

Meghan R. Hutch, PhD

Chicago, IL

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EDUCATION

Ph.D. Biomedical Informatics, Northwestern University, Chicago, IL Sept 2019 - Aug 2024

Dissertation: *Computational Approaches for Modeling the Clinical Risk of Adverse Health Outcomes for Hospitalized Patients With Infection or Trauma Derived Acute Neurological Illness*

Committee Yuan Luo (primary advisor), Andrew Naidech, Zongqi Xia, Justin Starren (chair)

Reflective and Effective Teaching Certificate, Northwestern University, Chicago, IL Sept 2022 - June 2023

B.Sc. Biology; Minor Chemistry, Honors, Sacred Heart University, Fairfield, CT Sept 2013 - May 2017

TEACHING EXPERIENCE

The University of Chicago, Data Science Institute

Chicago, IL

Preceptor of Data Science

Sept 2024 - **Present**

- **DATA 118: Introduction to Data Science I - Fall 2025**

- Teaching introduction to Python programming and biostatistics to 60 undergraduate students
- Managing an undergraduate team of two teaching assistants (TAs) and two graders

- **DATA 261: Statistical Pitfalls and Data Misinformation - Spring 2025**

- Introduced the importance of careful and ethical statistical practices to a course of 39 undergraduate students
- Managed an undergraduate team comprising of one teaching assistant and two graders

- **DATA 271: Data Science Clinic - Fall 2024 - Spring 2025**

- Mentored four undergraduate and two graduate students throughout the 2024-2025 academic year on a capstone project with an external non-profit organization, Food System 6
- Facilitated weekly meetings among student team members and with external collaborators
- Ensured students were making progress on weekly and quarterly project milestones

- **Data Science for Social Impact (DSSI) Summer Experience - Summer 2025**

- Co-taught lectures on Python programming and ethics for summer undergraduate students participating in an intensive deep-dive into coding and artificial intelligence
- Provided technical support to students during lectures and coding activities

- **Invited Instructor - Emerging World Leaders Summer Session - Summer 2025**

- Invited to teach two lectures from DATA-261 for high school students participating in the Emerging World Leaders program

Instructor at City Colleges of Chicago, Harry S. Truman College

Chicago, IL

Preceptor of Data Science; Adjunct Faculty

Sept 2024 - **Present**

- **CIS 175: Introduction to Data Science - Fall 2025**

- Teaching Truman College's introduction to data science as a dual-enrollment course to a class of 5 Sophomore and Junior High school students at Lycée Français de Chicago

- **BUS 213: Data Visualization and Presentation for Business - Spring 2025**

- Introduced 7 students to Excel and making visualizations for business purposes

Guest Instructor, Northwestern University

Chicago, IL

Invited as a guest instructor for select lessons

- **HBMI 442: Methods in Health & Biomedical Informatics - Winter 2024, Winter 2025**

- Invited to prepare and teach a 2 hour lecture to introduce electronic health care research and the use of scikit-learn for machine learning

- **HBMI 442: Methods in Health & Biomedical Informatics - Winter 2023**

- Invited to prepare and teach a 1-hour lecture to introduce federated learning methods

Teaching Assistant, Northwestern University

Chicago, IL

Teaching Assistant for MS/PhD-level classes

- **BIOSTAT 302: Intro to Biostatistics - Summer 2022, Summer 2023**

- Led R programming laboratory sessions for graduate students to demonstrate applications of biostatistical concepts and encourage best programming practices
- Graded and provided detailed feedback on homeworks

- **BIOSTAT 306: R Programming - Summer 2023**

- Facilitated twice-weekly office hours for students to review programming concepts and debug assignments
- Graded and provided feedback on 5 assignments, one midterm exam, and one final exam for 13 graduate students

- **HBMI 442: Methods in Health & Biomedical Informatics - Winter 2022**

- Supervised the class research projects of 12 graduate students
- Met with students weekly to support questions involving Python programming and the application of machine and deep learning methods

STUDENT RESEARCH

Data Science for Social Impact Summer Experience - Grievance Classification Aug 2025 - Present

- Mentored six undergraduate students on a project aimed at applying natural language processing techniques, specifically topic modeling, to classify grievance reports filed against the Palm Oil Industry
- Provided guidance on refining research questions, technical support, and preparation of final deliverables including: oral, video, and poster presentations and a one-page abstract
- Continuing to provide additional mentorship post-summer to prepare a research conference manuscript and presentation

Data Science Clinic - Choose Your Own Adventure Game Oct 2024 - Present

- Mentored six senior students through the 2024-2025 academic year as they collaborated with Food System 6, to develop a Choose your own Adventure Game that will spread awareness of challenges faced by the regenerative poultry farming industry
- Oversaw and ensured that students met weekly milestones and end of the quarter deliverables
- Facilitated communication and meetings among students and the Food System 6 collaborators
- Continuing to supervise project development to support the game's deployment

Independent Study on Artificial Intelligence and the Microbiome Summer 2025 - Present

- Invited to serve as a mentor to a Masters in Liberal Arts student completing his independent study focused on the use of Artificial Intelligence for studying the microbiome
- Provided bi-weekly readings and short presentations to enhance learning
- Supervising the write up of a final research paper

Classifying Social Impacts of Cancer during the COVID-19 Pandemic Summer 2022

- Supervised a high school student's summer research project through ResearchHStart, a multi-institutional program for students across the Chicago area
- Provided guidance on applying natural language processing methods to work with Twitter data
- Applied topic modeling techniques to identify the 'social-sequelae' of COVID-19 on topics related to cancer during the pandemic

SERVICE & OUTREACH

Hackathon Judge Chicago, IL

Invited and served as a judge for Transit Hacks 2025 (UChicago Transit Enthusiasts student organization) April 26, 2025

Guest Speaker, Data4All Chicago, IL

Presented my journey into data science to high school students at University of Chicago October 26, 2024

iMentor Chicago, IL

Mentored a high school student through the college application and post-secondary career process Sept 2020 - Dec 2023

Panelist: Day in the Life of a Graduate Student Chicago, IL

Shared my journey to and through graduate school with high school students Aug 2023

Student-Assisted Mentoring Program (StaMP) Chicago, IL

Mentored two first year Ph.D. students, Northwestern University Sept 2021 - June 2023

EvanSTEM Evanston, IL

Mentored middle schoolers during coding and engineering challenges, Evanston Public Library Sept 2021 - Dec 2022

Science Fair Judge Illinois

Reviewed Middle/High School science projects for the Illinois Junior Academy of Science Mar 2021, 2022

A Day in the Life of a STEM-itist Jan 2021-Nov 2021

Organized/moderated livestream events to expose middle schools to STEM Evanston, IL

Ludlowe Center for Health and Rehabilitation Sept 2014 - Aug 2016

Volunteered weekly to engage residents in recreational activities Fairfield, CT

SERVICE TO PROFESSION

Peer Reviewer at BMJ Digital Health & AI

October 2025 - Present

Selected as an expert peer reviewer, responsible for 1-5 reviews annually

Reviewer Applications for AAAI Undergraduate Consortium

2024, 2025

Review and score undergraduate applications to attend the AAAI's Annual Undergraduate Consortium

Ad hoc Reviewer

Oct 2024 - Present

PLOS Digital Health - Aug 2025

Frontiers in Microbiology - Oct 2024

LEADERSHIP

Codeathon Team Leader

Sept 2023

Team lead of four-day sprint to develop predictive models of prolonged respiratory failure, Northwestern University Chicago, IL

Data Science Initiative Scholars Journal Club

Jan 2021 - July 2021

Co-Founder of student led journal club, Northwestern University

Evanston, IL

Biomedical Informatics Data Science Student Group

Oct 2019 - Aug 2020

Leadership team, Northwestern University

Chicago, IL

NCAA Division I Team Captain

Aug 2016 - May 2017

Co-captain Cross Country, Indoor & Outdoor Track and Field Teams, Sacred Heart University

Fairfield, CT

SCHOLARSHIP

Developing Curriculum for AI in Medicine, University of Chicago

Oct 2024 - Present

- Leading the development of a set of educational modules to develop a future course focused on the use of AI in Medicine with Dr. Alexander Pearson

Co-Author - Chicago Guide for Data Science Textbook, University of Chicago

Oct 2024 - Present

- Collaborating with the University of Chicago's Data Science Institute's preceptors and instructional faculty to write a textbook to support students in the undergraduate major
- Leading the writing of a chapter on Data Wrangling

AI in Biomedicine Journal Club, University of Chicago

Oct 2024 - Present

- Frequent participant in the Center for Computational Medicine and Clinical Artificial Intelligence within the Biological Sciences Division
- Led and presented three journal clubs (Oct 2024, Apr 2025, Oct 2025)

RESEARCH EXPERIENCE

University of Chicago, Biological Sciences Division, Pearson Lab

Chicago, IL

Preceptor of Data Science

Sept 2025 - Present

• Prediction of Treatment Response for Patients with Head and Neck Cancers

- Leading efforts to curate a dataset and pipeline for abstracting radiomic features from computed tomography (CT) scans of patients with head and neck cancers
- Evaluating the utility of foundation models for the abstraction of features from computed tomography scans

Northwestern University, Department of Preventative Medicine

Chicago, IL

Ph.D. Candidate

April 2020 - Aug 2024

• Consortium for Clinical Characterization of COVID-19 by EHR

- **Project Link:** meghutch.github.io/Hospitalization_Trends
- Co-led and coordinated a multinational effort through 4CE to estimate the clinical trajectories of hospitalized COVID-19 patients with concurrent neurological illnesses.
- Collaboratively wrote and distributed an R package on Github that facilitated a federated approach to analyze the electronic health record data of hospitalized COVID-19 patients at 21 healthcare systems across 7 countries. This method ensured that confidential patient data was never shared across healthcare systems
- Applied survival analysis to delineate the clinical trajectories of 106,229 hospitalized COVID-19 patients
- Conducted a random-effects meta-analysis to quantify the risk and timing of poor clinical health outcomes (prolonged hospital stay, disease severity, and mortality) at each healthcare system and across healthcare systems

• Prediction of Hematoma Expansion after Traumatic Brain Injury

- **Project Link:** github.com/meghutch/traumaScanner
- Applied text-mining techniques (regular expressions) with Python on a large corpus of nearly 130,000 unstructured radiology text reports in order to identify a cohort of patients with post-traumatic hemorrhage

- Constructed a computational pipeline to pre-process brain CT images (e.g. normalization, scaling to correct Hounsfield units) and to quantify the volume of hemorrhage after brain injury by deploying a previously developed Python-based deep learning model
- Trained and evaluated a series of machine learning models to predict hematoma expansion after traumatic brain injury

SOAR: A Spatial Transcriptomics Analysis Resource

- **Project Link:** soar.fsm.northwestern.edu
- **Summary:** Spatial transcriptomics is an expanding set of techniques used to quantify gene expression within specific locations of a tissue sample. Such technology enables a more precise understanding of gene expression within specific cells and the interactions between cells
- Led website development for a collaborative team effort to deploy a R Shiny application that provides the scientific and research community access to a curated set of 304 spatial transcriptomic datasets with corresponding analyses of 2,785 tissue samples
- Created interactive modules for users to quickly investigate spatial variability of gene expression and cell-cell interactions across tissue samples
- Wrote bash scripts to facilitate large-scale data pre-processing, developed familiarity with web servers (Apache, Shiny), and the utilization of Git/Github for version control and semantic versioning
- Our application has had nearly 1,900 unique users from 40 countries

Boston Medical Center, Stroke and Neurocritical Care Division Boston, MA *Research Assistant* July 2018 - Aug 2019

- Coordinated tasks for hospital-based studies including: protocol development, institutional review board submission and maintenance, patient enrollment, data collection and analysis
- Led the acquisition and curation of a longitudinal dataset of pupillary measurements from critically ill patients in the intensive care unit. These efforts involved outreach with nurses to emphasize the importance of timely data collection, manually downloading patient data from recording devices, and programming with R to clean and organize data for downstream research studies

Brigham and Women's Hospital, Stroke and Neurocritical Care Division

Research Trainee

Boston, MA

May 2017 - Aug 2019

- Maintained and helped annotate a dataset of 1,359 radiology text reports in order to support efforts dedicated to developing natural language processing algorithms to detect salient stroke characteristics. These efforts have since led to 2 peer-reviewed and published research studies
- Conducted statistical analyses and hypothesis testing (t-test, wilcoxon-rank, correlation, and univariate, multiple, and mixed-effect linear/logistic regression models) with R to evaluate temporal relationships between pupil reactivity and brain swelling after brain injury

Sacred Heart University, Biology Department

Student Research Assistant

Fairfield, CT

Sept 2015 - May 2017

- Performed wet-lab experiments to quantify the molecular consequences of cadmium exposure in the American horseshoe crab, *Limulus polyphemus*
- Analyzed dose dependent survival curves and enzyme activity in cadmium treated horseshoe crabs

GRANTS, FELLOWSHIPS, AND AWARDS

T32 Predoctoral Grant, Biomedical Data Driven Discovery

National Library of Medicine

Chicago, IL

Sept 2020 - Sept 2021

Data Science Initiative Fellowship Award

Northwestern University sponsored award to support data science trainees

Chicago, IL

Sept 2019 - Sept 2020

Outstanding Poster Presentation

Eastern Colleges Science Conference

Wilks-Barre, PA

April 2017

Athletic Scholarship: Cross Country, Track and Field

Sacred Heart University

Fairfield, CT

Aug 2014 - May 2017

Thomas More Honors Scholar

Sacred Heart University

Fairfield, CT

Aug 2013 - May 2017

President's Excellence Award Scholarship

Sacred Heart University

Fairfield, CT

Aug 2013 - May 2017

*First and co-first author publications are indicated via asterisks.

1. Li Y, Ding Y, Dennis S, **Hutch MR***, Zhou J et al. SOAR elucidates biological insights and empowers drug discovery through spatial transcriptomics. *Sci. Adv.*11,eadt7450(2025).DOI:10.1126/sciadv.adt7450
2. **Hutch MR***, Son J, Le TT, Hong C, Wang X, Shakeri Z, et al. "Neurological diagnoses in hospitalized COVID-19 patients associated with adverse outcomes: A multinational cohort study." *PLOS Digit Health.* 2024 Apr 15;3(4):e0000484. doi: 10.1371/journal.pdig.0000484 2022.
3. Wang H, Li Y, **Hutch MR**, Kline AS, Otero S, Mithal L, Miller SE, Naidech A, Luo Y. "Patterns of diverse and changing sentiments towards COVID-19 vaccines: a sentiment analysis study integrating 11 million tweets and surveillance data across over 180 countries." *J Am Med Inform Assoc.* 2023;30(5).
4. Tan ALM, Getzen EJ, **Hutch MR**, et al. "Informative Missingness: What can we learn from patterns in missing laboratory data in the electronic health record?" *J Biomed Info.* 2023;139. doi:10.1016/j.jbi.2023.104306.
5. Moal B, Orioux A, Féré T, **et al.** "Acute respiratory distress syndrome after SARS-CoV-2 infection on young adult population: international observational federated study based on electronic health records through the 4CE consortium." *PLoS ONE* 18(1):e0266985. doi:10.1371/journal.pone.0266985
6. Gutiérrez-Sacristán A, Serret-Larmande A, **Hutch MR**, et al. "Hospitalizations Associated With Mental Health Conditions Among Adolescents in the US and France During the COVID-19 Pandemic." *JAMA Netw Open.* 2022;5(12):e2246548. doi:10.1001/jamanetworkopen.2022.46548
7. Kline A, Wang H, Li Y, Dennis S, **Hutch M**, Xu Z, Wang F, Cheng F, Luo Y. "Multimodal machine learning in precision health: A scoping review." *npj Digital Medicine.* 2022;5(171). doi:10.1038/s41746-022-00712-8
8. Tan BWL, Tan BWQ, Tan ALM, Schriver ER, Gutiérrez-Sacristán A, Das P, Yuan W, **Hutch MR**, et al. "Long-term kidney function recovery and mortality after COVID-19-associated acute kidney injury: An international multi-centre observational cohort study." *eClinicalMedicine.* 2023 January;55:101724. doi:10.1016/j.eclinm.2022.101724
9. Hong C, Zhang HG, L'Yi S, **et al.** "Changes in laboratory value improvement and mortality rates over the course of the pandemic: an international retrospective cohort study of hospitalised patients infected with SARS-CoV-2." *BMJ Open.* 2022 June;12:e057725. doi:10.1136/bmjopen-2021-057725
10. Klann JG, Strasser ZH, **Hutch MR**, et al. "Distinguishing Admissions Specifically for COVID-19 From Incidental SARS-CoV-2 Admissions: National Retrospective Electronic Health Record Study." *J Med Internet Res.* 2022 May 18;24(5):e37931. doi:10.2196/37931
11. Wang X, Zhang HG, Xiong X, **et al.** "SurvMaximin: Robust federated approach to transporting survival risk prediction models." *J. Biomed. Inform.* 2022(134):104176; doi:10.1016/j.jbi.2022.104176
12. **Hutch MR***, Liu M, Avillach P, Luo Y, Bourgeois FT. "National Trends in Disease Activity for COVID-19 among Children in the US." *Front. Pediatr.* 2021. doi:10.3389/fped.2021.700656
13. Chan WP, Prescott BR, Barra ME, Chung DY, Kim IS, Saglam H, **Hutch MR**, Shim M, Zafar SF, Benjamin EJ, Smirnakis SM, Dupuis J, Greer DM, Ong, CJ. "Dexmedetomidine and Other Analgesedatives Alter Pupil Characteristics in Critically Ill Patients." *Critical Care Explorations.* 2022 May 13;4(5):e0691. doi:10.1097/CCE.0000000000000691
14. Miller, MI, Orfanoudaki A, Cronin M, Saglam H, Kim IS, Tzalidi M, Vasilopoulos K, Fanaropoulou G, Fanaropoulou N, Kalin J, **Hutch M**, Brush B, Benjamin EJ, Shin M, Mian A, Greer DM, Smirnakis SM, Ong CJ. "Natural Language Processing of Radiology Reports to Detect Complications of Ischemic Stroke." *Neurocrit Care.* 2022 May 9. doi:10.1007/s12028-022-01513-3
15. Prescott B, Saglam H, Duskin J, Miller M, Thakur A, Gholap E, **Hutch M**, Smirnakis S, Zafar S, Dupuis J, Benjamin E, Greer D, Ong C. "Anisocoria and Poor Pupil Reactivity by Quantitative Pupillometry in Patients With Intracranial Pathology." *Critical Care Medicine, Publish Ahead of Print* 2021. doi:10.1097/CCM.0000000000005272
16. Bourgeois FT, Gutiérrez-Sacristán A, Keller MS, **et al.** "International Analysis of Electronic Health Records of Children and Youth Hospitalized With COVID-19 Infection in 6 Countries." *JAMA Netw Open.* 2021 Jun 1;4(6):e2112596. doi:10.1001/jamanetworkopen.2021.12596. Erratum in: *JAMA Netw Open.* 2021 Jul 1;4(7):e2122388
17. Wang H, Li Y, **Hutch MR**, Naidech A, Luo Y. "Using tweets to understand how COVID-19 related health beliefs are affected in the age of social media." *Journal of Medical Internet Research.* 2021. doi:10.2196/26302
18. Klann JG, Estiri H, Weber GM, **et al.** "Validation of an internationally derived patient severity phenotype to sup-

port COVID-19 analytics from electronic health record data." J Am Med Inform Assoc. 2021 Jul 14;28(7):1411-1420. doi:10.1093/jamia/ocab018

19. Ong CJ, Zhang R, Orfanoudaki A, Pierre M Caprasse F, **Hutch M**, Liang M, Fard D, Balogun O, Miller MI, Minnig M, Sağlam H, Prescott B, Greer DM, Smirnakis S, Bertsimas D. "Machine learning and natural language processing methods to identify ischemic stroke, acuity and location from radiology reports." PLoS ONE 2020. doi:10.1371/journal.pone.0234908
20. Ong CJ, **Hutch M**, Barra M, Kim A, Zafar S, Smirnakis SM. "Osmotic therapy effects on pupil reactivity: Quantification using pupillometry in critically ill neurologic patients." Neurocrit Care 2018. doi:10.1007/s12028-018-0620-y
21. Ong CJ, **Hutch M**, Smirnakis SM. "The Effect of Ambient Light Conditions on Quantitative Pupillometry." Neurocrit Care 2018. doi:10.1007/s12028-018-0607-8

CONFERENCE PRESENTATIONS

1. **Hutch MR**, Luo Y, Naidech A. "Predictive Models of Hematoma Expansion after Traumatic Brain Injury." American Medical Informatics Association (AMIA) Informatics Summit. Podium Abstract. Pittsburgh, Pennsylvania. March 12, 2025.
2. **Hutch MR**, Luo Y, Naidech A. "traumaScanner: A text-based algorithm for identifying patients with post-traumatic hemorrhage from radiology text reports." American Medical Informatics Association (AMIA) Informatics Summit. Pittsburgh, Pennsylvania. March 12, 2025.
3. **Hutch MR**, Ding J, Wang X, Rafiei A, Davis J, Gao C. "A multimodal approach to predicting prolonged respiratory failure: Clinical and molecular insights." Systems Biology Consortium for Infectious Diseases 2023 Annual Meeting. Chicago IL.
4. **Hutch MR**, Son J, Le TT, Hong C, Wang X, Shakeri Z, Visweswaran S, Cai T Luo Y Xia, Z. "Neurological Diagnoses in Hospitalized COVID-19 Patients Associated With Adverse Outcomes: A Multinational Cohort Study." American Medical Informatics Association (AMIA) Informatics Summit. Podium Abstract. Seattle, Washington. March 17, 2023.
5. **Hutch MR**, Bourgeois FT, Liu M, Avillach P, Luo Y. "National Trends in Disease Activity for COVID-19 among Children in the US." National Library of Medicine Informatics Training Conference. June 23, 2021.
6. **Hutch M**, Jenna L, Harris M, Deschenes S. "Assessment of Cadmium Tolerance and Oxidative Stress Response in Limulus Polyphemus." Eastern Colleges Science Conference, Wilkes-Barre, PA. April 2017. ***Award for excellence.**

TEXTBOOK CHAPTER

Hutch M.R., Luo, Y. (2024). Applications and Challenges of Human Computer Interaction and AI Interfaces for Health Care. In: Kushniruk, A.W., Kaufman, D.R., Kannampallil, T.G., Patel, V.L. (eds) Human Computer Interaction in Healthcare. Cognitive Informatics in Biomedicine and Healthcare. Springer, Cham. https://doi.org/10.1007/978-3-031-69947-4_4

ATHLETIC ACHIEVEMENTS

Chicago Marathon Finisher	Oct 2021
Northeast Conference Athlete of the Week	Oct 2016
All New England Honors	May 2016
<i>4th place in New England Championship 10,000 meter run</i>	
All Northeast Conference Honors - Second Team	May 2016
<i>2nd place in Northeast Conference Championship 10,000 meter run</i>	
Northeast Conference Cross Country All-Conference Team	Oct 2015
<i>10th place in Northeast Conference Cross Country Championship</i>	
Athletic Scholarship	Aug 2014 - May 2017
<i>Tuition support received for athletic accomplishments</i>	
NCAA Division 1 Student Athlete	Aug 2013 - May 2017
<i>Cross Country, Indoor, & Outdoor Track and Field</i>	