# Emily Alsentzer

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## EDUCATION

**MASSACHUSETTS INSTUTITE OF TECHNOLOGY/HARVARD UNIVERISTY** – Cambridge, MA (9/17 - current)
PhD, Health Science and Technology, Medical Engineering and Medical Physics

**STANFORD UNIVERSITY** – Stanford, CA (6/17)
MS, Biomedical informatics
BS, Computer Science, With Distinction, Tau Beta Pi

**HUME FOGG ACADEMIC HIGH SCHOOL** – Nashville, TN (5/12)
Valedictorian and Distinguished Scholars Diploma

## SKILLS

**Programming Languages:** Python, R, Java, Matlab, SQL, C++, C, Javascript, HTML/CSS
**Classes:** Machine Learning (ML), Natural Language Processing (NLP), Databases, Algorithms for Computational Biology, Data Driven Medicine, Biomedical Computing, Web Development, Social and Information Networks, Design and Analysis of Algorithms, Statistical Inference, Nonparametric Statistics, Pathology (Harvard Medical School)

## EXPERIENCE

**INTERN, VERILY (GOOGLE LIFE SCIENCES), Cambridge, MA (Summer 2017)**
- Developed NLP methods to automatically summarize patients' electronic health records
- Presented work at a Verily-wide poster session and gave an Analysis Review talk, final internship presentation, and a review talk about ontology guided feature engineering

**INTERN, HEALTHMAP, BOSTON CHILDREN'S HOSPITAL, HARVARD UNIVERSITY, Boston, MA (6/16-1/17)**
- Applied machine learning and natural language processing for topic classification of tweets related to patient experience at hospitals
- Developed library for Twitter topic classification that can be applied across projects at HealthMap
- Assessed LGBT healthcare quality using patient experience data from Twitter

**INTERN, DE LEO LAB, STANFORD HOPKINS MARINE STATION, Monterey, CA (Summer 2015)**
- Applied network theory to model the transmission of schistosomiasis, a water-borne infectious disease, using ODEs
- Demonstrated the influence of human mobility and network topology in disease transmission, which challenged the traditional assumption of homogenous mixing in populations
- Developed novel, data driven policy recommendations for mass drug administration and snail control

**TEAM COORDINATOR, STANFORD PARTNERS IN HEALTH ENGAGE, Stanford, CA (9/15-6/16)**
- Led Stanford's PIH Engage chapter to fundraise for PIH Engage (>$9,000), advocate for global health policies, and educate the Stanford community about global health issues

**EDITOR IN CHIEF & PRODUCTION OFFICER, STANFORD UNDERGRADUATE RESEARCH JOURNAL, Stanford, CA (9/13-6/16)**
- Led a team of 50 staff members to produce a peer-reviewed research journal that publishes articles in engineering, natural sciences, social sciences, and humanities
- Coordinated journal design, submissions, distribution, and outreach as well as cultivated relationships with Stanford University

**INTERN, AFRICAN FEDERATION FOR EMERGENCY MEDICINE, Cape Town, South Africa (4/15-6/15)**
- Analyzed website traffic and use of AFEM emergency medicine teaching materials using Google Analytics
- Developed graphics and content for AFEM website and implemented data management principles to maintain membership database

**CS106A SECTION LEADER, STANFORD UNIVERSITY, Stanford, CA (9/13-3/15)**
- Taught CS106A section, graded assignments, staffed the LAIR, a tutoring service for CS 106 students, and held weekly interactive grading sessions to help students improve the functionality and style of their code

**INTERN, MILITARY DIVISION OF TROPICAL MEDICINE, Bethesda, MD (Summer 2014)**
- Developed algorithms for detection of acute diarrheal disease outbreaks in an electronic disease surveillance system in the Peruvian Navy

**RESEARCH ASSISTANT, VIJAY PANDE LAB, STANFORD UNIVERSITY, Stanford, CA (10/13 – 12/14)**
- Identified potential drugs effective against West Nile Virus by screening a cheminformatics database for promising hits using ROCS computational software and validated via experimental collaboration

**RESEARCH INTERN, VANDERBILT VACCINE RESEARCH PROGRAM, Nashville, TN (Summer 2013)**
- Developed case presentations, interpreted VAERS reports, and conducted background research for case discussions of the Clinical Immunization Safety Assessment (CISA), a program run by the CDC
- Helped to create a more user friendly and concise algorithm for assessing diagnostic certainty of adverse events following immunization (AEFI) based on Brighton Collaboration definitions
- Evaluated the efficacy and accuracy of an algorithm for anaphylaxis when compared to the original Brighton case definition.

### RESEARCH ASSISTANT, RICHARD PEEK LAB, VANDERBILT UNIVERSITY, Nashville, TN (Summer 2011)

- Identified novel *H. pylori* adhesins responsible for binding the host receptor Decay Accelerating Factor (DAF)
- Used the following molecular techniques: immobilized metal affinity chromatography, silver staining and far western blotting, tandem mass spectrometry, and gene Splicing by overlap extension (gene SOEing)

## CLASS PROJECTS

### SOCIAL AND INFORMATION NETWORK ANALYSIS, CS224W (9/16-12/16)

- Characterized and predicted dogmatic communities on Reddit using network features with an AUC of 0.8
- Performed logistic regression, SVM, Random Forest, and Gradient Boosting classifiers as well as k-means clustering

### BIOMEDICAL INFORMATICS RESEARCH METHODOLOGY, BIOMEDIN 212 (4/16-6/16)

- Worked with Nigam Shah lab to develop semi-supervised ML algorithms with noisy labeling for phenotyping of patients with comorbidities
- Used Observational Medical Outcomes Partnership (OMOP) common data model to develop algorithms portable across institutions
- Assessed the tradeoff between increasing labeling accuracy, model complexity, and training sample size to maximize algorithm scalability

### COMPUTATIONAL MODELING OF MICROBIAL COMMUNITIES, BIOE115 (4/14-6/14)

- Analyzed mouse proteome in the stomach, jejunum, ileum, cecum and proximal colon under three colonization states (germ-free, colonized with *Bacteroides thetaiotaomicron*, and conventionally raised) to study proteomic abundance profiles along the gastrointestinal (GI) tract
- Performed K-means clustering, PCA, hierarchical clustering, random forest classification, and comparison of GO term abundances to assess differences in protein abundances

## HONORS / AWARDS

- Intel Science Talent Search Semifinalist (2012)
- Siemens "We Can Change the World" Challenge, 3rd place (2011)
- National AP Scholar (2012)
- Tennessee Junior Academy of Sciences, 2nd Place Presentation (2011)

## PUBLICATIONS

### MANUSCRIPTS:

- E Alsentzer, J Kemp, S Sokolow, N White, L Mari, R Casagrandi, J Perez-Saez, E Bertuzzo, A Rinaldo, M Gatto, J Remais, S Ermon, G De Leo. Prioritizing Efforts for Schistosomiasis Control: A Network Transmission Model Analysis. In prep.
- E Alsentzer, S Ballard, J Neyra, D Vera, R Hora, V Osorio, J Quispe, D Blazes, L Loayza. An Assessment of outbreak detection algorithms in a surveillance system in a resource limited setting. In prep.
- J Lichtman, E Alsentzer, M Jaffe, D Sprockett, E Masutani, E Ikwa, G Fragiadakis, D Clifford, B Huang, J Sonnenburg, K Huang, J Elias. The effect of microbial colonization on the host proteome varies by gastrointestinal location. ISMEJ. 2016 May; 10(5):1170-81.
- D, Joshi, E Alsentzer, K Edwards, A Norton, SE Williams. An Algorithm developed using the Brighton Collaboration case definitions is more efficient for determining diagnostic certainty. Vaccine. 2014 Jun; 32(28):3469-72.

### ABSTRACTS:

- E Alsentzer, D Vera, J Neyra, L Loayza, R Hora, V Osorio, J Quispe, S Ballard, D Blazes. Monitoring Acute Diarrhea via an Electronic Surveillance System in the Peruvian Navy. *Online Journal of Public Health Informatics*. 2015.
- E Alsentzer, HD Bitner, and LK Moribe. "Recolonization of Algal Assemblages After Flooding in Nashville Creeks." *Tennessee Junior Academy of Sciences Proceedings*. 2011.
- E Alsentzer, HD Bitner, CA Caffey, LC Lu, LK Moribe, and SM Rucker. "The Effect of Fertilizer Pollution on the Algal Profiles of Richland and Henry Creek." *Water Professionals Conference Proceedings*. 2010.
- E Alsentzer, HD Bitner, and LK Moribe. "The Use of Algae as BIoindicators of Water Quality in Nashville Creeks." *Water Professionals Conference Proceedings*. 2010.

### SEQUENCES:

- AM Eeds, EM Alsentzer, H Jin, T Khan, LC Lu, LK Moribe, SM Rucker, VL Shepherd, JI Creamer, CP Vanags, and KA McCue. GAPDH sequence of *Minuartia cumberlandensis*, *GenBank,* Accession HM017509, 2010.

## PRESENTATIONS

- E Alsentzer. "Parasite Dynamics in a Connected World: The effect of network topology and human mobility on schistosomiasis transmission and control." *Talk: Stanford Global Health Research Convening.* (Stanford, CA, January 2016).
- E Alsentzer. "Parasite Dynamics in a Connected World: The effect of network topology and human mobility on schistosomiasis transmission and control." *Poster: Symposia of Undergraduate Research and Public Service.* (Stanford, CA, October 2015).
- E Alsentzer. "Monitoring Acute Diarrhea via an Electronic Surveillance System in the Peruvian Navy." *Poster: International Society for Disease Surveillance Conference.* (Philadelphia, PA, December 2014).
- E Alsentzer. "Monitoring Acute Diarrhea via an Electronic Surveillance System in the Peruvian Navy." *Poster: Symposia of Undergraduate Research and Public Service.* (Stanford, CA, October 2014).
- E Alsentzer, HD Bitner, and LK Moribe. "Recolonization of Algal Assemblages After Flooding in Nashville Creeks." *Talk: Tennessee Junior Academy of Sciences Symposium.* (Nashville, TN, April 2011).
- E Alsentzer. "The Use of Algae as Bioindicators of Water Quality in Nashville Creeks." *Poster: Water Professionals Conference.* (Nashville, TN, July 2010).
- "The Effect of Fertilizer Pollution on the Algal Profiles of Richland and Henry Creek." *Poster: Water Professionals Conference.* (Nashville, TN, July 2010). Note: Research presented by CA Caffey and LK Moribe (research collaborators)