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KATHERINE HOFFMAN

I am a Research Biostatistician passionate about meaningful and reproducible research. I enjoy expanding my knowledge of statistical methodology, especially non-parametric causal inference. I am an organized but creative thinker who likes to create unique data visualizations to explain study designs and statistical estimation methods. I am particularly interested in applying novel methodology to complex health services applications and improving communication between data analysts and health-researchers.

EDUCATION

University of Michigan, Ann Arbor, MI — <i>M.S. in Biostatistics</i>	SEP 2016 – MAY 2018
University of Detroit Mercy, Detroit, MI — <i>B.S. in Biochemistry</i>	SEP 2011 – MAY 2015

EXPERIENCE

Weill Cornell Medicine, New York, NY

<i>Research Biostatistician III</i>	NOV 2021 – PRESENT
<i>Research Biostatistician II</i>	JUL 2020 – SEP 2021
<i>Research Biostatistician I</i>	AUG 2018 – JUN 2020

- **Biostatistical Collaborator for Division of Pulmonary and Critical Care Medicine (PCCM):** leads study design, data management, statistical modeling, and manuscript writing in collaboration with clinicians, manages all projects requiring statistical support within PCCM; educates researchers on data repositories and contemporary tools in epidemiology and statistics; independently generates ideas for new research on acute and chronic lung diseases in a critical ill population. Current projects include a Phase 1b clinical trial for Acute Respiratory Distress Syndrome (ARDS), examining -omics panels as predictors to poor prognosis for sepsis-suspect patients, and estimating the effect modification of a solid organ transplant on sepsis and mortality.
- **Assists Dr. Iván Díaz with illustrative applications** for novel causal inference methodology papers: develops analytical files, modifies software, generates figures, writes application sections.
- **Supervises four Research Biostatisticians:** meets weekly with supervisees, assists with project priorities, mentors direct reports technically and professionally.
- **Hiring co-manager** for new research biostatistician hires: reviews applications, organizes first-round interviews, screens candidates via 30 minute zoom call.

University of Michigan, Ann Arbor, MI

<i>Graduate Student Research Assistant</i>	FEB 2017 – MAY 2018
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- **Dr. Peter Song's Biostatistics Lab,** Aug 2017-May 2018: Led the first year of a research project to associate air pollution with end stage renal failure using geospatial analysis methods. Prepared longitudinal pollution data for analysis, generated geospatial visualizations over time, and organized bi-weekly meetings with collaborators at Shanghai Jiao Tong University.
- **Dr. Jeffrey Kidd's Computational Biology Lab,** May 2017-Sept 2017: Searched for inversions in the dog genome using R, Python and UNIX. Debugged and validated human genome inversion

detection techniques using the inversion and Variation using Long Range Information (VALOR) pipelines with positive canine inversion controls. Planned an analysis using Principal Component Analysis techniques with high-density SNP data.

- **Dr. Monica Dus' Neuroscience and Epigenetics Lab**, Feb 2017-Feb 2018: Wrote reproducible R scripts for neuroscience PhD students to visualize feeding patterns of *Drosophila* from high-dimensional data sets.

St. Joseph Mercy Hospital, Ann Arbor, MI

Patient Care Technician

JULY 2014 – AUG 2016

- Worked in 18 of 22 units (medical, surgical, cardiac – general and intensive care step-down; post-partum; emergency; rehabilitation; short-stay; psychiatric) as a member of the nursing resource pool at a 550-bed hospital.
- Aided nurses in care of 8-20 adult or pediatric patients each shift (unit-dependent).
- Performed blood draws and inserted peripheral intravenous lines (IVs).
- Assisted patients with activities of daily living, measured and recorded vital signs, and administered basic dressing changes and wound care.
- Performed emergency procedures including cardiopulmonary resuscitation (CPR) as needed.
- Documented all care in patients' Electronic Medical Records.
- Communicated with patients, families, nurses, physicians, and other healthcare providers while remaining in compliance with HIPAA standards.

Foundation for International Medical Relief of Children, Limón, Nicaragua

Women and Children's Health Community Volunteer

JUNE 2015 – AUG 2015

- Went door-to-door with a team of volunteers to interview over 100 women in a rural community of Nicaragua about their reproductive and living conditions. Collected data on paper and later transferred to Excel to visualize trends.
- Measured and recorded children's developmental progress and overall health at the community health clinic.
- Organized and ran yoga classes for women with Diabetes, led sports games for children during and after school, and helped educate community members on benefits of exercise for long-term wellness.

University of Detroit Mercy, Detroit, MI

Writing Center Consultant

AUG 2012 – MAY 2014

- Met with undergraduate and graduate students in 30 minute one-to-one appointments to assist with various stages of the writing process: pre-writing, research, drafting, writing, revising, and proofreading.
- Assisted students learning English as a second language with the technicalities of writing in English.

SOFTWARE

Active: R, markdown, LaTeX, git/Github, UNIX, SAS, Adobe Creative Cloud

Previous: Python, SQL, Matlab, Java, Maple

TEACHING

Teaching Assistant

- *Modern Methods for Causal Inference*. Weill Cornell Medicine – prepared and graded homework assignments, ran a weekly applied lab, held office hours, provided feedback on applied end-of-semester projects, and gave guest lectures for 10-30 M.S. Biostatistics and Data Science students – Summer 2019, 2020, and 2021, and Spring 2022.
- *Introduction to Health Services Research*. Weill Cornell Medicine – graded three open-answer assignments and held office hours for 30 M.S. Health Informatics students – Fall 2021.
- *Biostatistics II*. Weill Cornell Medicine – graded 10 theoretical and applied assignments and held office hours for 30 M.S. Biostatistics and Data Science students – Winter 2019.
- *Data Science I*. Weill Cornell Medicine – graded 4 programming homeworks and end-of-semester projects, ran 3 R labs, held office hours for 35 M.S. Biostatistics and Data Science students – Fall 2019.

Invited Lectures

- Swimmer Plots using ggplot2. R/Medicine conference – Remote – Aug 2022.
- Communicating with a Statistician. Weill Cornell Medicine – July 2022.
- Longitudinal Data Analysis. Weill Cornell Medicine – March 2020, 2021, and 2022.
- Big Data and Statistical Learning for Pulmonary and Critical Care. Weill Cornell Medicine – April 2022.

Scientific Communication (Selected works)

- A Day in the Life of a Biostatistician. KH Stats (>14,000 views) – April 2019.
- An Illustrated Guide to Targeted Maximum Likelihood Estimation, Introduction and Motivation. KH Stats (>8,000 views) – December 2020.
- Customizable Correlations Plots in R. KH Stats (>6,000 views) – June 2022.
- An Illustrated Guide to Superlearning. KH Stats (>5,500 views) – Oct 2020.
- An Illustrated Guide to Targeted Maximum Likelihood Estimation, the Algorithm. KH Stats (>5,000 views) – December 2020.
- On the Sidelines: NYC's COVID-19 Outbreak from the Eyes of a Pulmonary and Critical Care Team's Biostatistician. KH Stats (>3,500 views) – Oct 2020.
- Stats on Drugs: Interview with a Pharma-CRO Biostatistician. KH Stats (>3,500 views) – Nov 2019.
- An Illustrated Guide to Targeted Maximum Likelihood Estimation, Properties, Theory, and Learning more. KH Stats (>3,000 views) – December 2020.
- An Illustrated Introduction to Modified Treatment Policies. KH Stats (>1,000 views) – April 2022.
- Conditional and Iterated Expectations as Linear Regression Models (>1,000 views) – July 2020.
- Swimmer Plots for Multiple Variables using ggplot2. KH Stats (>1,000 views) – June 2022.
- Statistical Intuition for Optimal Treatment Regimes. KH Stats – July 2022.

TALKS

- Corticosteroids in COVID-19: Optimizing Observational Research through Target Trial Emulations. American Causal inference Conference. Berkeley, CA – May 2022.
- Tips and Tricks for Table 1's. Weill Cornell Medicine Biostatistics Computing Club – New York, NY – July 2022.

- Introduction to Ensemble Learning. Weill Cornell Medicine Biostatistics Computing Club – New York, NY – Jan 2021.
- Power Calculations in R. Weill Cornell Medicine Biostatistics Computing Club – New York, NY – Jan 2020.
- Become a super learner! Introduction to super learning and the sl3 package. NYC R-Ladies – New York, NY – Sept 2019.
- R Projects, the here package, and other tips from the NYC R Conference. Weill Cornell Medicine Biostatistics Computing Club – New York, NY – June 2019.
- Fireproof your Computer from Jenny Bryan! Learn the here package. NYC R-Ladies Lightning Talks – New York, NY – June 2019.
- Overview of dplyr: Weill Cornell Medicine Biostatistics Computing Club. New York, NY – March 2019.
- Learning Impact of Air Pollution on Kidney Disease Epidemiology in US and East China Using Big Public Health Data. Shanghai Jiao Tong University. Shanghai, China – March 2018.

POSTERS

- Estimating the Causal Effect of Sepsis on Mortality in Intensive Care Unit patients with and without a solid organ transplant. Joint Statistical Meetings – Remote – Aug 2020.
- Estimating the Causal Effect of Digoxin using Marginal Structural Models. Joint Statistical Meetings – Denver, CO – Aug 2019.
- Learning Impact of Air Pollution on Kidney Disease Epidemiology in US and East China Using Big Public Health Data. Michigan Institute for Data Science Symposium – Ann Arbor, MI – Nov 2017.

PUBLICATIONS

**Indicates authors contributed equally to the manuscript.*

Statistical Methodology

1. **Katherine L Hoffman**, Edward J Schenck, Michael J Satlin, William Whalen, Di Pan, Nicholas Williams, and Ivan Diaz. Corticosteroids in covid-19: Optimizing observational research through target trial emulations. *Accepted (journal to be announced)*, 2022
2. Ivan Diaz, **Katherine L Hoffman**, and Nima S Hejazi. Causal survival analysis under competing risks using longitudinal modified treatment policies. *arXiv preprint arXiv:2202.03513*, 2022
3. Ivan Diaz, Nicholas Williams, **Katherine L Hoffman**, and Edward J Schenck. Nonparametric causal effects based on longitudinal modified treatment policies. *Journal of the American Statistical Association*, pages 1–16, 2021

Clinical Applications

4. Edward J Schenck*, **Katherine L Hoffman***, Clara Oromendia, Elizabeth Sanchez, Eli J Finkelsztain, Kyung Sook Hong, Joseph Kabariti, Lisa K Torres, John S Harrington, Ilias I Siempos, et al. A comparative analysis of the respiratory subscore of the sequential organ failure assessment scoring system. *Annals of the American Thoracic Society*, 18(11):1849–1860, 2021
5. Luis G Gomez-Escobar*, **Katherine L Hoffman***, Justin J Choi, Alain Borczuk, Steven Salvatore, Sergio L Alvarez-Mulett, Manuel D Galvan, Zhen Zhao, Sabrina E Racine-Brzostek, He S Yang, et al. Cytokine signatures of end organ injury in covid-19. *Scientific reports*, 11(1):1–15, 2021
6. Edward J Schenck, **Katherine Hoffman**, Parag Goyal, Justin Choi, Lisa Torres, Kapil Rajwani, Christopher W Tam, Natalia Ivascu, Fernando J Martinez, and David A Berlin. Respiratory mechanics and gas exchange in covid-19–associated respiratory failure. *Annals of the American Thoracic Society*, 17(9):1158–1161, 2020
7. David R Price, **Katherine L Hoffman**, Clara Oromendia, Lisa K Torres, Edward J Schenck, Mary E Choi, Augustine MK Choi, Rebecca M Baron, Jin-Won Huh, and Ilias I Siempos. Effect of neutropenic critical illness on development and prognosis of acute respiratory distress syndrome. *American journal of respiratory and critical care medicine*, 203(4):504–508, 2021

8. David R Price, **Katherine L Hoffman**, Elizabeth Sanchez, Augustine MK Choi, and Ilias I Siempos. Temporal trends of outcomes of neutropenic patients with ards enrolled in therapeutic clinical trials. *Intensive care medicine*, 47(1):122–123, 2021
9. Edward J Schenck, **Katherine L Hoffman**, Marika Cusick, Joseph Kabariti, Evan T Sholle, and Thomas R Campion Jr. Critical care database for advanced research (cedar): An automated method to support intensive care units with electronic health record data. *Journal of Biomedical Informatics*, 118:103789, 2021
10. Lisa K Torres, **Katherine L Hoffman**, Clara Oromendia, Ivan Diaz, John S Harrington, Edward J Schenck, David R Price, Luis Gomez-Escobar, Angelica Higuera, Mayra Pinilla Vera, et al. Attributable mortality of acute respiratory distress syndrome: a systematic review, meta-analysis and survival analysis using targeted minimum loss-based estimation. *Thorax*, 76(12):1176–1185, 2021
11. William Z Zhang, **Katherine L Hoffman**, Kristen T Schiffer, Clara Oromendia, Michelle C Rice, Igor Barjaktarevic, Stephen P Peters, Nirupama Putcha, Russell P Bowler, J Michael Wells, et al. Association of plasma mitochondrial dna with copd severity and progression in the spiromics cohort. *Respiratory research*, 22(1):1–11, 2021
12. Katerina Andreadis, **Katherine Hoffman**, Debra D'Angelo, and Lucian Sulica. Sulcus vocalis: Results of excision without reconstruction. *The Laryngoscope*, 130(9):2208–2212, 2020
13. Chang Su, **Katherine Hoffman**, Xu Zhenxing, Elizabeth Sanchez, Ilias Siempos, John S Harrington, Alexandra Racanelli, Maria Plataki, Fei Wang, and Edward J Schenck. Evaluation of albumin kinetics in mechanically ventilated patients with covid-19 compared to those with sepsis-induced ards. *medRxiv*, 2021
14. David R Price*, Elisa Benedetti*, **Katherine L Hoffman**, Luis Gomez-Escobar, Sergio Alvarez-Mulett, Allyson Capili, Hina Sarwath, Christopher N Parkhurst, Elyse Lafond, Karissa Weidman, et al. Angiopoietin 2 is associated with vascular necroptosis induction in coronavirus disease 2019 acute respiratory distress syndrome. *The American journal of pathology*, 192(7):1001–1015, 2022
15. Karissa Weidman, Elyse LaFond, **Katherine L Hoffman**, Parag Goyal, Christopher N Parkhurst, Heather Derry-Vick, Edward Schenck, and Lindsay Lief. Post-intensive care unit syndrome in a cohort of covid-19 survivors in new york city. *Ann Am Thorac Soc*, pages 1158–1168, 2022
16. Chang Su, Zhenxing Xu, **Katherine Hoffman**, Parag Goyal, Monika M Safford, Jerry Lee, Sergio Alvarez-Mulett, Luis Gomez-Escobar, David R Price, John S Harrington, et al. Identifying organ dysfunction trajectory-based subphenotypes in critically ill patients with covid-19. *Scientific Reports*, 11(1):1–13, 2021
17. William Z Zhang, Michelle C Rice, **Katherine L Hoffman**, Clara Oromendia, Igor Z Barjaktarevic, J Michael Wells, Annette T Hastie, Wassim W Labaki, Christopher B Cooper, Alejandro P Comellas, et al. Association of urine mitochondrial dna with clinical measures of copd in the spiromics cohort. *JCI insight*, 5(3), 2020
18. Aneela Rahman, Eva Schelbaum, **Katherine Hoffman**, Ivan Diaz, Hollie Hristov, Randolph Andrews, Steven Jett, Hande Jackson, Andrea Lee, Harini Sarva, et al. Sex-driven modifiers of alzheimer risk: a multimodality brain imaging study. *Neurology*, 95(2):e166–e178, 2020
19. Tariq Chukir, Yi Liu, **Katherine Hoffman**, John P Bilezikian, and Azeez Farooki. Calcitriol elevation is associated with a higher risk of refractory hypercalcemia of malignancy in solid tumors. *The Journal of Clinical Endocrinology & Metabolism*, 105(4):e1115–e1123, 2020
20. Christian P Soneru, Charles A Riley, **Katherine Hoffman**, Abtin Tabaei, and Theodore H Schwartz. Intra-operative mri vs endoscopy in achieving gross total resection of pituitary adenomas: a systematic review. *Acta Neurochirurgica*, 161(8):1683–1698, 2019
21. Alberto Pinsino, Giulio M Mondellini, Eugene A Royzman, **Katherine L Hoffman**, Debra D'Angelo, Melissa Mabasa, Antonia Gaudig, Amelia M Zuver, Amirali Masoumi, A Reshad Garan, et al. Cystatin c-versus creatinine-based assessment of renal function and prediction of early outcomes among patients with a left ventricular assist device. *Circulation: Heart Failure*, 13(1):e006326, 2020
22. Harpreet S Bhatia, Joseph Bailey, Ozan Unlu, **Katherine Hoffman**, and Robert J Kim. Efficacy and safety of direct oral anticoagulants in patients with atrial fibrillation and chronic kidney disease. *Pacing and Clinical Electrophysiology*, 42(11):1463–1470, 2019
23. Jamuna K Krishnan, Mangala Rajan, Benjamin R Baer, **Katherine L Hoffman**, Mark N Alshak, Kerri I Aronson, Parag Goyal, Chioma Ezeomah, Shanna S Hill, Fernando J Martinez, et al. Assessing mortality differences across acute respiratory failure management strategies in covid-19. *Journal of Critical Care*, 70:154045, 2022
24. Uqba Khan, Cristian Pena, Julianna Brouwer, **Katherine Hoffman**, Arindam Roy Choudhury, Chao Zhang, Prashant Thakkar, Doron Betel, Sandipto Sarkar, Gregory Sonnenberg, et al. Impact of antibiotic use on response to treatment with immune checkpoint inhibitors. *American Journal of Clinical Oncology*, 2019
25. Maria Plataki, Di Pan, Parag Goyal, **Katherine Hoffman**, Jacky Man Kwan Choi, Hao Huang, Monika M Safford, and Edward J Schenck. Association of body mass index with morbidity in patients hospitalised with covid-19. *BMJ open respiratory research*, 8(1):e000970, 2021

26. Elizabeth Mauer, Jihui Lee, Justin Choi, Hongzhe Zhang, **Katherine L Hoffman**, Imaani J Easthausen, Mangala Rajan, Mark G Weiner, Rainu Kaushal, Monika M Safford, et al. A predictive model of clinical deterioration among hospitalized covid-19 patients by harnessing hospital course trajectories. *Journal of biomedical informatics*, 118:103794, 2021
27. Richa Batra, William Wahlen, Sergio Alvarez-Mulett, **Katherine Hoffman**, Will Simmons, John Harrington, Kelsey Chetnik, Mustafa Buyukozkan, Elisa Benedetti, Mary E Choi, et al. Multi-omic comparative analysis of covid-19 and bacterial sepsis-induced ards. *Under Revision at PLOS Pathogens*, 2022
28. E Coskun, R Kalil, A Yin, G Wehmeyer, **K Hoffman**, R Koppam, P Goyal, R Kaner, and E Siegler. Outcomes of the oldest old admitted with covid-19. *Journal of Palliative Care*, 2022.
29. X Wu, S Poli De Frias, S Taheri, I, **Hoffman, K** and Easthausen, AJ Esposito, LD Quesada Arias, E Ayaub, R Maurer, R Gill, et al. Differential protein expression in rheumatoid arthritis interstitial lung disease. In *D105. ILD EPIDEMIOLOGY II*, pages A7796–A7796. American Thoracic Society, 202031.
30. Jamuna K Krishnan, Kayley M Ancy, Clara Oromendia, **Katherine L Hoffman**, Imaani Easthausen, Nancy K Leidy, MeiLan K Han, Russell P Bowler, Stephanie A Christenson, David J Couper, et al. Characterizing copd symptom variability in the stable state utilizing the evaluating respiratory symptoms in copd instrument. *Chronic Obstructive Pulmonary Diseases: Journal of the COPD Foundation*, 9(2):195, 2022 39.
31. Jade I Basem, Anna F Roth, Robert S White, Virginia E Tangel, Silis Y Jiang, Jacky M Choi, **Katherine L Hoffman**, et al. Patient care in rapid-expansion intensive care units during the covid-19 pandemic crisis. *BMC anesthesiology*, 22(1):1–11, 2022
32. Sergio Alvarez-Mulett, Mustafa Buyukozkan, Alexandra C Racanelli, Frank Schmidt, Richa Batra, **Katherine L Hoffman**, Hina Sarwath, Rudolf Engelke, Luis Gomez-Escobar, Will Simmons, et al. Integrative metabolomic and proteomic signatures define clinical outcomes in severe covid-19. *medRxiv*, 2021
33. Moritz Reiterer, [10 authors], **Katherine Hoffman**, [16 authors]. Hyperglycemia in acute COVID-19 is characterized by insulin resistance and adipose tissue infectivity by SARS-CoV-2. *Cell metabolism*, 33(11):2174–2188, 202129.
34. Parag Goyal, [9 authors], **Katherine L. Hoffman**, [11 authors]. Clinical characteristics of covid-19 in new york city. *New England Journal of Medicine*, 382(24):2372–2374, 2020
35. Parag Goyal, [15 authors], **Katherine L Hoffman**, [7 authors]. Obesity and covid-19 in new york city: a retrospective cohort study. *Annals of internal medicine*, 173(10):855–858, 2020
36. Greer Waldrop, [10 authors], **Katherine L Hoffman**, [18 authors]. Prolonged unconsciousness is common in covid-19 and associated with hypoxemia. *Annals of neurology*, 2022
37. Michael J Satlin, [19 authors], **Katherine L Hoffman**, [7 authors]. Impact of a rapid molecular test for klebsiella pneumoniae carbapenemase and ceftazidime-avibactam use on outcomes after bacteremia caused by carbapenem-resistant enterobacterales. *Clinical Infectious Diseases*, 2022

Non-peer reviewed work

38. **Katherine L Hoffman**. Covid-19: a view from the sidelines. *Significance*, 18(1):40–43, 2021
39. **Katherine L Hoffman**. A beautiful affliction: Tracing the role of mentally ill artists in reducing the negative stigma of mental illness, Undergraduate Thesis for fulfillment of the Honors Program, 2015

HONORS & AWARDS

- NSF Early Career Researchers Travel Scholarship – May 2022.
- University of Michigan Graduate Student Research Assistant Tuition Scholarship – 2017-2018.
- University of Detroit Mercy Softball All Decade, Second Team – 2020.
- University of Detroit Mercy Leadership Pin – April 2015.
- University of Detroit Mercy Honors program graduate – April 2015.
- University of Detroit Mercy *Magna Cum Laude* – April 2015.
- University of Detroit Mercy “Dad Butler” award for student-athletes demonstrating exceptional determination in rehabilitating from a sports injury – April 2014.
- University of Detroit Mercy Softball Tuition Scholarship – 2011-2015.

LEADERSHIP

- Co-host of Weill Cornell Medicine Biostatistics Computing Club – 2021-present.
- Host of Weill Cornell Medicine causal inference reading group – 2019-2020.
- Co-president of Michigan Biostatistics Student Association– 2017-2018.
- Co-captain of NCAA Division I softball team – 2014-2015.
- Team representative for NCAA Student-Athlete Advisory Committee – 2013-2015.

SERVICE

- University of Michigan Statistics in the Community (STATCOM) volunteer – primary project: data analytics for Ozone House for at-risk teenagers' emergency call center – 2016-2018.
- Volunteer analyst – created data visualizations for St. Joseph Mercy IV infections – 2017-2018.
- Head coach of Milan Junior Varsity softball team – 2016.
- Volunteer at Henry Ford Hospital – 2012-2013.