Marie-Laure Charpignon

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EDUCATION

Massachusetts Institute of Technology | Cambridge, MA, USA   **January 2025**
PhD in Social & Engineering Systems and Statistics. GPA: 4.9/5.0.
Institute for Data, Systems, and Society (IDSS). Laboratory for Information and Decision Systems (LIDS).
Doctoral fellowship at the Eric & Wendy Schmidt Center of the MIT-Harvard Broad Institute.
Thesis Committee: Prof. Munther Dahleh, Prof. Caroline Uhler, Dr. Leo Celi, Dr. Maimuna Majumder, Dr. Mark Albers.

Stanford University | Stanford, CA, USA   **June 2016**
MSc in Mathematical & Computational Engineering. Statistics & Data Science Track. GPA: 4.0/4.0.

Ecole Centrale Paris | Paris, France   **June 2014**
BSc in Engineering Sciences. Applied Mathematics Track. Top 1% in a class of 520 students. GPA: 4.13/4.33.

RESEARCH & PROFESSIONAL EXPERIENCE

MIT & Harvard | Cambridge, MA, USA   **February 2019 – Present**
Combining causal inference in medical records and systems pharmacology: drug repurposing for dementia.
In collaboration with Dr. Mark Albers (HMS, MGH), Prof. Deborah Blacker (HSPH, HMS, MGH), Dr. Anthony Philippakis (Broad Institute, Google Ventures), and Prof. Ioanna Tzoulaki (Imperial College London).
Evaluation of COVID-19-related policies: transmission dynamics, excess mortality, and optimal vaccination strategies.
In collaboration with Dr. Maimuna Majumder (HMS, BCH) and Prof. Milind Tambe (Harvard).

Clalit Innovation | Tel Aviv, Israel   **June 2023 – Present**
Research Intern. Behavioral Health Insights Unit. Co-supervised by Dr. Adi Berliner and Prof. Ran Balicer.

INSERM & INRIA | Bordeaux, France   **June 2021 – February 2023**
Research Intern. Center for Population Health. Statistics in Systems Biology and Translational Medicine.
Co-supervised by Dr. Melanie Prague and Prof. Rodolphe Thiebaut.

Microsoft Research | Cambridge, MA, USA
Research Intern. Computational Social Science and Causal Inference & Human-Centered AI.   **May 2022 – December 2023**
Co-supervised by Dr. Sid Suri, Dr. Sonia Jaffe, Dr. Longqi Yang, and Dr. Fereshteh Amini.
Research Intern. Econometrics and Causal Inference & Medical, Health, and Genomics.   **January 2021 – September 2022**
Co-supervised by Dr. Emma Pierson and Dr. Vasilis Syrgkanis.

Microsoft | Redmond, WA, USA   **October 2016 – September 2018**
Data Scientist. Office Engineering Product Group and Microsoft Education.

SELECTED JOURNAL PUBLICATIONS

14. **Charpignon M.-L.** et al. Drug overdose-related excess mortality in the United States during the COVID-19 pandemic (March 2020-August 2021). The American Journal of Public Health, May 2024.

13. **Charpignon M.-L.** et al. Association between social vulnerability and place of death during the first 2 years of COVID-19 in Massachusetts. Age & Ageing, February 2024.

12. **Charpignon M.-L.**, Gupta S., Majumder M.S. Massachusetts companion program bolsters COVID 19 vaccination rates among seniors. Vaccine, January 2024.

11. Vakulenko Lagun B., Magdamo C., **Charpignon M.-L.** et al. causalCmprsk: An R package for nonparametric and Cox-based estimation of average treatment effects in competing risks data. Computer Methods and Programs in Biomedicine, December 2023.

10. **Charpignon M.-L.** et al. Going beyond the means: Exploring the role of bias from digital determinants of health in technologies. PLOS Digital Health, October 2023.

9. Chen R., **Charpignon M.-L.** et al. Excess mortality with Alzheimer's disease and related dementias as an underlying or contributing cause During the COVID-19 Pandemic in the US. JAMA Neurology, September 2023.

8. Paireau J., **Charpignon M.-L.** et al. Impact of non-pharmaceutical interventions, climate, vaccination, and variants on COVID-19 transmission across departments in metropolitan France. BMC Infectious Diseases, March 2023.

7. **Charpignon M.-L.** et al. Critical bias in critical care devices. Critical Care Clinics, February 2023.

6. **Charpignon M.-L.** et al. Drug repurposing of metformin for Alzheimer's disease: Causal inference in medical records and complementary systems pharmacology for biomarker identification. Nature Communications, December 2022.

5. **Charpignon M.-L.** et al. Suicides among adolescents during the COVID-19 pandemic. JAMA Pediatrics, April 2022.

4. Celi L.A., Cellini J., **Charpignon M.-L.** et al. Perpetuating healthcare disparities through bias in artificial intelligence – A global review. PLOS Digital Health, April 2022.

3. Wong A.-K. I., **Charpignon M.-L.** et al. Analysis of discrepancies between pulse oximetry and arterial oxygen saturation measurements by race/ethnicity and association with organ dysfunction and mortality: A retrospective observational study. JAMA Open, November 2021.

2. **Charpignon M.-L.**, Samuel M., Celi L.A. Who does the model learn from? Lancet Digital Health, April 2021.

1. Wilder B., **Charpignon M.-L.** et al. Modeling between-population variation in COVID-19 dynamics in Hubei, Lombardy, and New York City. Proceedings of the National Academy of Sciences, September 2020.

OTHER JOURNAL PUBLICATIONS

14. **Charpignon M.-L.** et al. Diversity in the medical research ecosystem: A descriptive scientometric analysis of over 49,000 studies and 150,000 authors published in high-impact medical journals between 2007 and 2022. BMJ Open, to appear.

13. Matos J., Gallifant J., Chowdhury A., Economou-Zavlanos N., **Charpignon M.-L.** et al. A clinician's guide to understanding bias in critical clinical prediction models. Critical Care Clinics, October 2024.

12. Sikdar S., Venturini S., **Charpignon M.-L.** et al. What we should learn from pandemic publishing. Nature Human Behavior, September 2024.

11. **Charpignon M.-L.**, Celi L. et al. Diversity and inclusion: A hidden additional benefit of open science. PLOS Digital Health, July 2024.

10. Matos J., Struja T., Gallifant J., Nakayama L., **Charpignon M.-L.** et al. BOLD: Blood-gas and Oximetry Linked Dataset. Nature Scientific Data, May 2024.

9. **Charpignon M.-L.** et al. Navigating the new normal: Examining co-attendance in a hybrid work environment. PNAS, December 2023.

8. Nazer L. Abusara A.A., Aloran B.B., Szakmany T. Nabulsi H.H., Petushkov A.A., **Charpignon M.-L.** et al. Patient diversity and author representation in clinical studies supporting the Surviving Sepsis Campaign guidelines for management of sepsis and septic shock 2021: a systematic review of citations. BMC Infectious Diseases, November 2023.

7. Glymour M., **Charpignon M.-L.** et al. Preprints and the future of scientific publishing: in favor of relevance, AJE, March 2023.

6. Ramjee D., Pollack C., **Charpignon M.-L.** et al. Is Evolving face mask guidance during a pandemic harmful to public perception? An Analysis of Sentiment and Emotion on Twitter. JMIR, February 2023.

5. Wong A.-K. I., Kim H., **Charpignon M.-L.** et al. A method to explore variations of ventilator-associated event surveillance definitions in large critical care databases in the United States. Critical Care Explorations, April 2022.

4. Ramjee D., Smith L., Doanvo A., **Charpignon M.-L.** et al. Evaluating criminal justice reform during COVID-19: The need for a novel sentiment analysis package. PLOS Digital Health, April 2022.

3. Cosgriff C.V., **Charpignon M.-L.** et al. Village mentoring and hive learning: The MIT Critical Data experience. Cell iScience, June 2021.

2. Lai Y., **Charpignon M.-L.** et al. Unsupervised learning for county-level typological classification for COVID-19 research. Intelligence-Based Medicine, September 2020.

1. Luo E., Newman S., Amat M., **Charpignon M.-L.** et al. MIT COVID-19 datathon: data without boundaries. BMJ Innov., August 2020.

HONORS & AWARDS

University of Chicago & UC San Diego | Rising Star in Data Science	**October 2023**
MISTI Global Grant | Program to foster MIT-Israel research collaborations, $30k	**May 2023**
Kaufman Teaching Certificate Program | MIT Teaching Pedagogy Award	**May 2023**
Robert Guenassia Award | MIT Office of Graduate Education, $1,500	**January 2023**
Moderna Global Fellowship | Program for Young Researchers (50 awardees worldwide), $200k	**September 2022**
Broad Institute Eric & Wendy Schmidt Center Fellowship	**June 2022**
Harvard Center for Research on Computation and Society Fellowship	**March 2022**
FDA-Stanford Machine Learning for Healthcare Fellowship	**February 2020**
Rotary International Graduate Research Fellowship	**February 2019**
Health Hackathon | Organized by Tegan & Sara Foundation and MGH at the Broad Institute (2nd prize)	**September 2018**
Columbia University Presidential Fellowship | Declined	**September 2016**
Student Economic Forum | Organized by the French Central Bank and ESSEC Business School (1st national prize)	**April 2014**

TEACHING EXPERIENCE & OUTREACH

Teaching Assistant | Statistics, Computation & Applications (Fall 2019 & Fall 2021), Statistical Learning & Data Mining (Spring 2019), Linear Dynamical Systems (Winter 2016), Linear Algebra & PDEs for Engineers (Winter 2015).

Online Education Course Contributor | Data Science for Disaster Resilience and Health Disparities Research (Fall 2021-present), Global Health Informatics (Spring 2020-present), Collaborative Data Science in Medicine (Fall 2019-present).

Health Hackathon Mentor | Moderated on-site events in Brazil, Denmark, Italy, Singapore, South Korea, and Colombia (Fall 2019-present).

MENTORING EXPERIENCE

Chineze Egbunike, BSc Student, Columbia University	**2024 – Present**
Ayush Jain, BSc Student, Duke University	**2023 – Present**
Joy Lin, BSc Student, MIT	**2023 – Present**
Suzanne Jiang, BSc Student, MIT	**2023 – Present**
Alexandra Kortchemski, MSc Student, CentraleSupelec (now at Harvard Medical School)	**2022 – Present**
Joao Matos, MSc Student, University of Porto & MIT (now at Duke University)	**2022 – Present**
Brendan Lawler, BSc Student, Tufts University	**2021 – Present**
Anika Puri, BSc Student, MIT	**2020 – Present**
Jay Chandra, BSc Student, Harvard College (now at Harvard Medical School)	**2019 – 2022**
Yiqing Du, BSc Student, MIT	**2023**
Jeremy Adjadj, MSc Student, Harvard Medical School	**2022 – 2023**
Oliver Nizet, BSc Student, Johns Hopkins University	**2021 – 2023**
Johnattan Ontiveros, BA Student, Harvard College (now at MIT)	**2020 – 2023**

Lucas Leforestier, CentraleSupelec (now at MIT)	**2020 – 2023**
Vishnou Vinayagame, MSc Student, CentraleSupelec (now at University of Toronto)	**2020 – 2023**
Antoine Lopes Ferreira, CentraleSupelec (now at London School of Economics)	**2020 – 2023**
Vassili Chesterkine, MSc Student, CentraleSupelec & MIT	**2020 – 2023**
Theodore de Pomereu, MSc Student, CentraleSupelec & Cambridge University	**2020 – 2023**
Adrien Carrel, MSc Student, CentraleSupelec & Imperial College London	**2020 – 2023**
Anton Petushkov, BSc Student, University of Michigan	**2020 – 2023**
Saahil Sundaresan, BSc Student, Stanford University	**2020 – 2022**
Skyler Shapiro, BSc Student, Cornell University	**2020 – 2022**
Anna Miller, BA Student, Swarthmore College	**2020 – 2022**
Hector Bonnefoi, MSc Student, CentraleSupelec (now at Columbia University)	**2020 – 2022**
Tony Wu, MSc Student, CentraleSupelec & Cambridge University	**2020 – 2022**
Anushka Bhaskar, BA Student, Harvard College & Cambridge University	**2019 – 2022**

LEADERSHIP EXPERIENCE

Machine Learning at MIT | Graduate Student Committee Retreat Chair	**2020 – 2022**
MIT Policy Hackathon | Head of External Relations	**2018 – 2020**
New England Graduate Women in Science & Engineering | Diversity & Inclusion Chair	**2018 – 2020**
King County Emerging Leaders | Microsoft Committee Member	**2016 – 2018**
Ecole Centrale Symposium in Science, Technology, and Policy | Co-Founder	**2013 – 2016**
Ecole Centrale High School Tutoring Organization | Treasurer & Fundraiser, 130k€ annual budget	**2012 – 2014**

MEDIA COVERAGE

Projecting the Future of Health Care Needs in Aging Populations (UPenn, May 2023).
Adolescent suicides increased in 5 US states during the pandemic. Why parents should be concerned (CNN, April 2022).
Study: Adolescents Accounted for Larger Share of Suicides in 2020 (US News & World Report, April 2022).
Adolescents accounted for larger share of suicides in many states in 2020 (NBC, April 2022).
IDSS MicroMasters Teaching Assistants (IDSS News, November 2021).
A Model Approach to Public Health (Spectrum, Fall 2020).
University Of Toronto startup leverages big data to fight COVID-19 in Mogadishu (University of Toronto News, December 2020).
Four days of work, followed by 10 days of lockdown could help prevent another wave of infections (Business Insider France, May 2020).
What is the right strategy to limit the spread of COVID-19? (Medical Xpress, May 2020).
Georgia's Experiment in Human Sacrifice (The Atlantic, April 2020).
New Model Shows How Deadly Lifting Georgia's Lockdown May Be (The Daily Beast, April 2020).
Model finds 'middle ground' for India's lockdown exit (Nature India, April 2020).
Annual Women in Data Science conference discusses fake news (MIT News, April 2020).
Combining artificial intelligence with their passions (MIT News, March 2019).
Women in Data Science conference unites global community of researchers and practitioners (MIT News, March 2019).

SELECTED INVITED TALKS & PRESENTATIONS

Harvard Medical School | Computational Health Informatics Program Symposium	**February 2024**
Bordeaux Population Health | Division of Biostatistics, Epidemiology, and Population Health	**January 2024**
Machine Learning for Health | Annual Conference	**December 2023**
INFORMS | Cluster on Networks, Org Structure, and Media for Business Decisions	**October 2023**
Interdisciplinary Association for Population Health Science | Panel Session on the Statistical Estimation of Disparities	**October 2023**
INFORMS Healthcare | Clusters on Health Equity & Mental Health Modeling	**July 2023**
Society for Epidemiologic Research Conference | Sessions on Behavioral Health & Novel Data Sources	**June 2023**
New England Statistics Symposium | Panel Session on Statistical Methodologies for Mitigating Disparities in Medicine	**June 2023**
University of Pennsylvania | Population Studies Center	**May 2023**
Stanford University | Panel Session on Data Science and Climate Change	**February 2023**
UCSF & UC Berkeley | Department of Epidemiology & Biostatistics	**January 2023**
Purdue University | Annual Data Science Week	**December 2022**
Roche Pharmaceuticals | Federated Analytics & Federated Learning Symposium	**June 2022**
Technion | Faculty of Industrial Engineering & Management	**March 2022**
Harvard School of Public Health | Health Data Science Symposium	**November 2021**
Paris-Saclay University | Department of Mathematics & Informatics for Complex Systems Modeling	**January 2021 & 2024**
NeurIPS | Workshop on Machine Learning and Causal Inference for Improved Decision-Making	**December 2019**

CONFERENCE PROCEEDINGS

6. Rodríguez A., Adhikari B., Srivastava A., Pei S., **Charpignon M.-L.** et al. epiDAMIK 2024: The 7th International Workshop on Epidemiology meets Data Mining and Knowledge Discovery. Proceedings of the 30th ACM SIGKDD Conference on Knowledge Discovery and Data Mining, August 2024.

5. Jain A., **Charpignon M.-L.**, Chen I.Y, Philippakis A., Alaa A. Generating new drug repurposing hypotheses using disease-specific hypergraphs. Pacific Symposium on Biocomputing, January 2024.

4. **Charpignon M.-L.**, Jain A., Chen I.Y, Alaa A. Generating new drug repurposing hypotheses by fusing disease-specific hypergraphs. Machine Learning for Health, December 2023.

3. Venturini S., Sikdar S., **Charpignon M.-L.** et al. The COVID-19 research outbreak: how the pandemic culminated in a surge of new researchers. International Conference on Computational Social Science, July 2023.

2. DeVost M.A., Chen Y.H., **Charpignon M.-L.** et al. Marital status associated with excess ADRD mortality among Californians during the COVID-19 pandemic. Alzheimer's Association International Conference, July 2023.

1. Matos J., Struja T., Gallifant J., **Charpignon M.-L.** et al. Shining light on dark skin: Pulse oximetry correction models. IEEE Meeting on Bioengineering, June 2023.

SELECTED WORKSHOP PAPERS

7. Hulland E.N., **Charpignon M.-L.** et al. Estimating time-varying cholera transmission and oral cholera vaccine effectiveness in Haiti and Cameroon, 2021-2023. Workshop on Computational Epidemiology, ACM SIGKDD 2024.

6. Nguyen D.S.A., **Charpignon M.-L.** et al. Risk-based ring vaccination: A strategy for pandemic control and vaccine allocation. Workshop on Computational Epidemiology, ACM SIGKDD 2023.

5. Wilder B., **Charpignon M.-L.** et al. Integrating agent-based modeling and Bayesian inference to uncover between-population variation in COVID-19 dynamics. Workshop on Machine Learning for Global Health, International Conference on Machine Learning, 2020.

4. Mate A., Killian J., Wilder B., **Charpignon M.-L.** et al. Evaluating COVID-19 lockdown policies for India: A preliminary modeling assessment for individual states. Workshop on Humanitarian Mapping, ACM SIGKDD, 2020.

3. **Charpignon M.-L.** et al. A causal inference framework for antidiabetic drug repurposing using observational data from United States electronic health records. Workshop on Machine Learning for Health, NeurIPS, 2019.

2. **Charpignon M.-L.** et al. Using news articles to model hepatitis A outbreaks: A case study in California and Kentucky. Workshop on Artificial Intelligence for Social Good, NeurIPS, 2019.

1. **Charpignon M.-L.** et al. Moving beyond correlation: Using a causal inference approach to measure the impact of a customer's attribute on product retention. Workshop on machine learning & causal inference for improved decision-making, NeurIPS, 2019.

MANUSCRIPTS UNDER REVIEW

5. Wells W., Chen Y.-H., **Charpignon M.-L.** et al. Historical state compulsory schooling laws and pandemic-era mortality: A quasi-experimental study. Under review at The Lancet.

4. Kim Y.J., Riley A., Morales J.F., **Charpignon M.-L.** et al. Intersections of immigrant documentation status in excess natural-cause mortality among Asians and Pacific Islanders in California (2020-2023). Under review at JAMA Network Open.

3. Hulland E.N., **Charpignon M.-L.** et al. "What's in a name?": Using mpox as a case study to understand the importance of communication, advocacy, and information accuracy in disease nomenclature. Revision at Scientific Reports.

2. Riley A., Kim Y.J., Morales J.F., **Charpignon M.-L.** et al. Inequities in excess pandemic mortality by legal status in California: a retrospective analysis from March 2020 through May 2023. Revision at The American Journal of Public Health.

1. **Charpignon M.-L.** et al. Nationwide regional trends in adolescent suicides. Revision at Pediatrics.

PRE-PRINTS & MANUSCRIPTS IN PREPARATION

9. **Charpignon M.-L.**, Su B. et al. Emulation of an antihypertensive target trial in US and UK electronic health records: comparative effectiveness of the repurposing potential of ACE inhibitors and angiotensin receptor blockers for preventing dementia.

8. **Charpignon M.-L.**, Chen Y.-H., Kiang M., Glymour M. Counterpoint: Journals should serve science and the public, not publishers.

7. Matos J., Nakayama L.F., **Charpignon M.-L.** et al. The medical knowledge oligarchies: Network analysis of medical research publication and collaboration. medRxiv, June 2023.

6. **Charpignon M.-L.**, Chesterkine V., Majumder M.S. Spatiotemporal modeling of opioid-related mortality in the United States.

5. **Charpignon M.-L.** et al. Vaccine distribution through augmented companion programs may improve health outcomes.

4. Haque S., **Charpignon M.-L.** et al. Diversity of COVID-19 experts and their co-mention network as portrayed in the news media.

3. Chen Y.-H., Chen R., **Charpignon M.-L.** et al. COVID-19 mortality among working-age Americans in 46 states, by industry and occupation. medRxiv, April 2022.

2. Celi L.A., **Charpignon M.-L.** et al. Gender balance and readability of COVID-19 scientific publishing: A quantitative analysis of 90,000 preprint manuscripts. medRxiv, June 2021.

1. Perrault A., **Charpignon M.-L.** et al. Designing efficient contact tracing through risk-based quarantining. NBER, November 2020.

OPEN DATA & SOFTWARE

4. BOLD: Blood-gas and Oximetry Linked Dataset for open-source research. PhysioNet, November 2023.

3. causalCmprsk: Nonparametric and Cox-based estimation of ATE in competing risks. CRAN R project & package, July 2023.

2. Flatten: COVID-19 survey data on symptoms, demographics, and mental health in Canada. PhysioNet, March 2021.

1. The Global Conflict Risk Index: Artificial intelligence for conflict prevention. European Commission Joint Research Center Reports, 2019.

COMMUNITY SERVICE

Journal Reviewer | PLOS family, Lancet Digital Health, Lancet Regional Health Europe, Nature Communications, JAMIA, American Journal of Public Health, Archives of Public Health, Pathogens and Global Health, Clinical Infectious Diseases, Age & Ageing, Environmental Science & Policy, Frontiers in Nutrition, Journal of Health and Social Behavior, Health Informatics, Transactions on Intelligent Systems and Technology.
Conference Reviewer | MLHC, ML4H, CHIL, AMIA.
Program Committees | IJCAI AI for Social Good, KDD Humanitarian Mapping.
Workshop Organizing Committees | NeurIPS Machine Learning in Public Health, ICLR AI for Public Health, KDD epiDAMIK.
Workshop Reviewer | NeurIPS, ICML, ICLR.