation: "Intro to Python" & "Chemical Inventory Database System and School-Wide Integration," DePauw Senior Sem. *May 2014*
Honors Award for Presentation: "No Fomo," organization application for Windows phone, Imagine Cup, Microsoft Corporation *January 2014*
1st prize Poster: "Creation of D4M Algorithm Protein Analysis," Carnegie Mellon OurCS Conference *October 2013*
Presentation & Poster: "Male-Male Cricket Frog Aggressive Behavior" and "Parachuting Arboreal Frogs," DePauw Summer Research *Sept. 2011*

Several articles **Interviews:** http://bit.ly/2ByXtnH, http://bit.ly/2ijyNrO, https://bit.ly/2QTf4hS **Articles:** https://bit.ly/2OXStDj, http://bit.ly/2nrRkHQ, https://bit.ly/2InnOv7