Ashley Mae Conard

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Education

Brown University: Master's Computer Science (2019), Ph.D. Computational Biology, Computer Science track (2021)
DePauw University: B.A. (2014), Major: Computer Science (specialized in Biochemistry), Minor: French, GPA: 3.7

Computing & Technology Internship Experience (selected)

Computational Biology PhD Candidate, Brown University, Dr. Lorin Crawford, Dr. Erica Larschan, and Dr. Charles Lawrence, RI *Current*

Building interpretable multi-omics and time-series Bayesian inference models and visualizations to uncover regulatory mechanisms.

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

Designed 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*

Developed deep learning method to improve DNA single-cell sequencing data for large region mutation (copy-number) inference. Created 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 cooperative game theory, machine learning, and structural bioinformatics to uncover binding specificities in SH3 protein.

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, IT Associate Program, 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, Markdown, Python, R, RShiny, SQL
Development Tools / Environments: Arduino IDE, BlueJ, Conda, Docker, Eclipse, Jupyter, Putty, RStudio, Visual Studio Code, Xcode
Big Data Tools: Apache Hadoop, Apache Accumulo, MPI, OpenMP, Slurm

Application Programs / Platforms: ArcGIS, Arduino, Audacity, Business Objects, Cytoscape, Chimera, Discoverant, Dreamweaver, Final Cut Pro, GIMP, Illustrator, Infopath, MakerBot, Raspberry Pie, Raven, RosettaLigand

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), Dutch (beginner)

Awards & Honors Accepted

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

Publications

co-first: *, corresponding: ‡

- **A. Conard**, R. Singh‡, L. Crawford‡. A Bayesian Inference Approach to Predicting and Interpreting Cancer Patient Gene Regulatory Networks from Multiple Data Types. *Intelligent Systems in Molecular Biology (ISMB)*. (In preparation). 2021
- **A. Conard***, A. DenAdel*, C. Lawrence‡. Lessons in Bayesian Inference in Genomics and Molecular Biology. (In preparation). 2021
- **A. Conard**, I. Nathoo, M. Tsarli, C. Lawrence, E. Larschan‡. XvsY: A Computational Approach to Distinguish the Temporal Sex-Specific Roles of Vital Co-Factors on Brain Development in Drosophila. (In preparation). 2021
- **A. Conard**, E. Cilia, T. Lenaerts‡. Game Theory and Feature Selection Show FYN Protein Domain Amino Acid Dependencies. (In preparation). 2021
- M. Ray*, **A. Conard*** , E. Larschan‡. The CLAMP transcription factor regulates sex-specific splicing in the Drosophila early embryo. *Nature Communications.* (In submission). 2021
- N. D'Silva*, K. McCullar*, **A. Conard**, et al. Neuromolecular and behavioral adaptation associated with alcohol deprivation. *Current Biology.* (In submission). 2021
- **A. Conard**‡, N. Goodman, Y. Hu, N. Perrimon, R. Singh, C. Lawrence‡, E. Larschan‡. TIMEOR: a web-based tool to uncover regulatory mechanisms from temporal and multi-omics data. *NAR Web Server Issue*. (In submission). 2020
- M. Tsarli, **A. Conard**, E. Larschan‡. Drosophila CLAMP protein regulates neurogenesis in the optic lobe. Genetics. (Under review). 2020
- **A. Conard**, B. Raphael. Identification of Subclonal Drivers and Copy-Number Variants from Bulk and Single-Cell DNA Sequencing of Tumors. *Thesis M.S. in C.S., Brown University*. 2019
- Cuypers, A. Jacobsen, B. Siranosian, K. Schwahn, **A. Conard**, et al. Highlights from the ISCB Student Council Symposia in 2016. *F1000Research*. 2016, 5(ISCB Comm J):2852
- **A. Conard**, S. Dodson, J. Kepner‡, D. Ricke‡. Using a Big Data Database to Identify Pathogens in Protein Data Space, *arXiv*:1501.05546.

Leadership, Activities, Teaching (selected)

Professional Organizations & Positions

Student of Vision Abie Award Judge and Co-creator: intl. award to CS student for building tech. solution to local problem	*2015 -Current*
ISCB, IEEE, AAAS, ACS, SIAM member, made Chemistry Day Workshop ('10), ushered IEEE Computing Workshop ('13)	*Current*
Ambassador to France (to return every 5 yrs): selected to represent US for D-Day Embarkation Commemoration	*2004-Current*
Fulbright Board of Trustees: young professional board member (Finance & Conference Committee, Strategic Task Force)	*2018-2020*
Finance Chair for International Society of Computational Biology (ISCB) 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*

Brown University

Reviewer: Assisting advisors to review for AISTATS (2020), Nature Communications, and Genes and Development (2019)
Teaching: 2021 Applied Math 1080 (Inference in Mol. Bio. teacher), 2019 Applied Math 0650 (Stat. Inference II lecturer)
Mentoring: Dominique Pablito (graduate, 2021), Isaac Nathoo (undergraduate 2021), Nathaniel Goodman (undergraduate 2020)

DePauw University

Co-founder Robotics Club: mostly Arduino and 3D printing, **University Athletics:** Soccer (2010-2012) and Women's Track (2013-2014)
Co-founder of DePauw Farm: 2-acre farm, 25% produce given to local Greencastle IN food pantry https://bit.ly/2yifZ4D

Several 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