

CALEB N. ELLINGTON

calebellington.com

Office 7603, Gates-Hillman Center
School of Computer Science
Carnegie Mellon University
Pittsburgh, PA 15213

PUBLICATIONS & PRESENTATIONS

Ellington, Caleb, Ben Lengerich, Thomas B.K. Watkins, Jiekun Yang, Manolis Kellis, Eric P. Xing. **"Sample-Specific Contextualized Graphical Models Using Clinical and Molecular Data Reveal Transcriptional Network Heterogeneity Across 7000 Tumors."**

- [Platform Talk](#), Cold Spring Harbor Laboratory – Biological Data Science, 2022.
- **Accepted 10/20 for Poster Presentation**, Graph Learning for Industrial Applications NeurIPS Workshop, 2022.
- **Accepted 10/23 for Poster Presentation**, Machine Learning for Health, 2022.

Lengerich, Ben, Caleb Ellington, Bryon Aragam, Eric P. Xing, and Manolis Kellis. **"NOTMAD: Estimating Bayesian Networks with Sample-Specific Structures and Parameters."** ArXiv:2111.01104 [Cs, Stat], November 1, 2021. <http://arxiv.org/abs/2111.01104>.

Chen, Xinshi, Haoran Sun, Caleb Ellington, Eric Xing, and Le Song. **"Multi-Task Learning of Order-Consistent Causal Graphs."** In Advances in Neural Information Processing Systems, 34:11083–95. Curran Associates, Inc., 2021.

<https://proceedings.neurips.cc/paper/2021/hash/5c3a3b139a11689e0bc55abd95e20e39-Abstract.html>.

Lengerich, Benjamin J, Mark E Nunnally, Yin Aphinyanaphongs, Caleb Ellington, and Rich Caruana. **"Automated Interpretable Discovery of Heterogeneous Treatment Effectiveness: A COVID-19 Case Study."** J. Biomed. Inform., April 30, 2022, 104086.

<https://doi.org/10.1016/j.jbi.2022.104086>.

SOFTWARE



Contextualized
Heterogeneous Modeling Toolbox

contextualized.ml: A statistical machine learning toolbox for estimating models, distributions, and functions with context-specific parameters.

TEACHING & MENTORING

Teaching Assistant, 10-701 Ph.D. Introduction to Machine Learning

Instructors: Henry Chai, Maria Balkan

Jan 2022 - May 2022

Carnegie Mellon University

Teaching Assistant, 02-319 Genetics and Epigenetics of the Brain

Instructors: Andreas Pfenning

Aug 2021 - Dec 2021

Carnegie Mellon University

Current Mentees

- Alyssa Lee, Computational Biology BS Student, CMU
- Jannik Deuschel, Machine Learning MS Student, KIT
- Juwayni Lucman, Artificial Intelligence MS Student, MBZUAI
- Wesley Lo, Mathematics BS Student, MIT
- Ikechukwu Daniel Adebisi, Mechanical Engineering MEng Student, MIT

POSITIONS

- **Ph.D. Student in Computational Biology** Sept 2020 - Present
Statistical Artificial Intelligence and Integrative Genomics (SAILING) Lab, Carnegie Mellon University Pittsburgh, PA
- **Research Assistant** Jan 2019 - June 2020
Baker Lab, Institute for Protein Design, University of Washington Seattle, WA
- **Software Engineer Intern** June 2019 - Aug 2019
Indeed.com Austin, TX

- Research Assistant <i>Klavins Lab, Automated Bio-Fabrication Facility, University of Washington</i>	Jan 2017 - Dec 2018 Seattle, WA
- Biomedical Engineering Consultant <i>Dhulikhel Hospital / Bioengineering Department, University of Washington</i>	Aug 2018 - Sept 2018 Dhulikhel, Nepal
- Software Engineer Intern <i>Amazon.com</i>	June 2018 - Aug 2018 Seattle, WA
- Software Engineer Intern <i>Inscripta Biotechnology</i>	June 2017 - Aug 2017 Boulder, CO

EDUCATION

Carnegie Mellon University <i>Ph.D. Student in Computational Biology</i> <i>Advised by Eric P. Xing</i>	Sept 2020 - Present Pittsburgh, PA
University of Washington <i>B.Sc. Computer Science</i> <i>B.Sc. Bioengineering (Honors)</i>	Sept 2016 - Jun 2020 Seattle, WA

AWARDS

- GRFP Honorable Mention (NSF) <i>Project: Deep Generative Models for Ligand-based Protein Design</i>	Apr 2020
- Fulbright Semifinalist (Fulbright) <i>Project: Freelance Ambulances: Integrating Nepal's private transportation with emergency services</i>	Apr 2020
- Levinson Emerging Scholar (Washington Research Foundation) Awarded to highly motivated students demonstrating exceptional communication skills pursuing advanced bioscience careers.	Sept 2019
- Husky 100 Awardee (University of Washington) The Husky 100 recognizes 100 students (graduate and undergraduate) from all UW campuses who are making the most of their time at UW.	Mar, 2019
- Mary Gates Research Scholar (University of Washington) <ul style="list-style-type: none"> - <i>Project: Data-Driven Genetic Engineering with Hydra vulgaris</i> - Awarded for strong academic merit, good mentor relationships, intensity of research experience, and long-term impact of the proposed project. 	Feb, 2018

COMMUNITY INVOLVEMENT

- Junior Chair , Round-table: Injecting Domain Knowledge into DL Models, ML4H	December, 2022
- Reviewer , Machine Learning for Health (ML4H)	September, 2022
- Reviewer , Time Series for Health (NeurIPS workshop)	September, 2022

LEADERSHIP, VOLUNTEERING, & FUNDRAISING

Department Senator, CMU Representative CMU Graduate Student Association Founding director of the U. Pitt-CMU CompBio Hackathon	Sept 2021 - Current Pittsburgh, PA
President, Educator, Iron Phi , Phi Delta Theta, Washington Alpha Raised \$49,000 for the Service for Sight Foundation Raised \$1,000 for the Live Like Lou Foundation	Nov 2017 - Nov 2019 Seattle, WA
Eagle Scout , <i>Boy Scouts of America</i> Construction of the U. Texas Field Laboratory's Research Pier	Nov 2015 Austin, TX
Run-to-the-Sun Overnight Relay , Beyond Batten Foundation \$500 to the Beyond Batten Foundation	Apr 2015 Austin, TX

MEDIA (Available on my [YouTube](#), also linked at [calebellington.com](#))

- Contextualized Graphical Models Reveal Sample-Specific Transcriptional Networks for 7000 Tumors (CSHL)	Nov 2022
- Multi-task Learning of Consistent-Order Causal Graphs (NeurIPS)	Dec 2021
- Mixed Feelings: Recognizing, Representing, and Interpolating Human Emotion	Dec 2020

- Deep Learning for Contact Prediction in *de novo* Protein Models (UW Research Symposium)
- Bioscience Python Tutorials 1-4: Protein Sequence Alignment CLI (YouTube)

May 2020

May 2020

SKILLS

Programming: Python (9 yrs), Java (7 yrs), C++ (2 yrs), PyTorch (3 yrs), Tensorflow/Keras (2 yrs), MySQL (2 yrs), React.js (2 yrs), C, Ruby, Django, Git, Superset, AWS, Jira, Linux/Unix, Bash

Languages: Intermediate I Chinese