# KYLE SWANSON

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## EDUCATION

**University of Cambridge (Trinity College)**, Cambridge, United Kingdom
MASt in Mathematical Statistics (Part III of the Mathematical Tripos) *Expected June 2020*

**Massachusetts Institute of Technology**, Cambridge, MA
M.Eng. in Computer Science and Engineering, advised by Regina Barzilay *June 2019*
B.S. in Computer Science and Engineering (Course 6-3) and Mathematics (Course 18) *June 2018*
GPA: 5.0/5.0
Courses: Introduction to Machine Learning, Advances in Computer Vision, Advanced Natural Language Processing, Inference and Information, Design and Analysis of Algorithms, Software Construction, Linear Algebra, Real Analysis

## RESEARCH/WORK EXPERIENCE

Scholarships: Marshall Scholarship, MIT EECS Angle Undergraduate Research and Innovation Scholar
Honor Societies: Phi Beta Kappa (PBK), Tau Beta Pi (TBP), Eta Kappa Nu (HKN)
Programming Skills: Python, PyTorch, scikit-learn, HTML, CSS, JavaScript

**ASAPP, Inc. – Machine Learning Research Intern**, New York, NY *Summer 2019*
Investigated using optimal transport to increase the interpretability of neural models for natural language processing [3]

**MIT CSAIL – Graduate Researcher in Machine Learning**, Cambridge, MA *September 2018–June 2019*
Worked with Regina Barzilay in MIT's Computer Science and Artificial Intelligence Laboratory (CSAIL) along with Amgen, BASF, and Novartis to develop message passing neural networks to improve molecular property prediction [4] collaborated with the Broad Institute of MIT and Harvard to apply these methods to antibiotic discovery [1]

**ASAPP, Inc. – Machine Learning Research Intern**, New York, NY *Summer 2018*
Researched and built a retrieval-based chatbot with a 56% improvement in performance over ASAPP's previous model [5]

**MIT CSAIL and MGH – Undergraduate Researcher in Machine Learning**, Cambridge/Boston, MA *September 2016–June 2018*
Collaborated with Regina Barzilay at MIT CSAIL and Constance Lehman at Massachusetts General Hospital (MGH) to use convolutional neural networks to improve breast cancer risk prediction in mammography [6]

**Suleyman Demirel University – Machine Learning Teacher**, Almaty, Kazakhstan *January 2018*
Developed and taught a one-month machine learning course to 20 university students: https://github.com/swansonk14/IntroML

**Driver, Inc. – Data Science Intern**, San Francisco, CA *Summer 2017*
Developed an algorithm to accurately detect near-duplicate content in cancer patients' medical records

**Microsoft Corporation – Front-end Software Engineering Intern**, Bellevue, WA *Summer 2016*
Improved the performance and aesthetic of an internal web tool used to view application events in near real-time

## PUBLICATIONS

[1] J. Stokes, K. Yang, **K. Swanson**, W. Jin, A. Cubillos-Ruiz, N. Donghia, C. MacNair, S. French, L. Carfrae, Z. Bloom-Ackerman, V. Tran, A. Chiappino-Pepe, A. Badran, I. Andrews, E. Chory, G. Church, E. Brown, T. Jaakkola, R. Barzilay, J. Collins. A Deep Learning Approach to Antibiotic Discovery. *Cell*, 2020.
[2] K. Swanson, S. Trivedi, J. Lequieu, **K. Swanson**, R. Kondor. Deep learning for automated classification and characterization of amorphous materials. *Soft Matter*, 2020.
[3] **K. Swanson**, L. Yu, T. Lei. Interpretable Text Matching by Learning a Constrained Alignment. *Workshop on Optimal Transport & Machine Learning at the Thirty-third Conference on Neural Information Processing Systems*, 2019.
[4] K. Yang, **K. Swanson**, W. Jin, C. Coley, P. Eiden, H. Gao, A. Guzman-Perez, T. Hopper, B. Kelley, M. Mathea, A. Palmer, V. Settels, T. Jaakkola, K. Jensen, R. Barzilay. Analyzing Learned Molecular Representations for Property Prediction. *Journal of Chemical Information and Modeling*, 2019.
[5] **K. Swanson**, L. Yu, C. Fox, J. Wohlwend, T. Lei. Building a Production Model for Retrieval-Based Chatbots. *Workshop on NLP for Conversational AI at the 57th Annual Meeting of the Association for Computational Linguistics*, 2019.
[6] C. Lehman, A. Yala, T. Schuster, B. Dontchos, M. Bahl, **K. Swanson**, and R. Barzilay. Mammographic Breast Density Assessment Using Deep Learning: Clinical Implementation. *Radiology*, 2018.