

Sean McGrath

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EDUCATION

Ph.D. Biostatistics , Harvard University <i>Advisor</i> : Dr. Rajarshi Mukherjee	2024
A.M. Biostatistics , Harvard University	2021
B.Sc. Mathematics , McGill University	2018

ACADEMIC APPOINTMENTS

Research Fellow , Harvard Medical School and Harvard Pilgrim Health Care Institute <i>Advisor</i> : Dr. Jessica Young	2024–Present
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FELLOWSHIPS

• Thomas O. Pyle Fellowship, Harvard Medical School and Harvard Pilgrim Health Care Institute	2024–2025
• National Science Foundation Graduate Research Fellowship	2019–2024
• Fonds de recherche du Québec - Nature et technologies B1X Research Scholarship	2019–2021
• National Institutes of Health T32 Ruth L. Kirschstein Institutional National Research Service Award	2019–2021

SELECTED AWARDS

• Certificate of Distinction of Teaching, Harvard University (three times)	2020, 2021, 2023
• Honorable Mention in the New Advances in Statistics and Data Science Poster Competition	2022
• Top Cited Article 2020-2021, Wiley (Biometrical Journal)	2022
• Professional Development Fund Award, Harvard University	2022
• Undergraduate Student Research Award, Natural Sciences and Engineering Research Council of Canada	2018
• McGill Science 21 st Century Ambassador Fund Award, McGill University	2018
• Travel Award, Statistical Society of Canada	2017
• First Place in Case Studies in Data Analysis Poster Competition, Statistical Society of Canada	2017
• Summer Studentship Award, Meakins-Christie Laboratories (twice)	2016, 2017
• Best Oral Presentation, RI-MUHC Joint Summer Student Research Day	2017

PUBLICATIONS

1. Wang G*, **McGrath S***, Lian Y*. CausalMetaR: An R package for performing causally interpretable meta-analyses. *Research Synthesis Methods*. In press.
2. de Vries TAC, Mallick IU, Bhagirath VC, Eikelboom JW, Gomes C, Yi Q, **McGrath S**, Hirsh J, Chan NC. Usual on-therapy ranges of drug concentrations in patients with atrial fibrillation treated with direct oral anticoagulants: A systematic review and meta-analysis. *Thrombosis and Haemostasis*. 2024 Nov 21 [Epub ahead of print].
3. Al Tawil A, **McGrath S**, Ristl R, Mansmann U. Addressing treatment switching in the ALTA-1L trial with g-methods: Exploring the impact of model specification. *BMC Medical Research Methodology*. 2024; 24: 314.
4. Lui L, Réquia WJ, dos Santos F, Albert CE, da Cruz Vieira L, **McGrath S**. Determining factors associated with vaccination coverage in the first year of life in Brazil (2013-2022). *Vaccine*. 2024; 42: 126382.

5. Iskander R, Moyer H, Fergusson D, **McGrath S**, Benedetti A, Kimmelman J. The benefits and risks of receiving investigational solid tumour drugs in randomized trials: A systematic review and meta-analysis. *Annals of Internal Medicine*. 2024; 177: 759-767.
6. **McGrath S**, Zhao XF, Ozturk O, Katzenschlager S, Steele R, Benedetti A. metamedian: An R package for meta-analyzing studies reporting medians. *Research Synthesis Methods*. 2024; 15: 332-346.
7. **McGrath S**, Mukherjee R, Réquia WJ, Lee WC. Wildfire exposure and academic performance in Brazil: A causal inference approach for spatiotemporal data. *Science of the Total Environment*. 2023; 905: 167625.
8. Chiu, YH, Wen, L, **McGrath S**, Logan R, Dahabreh IJ, Hernán, MA. Evaluating model specification when using the parametric g-formula in the presence of censoring. *American Journal of Epidemiology*. 2023; 192: 1887-1895.
9. **McGrath S**, Mehta P, Zytek A, Lage I, Lakkaraju H. When does uncertainty matter?: Understanding the impact of predictive uncertainty in ML assisted decision making. *Transactions on Machine Learning Research*. 2023.
10. **McGrath S**, Katzenschlager S, Zimmer AJ, Seitel A, Steele R, Benedetti A. Standard error estimation in meta-analysis of studies reporting medians. *Statistical Methods in Medical Research*. 2023; 32: 373-388.
11. Lee JH, Garg T, Lee J, **McGrath S**, Rosman L, Schumacher SG, Benedetti A, Qin ZZ, Gore G, Pai M, Sohn H. Impact of molecular diagnostic tests on diagnostic and treatment delays in tuberculosis: A systematic review and meta-analysis. *BMC Infectious Diseases*. 2022; 22: 940.
12. Brümmer LE, Katzenschlager S, **McGrath S**, Schmitz S, Gaeddert M, Erdmann C, Bota M, Grilli M, Larmann J, Weigand MA, Pollock NR, Macé A, Erkosar B, Carmona S, Sacks JA, Ongarello S, Denkinger CM. Accuracy of rapid point-of-care antigen-based diagnostics for SARS-CoV-2: An updated systematic review and meta-analysis with meta-regression analyzing influencing factors. *PLOS Medicine*. 2022; 19: e1004011.
13. Chiu, YH, Yland JJ, Rinaudo P, Hsu J, **McGrath S**, Hernández-Díaz S, Hernán MA. Effectiveness and safety of intrauterine insemination vs. assisted reproductive technology: Emulating a target trial using an observational database of administrative claims. *Fertility and Sterility*. 2022; 117: 981-991.
14. Zimmer AJ, Lainati F, Aguilera Vasquez N, Chedid C, **McGrath S**, Benedetti A, MacLean E, Ruhwald M, Denkinger CM, Kohli M. Biomarkers that correlate with active pulmonary tuberculosis treatment response: A systematic review and meta-analysis. *Journal of Clinical Microbiology*. 2022; 60: e01859-21.
15. **McGrath S**, Young JG, Hernán MA. Revisiting the g-null paradox. *Epidemiology*. 2022; 33: 114-120.
16. Katzenschlager S, Zimmer AJ, Gottschalk C, Grafeneder J, Seitel A, Maier-Hein L, Benedetti A, Larmann J, Weigand MA, **McGrath S***, Denkinger CM*. Can we predict the severe course of COVID-19 - A systematic review and meta-analysis of indicators of clinical outcome? *PLOS One*. 2021; 16: e0255154.
17. **McGrath S**, Zhao XF, Steele R, Thombs BD, Benedetti A, and the DEPRESSion Screening Data (DEPRESSD) Collaboration. Estimating the sample mean and standard deviation from commonly reported quantiles in meta-analysis. *Statistical Methods in Medical Research*. 2020; 29: 2520-2537.
18. **McGrath S***, Lin V*, Zhang Z, Petito LC, Logan RW, Hernán MA, Young JG. gfoRmula: An R package for estimating the effects of sustained treatment strategies via the parametric g-formula. *Patterns*. 2020; 1: 100008.
19. **McGrath S**, Sohn H, Steele R, Benedetti A. Meta-analysis of the difference of medians. *Biometrical Journal*. 2020; 62: 69-98.
20. **McGrath S**, Zhao XF, Qin ZZ, Steele R, Benedetti A. One-sample aggregate data meta-analysis of medians. *Statistics in Medicine*. 2019; 38: 969-984.

* indicates equal contribution

SUBMITTED PAPERS AND PREPRINTS

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21. **McGrath S**, Mukherjee R. Nuisance function tuning and sample splitting for optimal doubly robust estimation. *arXiv*. <https://arxiv.org/abs/2212.14857>.
 22. **McGrath S**, Zhu C, Guo M, Duan R. LEARNER: A transfer learning method for low-rank matrix estimation. *arXiv*. <https://arxiv.org/abs/2412.20605>.

23. Brümmer LE, Erdmann C, Tolle H, **McGrath S**, Olaru I, Katzenschlager S, Yerlikaya S, Grilli M, Pollock NR, Erkosar B, Macé A, Ongarello S, Johnson CC, Sacks JA, Denkinger CM. The clinical utility and epidemiological impact of self-testing for SARS-CoV-2 using antigen detecting diagnostics: A systematic review and meta-analysis. *medRxiv*. <https://www.medrxiv.org/content/10.1101/2022.07.03.22277183v1>.

SOFTWARE

1. Lin V*, **McGrath S***,†, Zhang Z, Logan R, Petito LC, Li J, McGee E, Cheng C, Young JG, Hernán MA. gfoRmula: Parametric g-formula. R package version 1.1.0. <https://CRAN.R-project.org/package=gfoRmula>.
2. Li J, Rein S, **McGrath S**, Logan R, O’Dea R, Hernán MA. pygformula: A python implementation of the parametric g-formula. Python package version 1.1.2. <https://pypi.org/project/pygformula>.
3. Cheng Z, Li J, Rein S, O’Dea R, **McGrath S**, Wen L, Hernán MA. gfoRmulaICE: Parametric Iterative Conditional Expectation G-Formula. R package version 0.1.0. <https://CRAN.R-project.org/package=gfoRmulaICE>.
4. Yi L, Wang G, **McGrath S**†, Dahabreh IJ. CausalMetaR: Causally interpretable meta-analysis. R package version 0.1.2. <https://CRAN.R-project.org/package=CausalMetaR>.
5. **McGrath S**†, Zhu C, Duan D. learner: Latent space-based transfer learning. R package version 0.1.0. <https://CRAN.R-project.org/package=learner>.
6. **McGrath S**†, Zhao XF, Katzenschlager S, Ozturk O, Steele R, Benedetti A. metamedian: Meta-analysis of medians. R package version 1.1.1. <https://CRAN.R-project.org/package=metamedian>.
7. **McGrath S**†, Zhao XF, Steele R, Benedetti A. estmeansd: Estimating the sample mean and standard deviation from commonly reported quantiles in meta-analysis. R package version 1.0.1. <https://CRAN.R-project.org/package=estmeansd>.

† indicates package maintainer

PRESENTATIONS

Oral Presentations

1. Brümmer LE, Zorger AM, Worbes K, **McGrath S**, Erdmann C, Tolle H, Katzenschlager S, Yerlikaya S, Grilli M, Pollock NR, Erkosar B, Mace A, Ongarello S, Johnson CC, Sacks JA, Skoetz N, Lee RA, Denkinger CM. The clinical utility and epidemiological impact of self-testing for SARS-CoV-2 using antigen detecting diagnostics: A systematic review and meta-analysis. Talk presented at: *Gesundheit Gemeinsam 2024*. September 8–13 2024; Dresden, Germany.
2. **McGrath S**, Mukherjee R, Réquia WJ, Lee WC. Wildfire exposure and academic performance in Brazil: A causal inference approach for spatiotemporal data. Talk presented at: *35th Annual Conference of the International Society for Environmental Epidemiology*. September 17–21 2023; Kaohsiung, Taiwan.
3. **McGrath S**, Duan R. Transfer learning approaches for synthesizing genetic association studies. Talk presented at: *17th Annual Meeting of the Society for Research Synthesis Methodology*. July 5–7 2023; Paris, France.
4. **McGrath S**. Meta-analysis of studies reporting medians. Talk presented at: *Lady Davis Institute Centre for Clinical Epidemiology Seminar*. April 11 2023; Online.
5. **McGrath S**, Zhao XF, Ozturk O, Katzenschlager S, Steele R, Benedetti A. metamedian: An R package for meta-analyzing studies reporting medians. Talk presented at: *Evidence Synthesis and Meta-Analysis in R Conference 2023*. March 27–31 2023; Online.
6. **McGrath S**, Zhao XF, Steele R, Benedetti A. estmeansd: An R package for estimating means and standard deviations from studies reporting medians in meta-analysis. Talk presented at: *Evidence Synthesis and Meta-Analysis in R Conference 2023*. March 27–31 2023; Online.
7. **McGrath S**, Mukherjee R. Undersmoothing and sample splitting for estimating nonparametric functionals. Talk presented at: *Joint Statistical Meetings*. August 6–11 2022; Washington, D.C., USA.
8. Yland J, Chiu YH, **McGrath S**, Hernández-Díaz S. Comparative effectiveness of ovulation induction medications: evidence from a large healthcare database in the United States. Talk presented at: *36th International Conference on Pharmacoepidemiology and Therapeutic Risk Management (ICPE 2020 All Access)*. September 16–17 2020; Online.

9. **McGrath S**, Kaouache M, Grover S. Estimating the long-term effects of weight loss and the risk of dementia using the McGill Cardiometabolic Model. Talk presented at: *Metabolic Disorders and Complications Program Seminar*. December 6 2018; Montreal, Canada.
10. **McGrath S**, Steele R, Benedetti A. Meta-analysis of the difference of medians. Speed presentation (talk and poster) given at: *Joint Statistical Meetings*. July 28–August 2 2018; Vancouver, Canada.
11. **McGrath S**, Steele R, Benedetti A. Meta-analysis of the difference of medians. Talk presented at: *46th Annual Meeting of the Statistical Society of Canada*. June 3–6 2018; Montreal, Canada.
12. **McGrath S**, Steele R, Benedetti A. Methods for estimating the sampling variance of the median for meta-analysis. Talk presented at: *McGill University (Bio)Statistics Research and Career Day*. September 22 2017; Montreal, Canada.
13. **McGrath S**, Steele R, Benedetti A. A comparison of methods for meta-analyzing medians: Applications to estimating diagnostic delays. Talk presented at: *Research Institute of the McGill University Health Centre Joint Summer Student Research Day*. August 10 2017; Montreal, Canada.
14. **McGrath S**, Zhao X, Qin ZZ, Steele R, Benedetti A. Meta-analysis of medians. Talk presented at: *12th Annual Meeting of the Society for Research Synthesis Methodology*. July 3–5 2017; Montreal, Canada.
15. **McGrath S**, Steele R, Benedetti A. Incorporating medians in meta-analysis. Talk presented at: *45th Annual Meeting of the Statistical Society of Canada*. June 11–14 2017; Winnipeg, Canada.
16. **McGrath S**, Zhao X, Qin ZZ, Steele R, Benedetti A. Meta-analysis of medians. Talk presented at: *Respiratory Epidemiology and Clinical Research Unit Seminar*. December 2 2016; Montreal, Canada.

Poster Presentations

17. **McGrath S**, Mukherjee R. Undersmoothing and sample splitting for estimating nonparametric functionals. Poster presented at: *New Advances in Statistics and Data Science*. May 24–26 2022; Honolulu, USA.
18. Zimmer AJ, Lainati F, Aguilera Vasquez N, Chedid C, **McGrath S**, Benedetti A, MacLean E, Ruhwald M, Denkinger CM, Kohli M. Biomarkers for active pulmonary tuberculosis treatment response: A systematic review. Poster presented at: *52nd Union World Conference on Lung Health*. October 19-22 2021; Online.
19. **McGrath S**, Sohn H, Steele R, Benedetti A. Meta-analysis of the difference of medians. Poster presented at: *Research Institute of the McGill University Health Centre Summer Student Research Day*. August 13 2018; Montreal, Canada.
20. Coulombe J, **McGrath S**, Wang Z. Can gene expression data identify patients with Inflammatory Bowel Disease? Poster presented at: *Centre de Recherches Mathématiques Workshop: Risk Modelling, Management and Mitigation in Health Sciences*. December 11–13 2017; Montreal, Canada.
21. Coulombe J, **McGrath S**, Wang Z. Can gene expression data identify patients with Inflammatory Bowel Disease? Poster presented at: *45th Annual Meeting of the Statistical Society of Canada*. June 11–14 2017; Winnipeg, Canada.
22. **McGrath S**, Zhao X, Qin ZZ, Benedetti A. Meta-analysis of medians. Poster presented at: *44th Annual Meeting of the Statistical Society of Canada*. May 29–June 1 2016; St. Catharines, Canada.

TEACHING EXPERIENCE

Teaching Assistant

Harvard University

- EPI 524: Confounding Control: A Component of Causal Inference 2025
A Master's-level course for Public Health degree programs
- EPI 524: Confounding Control: A Component of Causal Inference 2024
A Master's-level course for Public Health degree programs
(Course development teaching assistant)
- BST 222: Basics of Statistical Inference 2023
A Master's-level course for Biostatistics degree programs
- BST 231: Statistical Inference I 2023
A PhD-level course for Biostatistics degree programs
- BST 230: Probability Theory and Applications I 2021
A PhD-level course for Biostatistics degree programs
- ID 201: Core Principles of Biostatistics and Epidemiology for Public Health Practice 2020
A Master's-level course for Public Health degree programs

PROFESSIONAL ACTIVITIES

Mentorship

- Research Project Mentor: Summer Program in Biostatistics and Computational Biology 2021–2024
- Project Mentor: StatStart High School Summer Program in Biostatistics 2021–2023
- Graduate Student Mentor: Group for Undergraduates in Statistics at Harvard 2020–2022

Conference Organization

- Fundraising Committee Member: Canadian Statistics Student Conference 2018
- Local Arrangements Committee Member: Society for Research Synthesis Methodology Annual Meeting 2017

Ad-Hoc Peer Review

- Statistics and Machine Learning:
 - * *Journal of the Royal Statistical Society: Series B, Biometrics, Statistics in Medicine, Lifetime Data Analysis, Biometrical Journal, Research Synthesis Methods, BMC Medical Research Methodology, BMC Medical Informatics and Decision Making, Journal of Open Source Software, ASTA Advances in Statistical Analysis, Applied Soft Computing Journal*
- Epidemiology and Biomedical Sciences:
 - * *American Journal of Epidemiology, Annals of Epidemiology, PLOS Global Public Health, Frontiers in Epidemiology, Journal of Public Health and Emergency*

OTHER

Citizenship: United States of America, Canada

Statistical Programming: R, MATLAB, Stan, SAS, Stata

Machine Learning Frameworks: Sklearn, Keras, Tensorflow

Programming Languages: Python, Java, C++

Reproducible Research: Git/GitHub, R Markdown, Jupyter Notebook, Overleaf

Specialized Software: Shiny, L^AT_EX