Nikolaos Ignatiadis ⬤ — CV

CONTACT DETAILS

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RESEARCH INTERESTS

I am interested in the development of interpretable statistical methods, accompanied by robust software implementations, for the analysis of datasets generated from modern, high-throughput technologies. From a statistical perspective, this interest encompasses Empirical Bayes analysis, causal inference, multiple testing and statistics in the presence of contextual side-information.

ACADEMIC EMPLOYMENT

Department of Statistics and Data Science Institute, University of Chicago Chicago, USA
- Assistant Professor 07/2023 - present

Department of Statistics, Columbia University New York, USA
- Postdoctoral Research Scientist 09/2022 - 06/2023

EDUCATION

Stanford University Stanford, California, USA
- **Ph.D., Statistics** (GPA 4.24) 09/2016 – 06/2022
  Thesis advisor: Stefan Wager
  Thesis title: Nonparametric perspectives on empirical Bayes.
- **M.S., Statistics**

Heidelberg University Heidelberg, Germany
- **M.Sc., Scientific Computing**, Grade 1.0 2015 - 2016
  Thesis advisors: Wolfgang Huber and Enno Mammen
- **B.Sc., Mathematics**, Grade 1.0 with *distinction* 2011 - 2015
  Thesis advisors: Wolfgang Huber and Rainer Dahlhaus
- **B.Sc., Molecular Biotechnology**, Grade 1.0 2010 - 2013

AWARDS AND FELLOWSHIPS

Jerome H. Friedman Applied Statistics Dissertation Award 2022
For developing methodology that uses side information for increased power in multiple testing problems and for developing approaches to inference in empirical Bayes problems.

Ric Weiland Graduate Fellowship in the Humanities & Sciences 2020 - 2021
This fellowship is awarded to exceptional rising fourth year doctoral candidates in the humanities, social sciences, mathematics, and statistics upon departmental or programmatic nomination.

Departmental Teaching Assistant Award, Statistics Department, Stanford 2018

iGEM Grand Prize Winner & Best Foundational Advance 2013
The International Genetically Engineered Machine competition with Team Heidelberg at MIT.

Deutschlandstipendium, Heidelberg University, Germany 2011 - 2013
This scholarship is awarded to talented and high-achieving students at public and state recognised institutions of higher education in Germany and is supported by the German Federal Government.

Bronze medal at the International Biology Olympiad, Changwon, South Korea 2010

JOURNAL PUBLICATIONS

1. Nikolaos Ignatiadis, Ruodu Wang, Aaditya Ramdas (2023). **E-values as unnormalized weights in multiple testing.** Biometrika (forthcoming).
2. Ethan Steinberg, Nikolaos Ignatiadis, Steve Yadlowsky, Yizhe Xu, Nigam H. Shah (2023). **Using public clinical trial reports to probe non-experimental causal inference methods.** BMC Medical Research Methodology, 23, 204.
3. Nikolaos Ignatiadis, Sujayam Saha, Dennis L. Sun, Omkar Muralidharan (2023). **Empirical Bayes mean estimation with nonparametric errors via order statistic regression on replicated data.** Journal of the American Statistical Association, Theory and Methods, 118(542), 987-999.

4. Nikolaos Ignatiadis, Stefan Wager (2022). **Rejoinder: Confidence Intervals for Nonparametric Empirical Bayes Analysis.** Journal of the American Statistical Association, Theory and Methods, 117(539), 1192-1199.
5. Nikolaos Ignatiadis, Stefan Wager (2022). **Confidence Intervals for Nonparametric Empirical Bayes Analysis.** Journal of the American Statistical Association, Theory and Methods, 117(539), 1149-1166.
6. Nikolaos Ignatiadis, Wolfgang Huber (2021). **Covariate powered cross-weighted multiple testing.** Journal of the Royal Statistical Society: Series B (JRSS-B), 83(4), 720-751.
7. Loukia Karacosta, Benedict Anchang, Nikolaos Ignatiadis, Samuel Kimmey, Jalen Benson, Joseph Shrager, Robert Tibshirani, Sean Bendall, Sylvia K. Plevritis (2019). **Mapping lung cancer epithelial-mesenchymal transition states and trajectories with single-cell resolution.** Nature communications, 10, 5887.
8. Nikolaos Ignatiadis, Bernd Klaus, Judith Zaugg, Wolfgang Huber (2016). **Data-driven hypothesis weighting increases detection power in genome-scale multiple testing.** Nature methods, 13(7), 577-580.
9. Ralf Beer, Konrad Herbst, Nikolaos Ignatiadis, Ilia Kats, Lorenz Adlung, Hannah Meyer, Dominik Niopek, Tania Christiansen, Fanny Georgi, Nils Kurzawa, Johanna Meichsner, Sophie Rabe, Anja Riedel, Joshua Sachs, Julia Schessner, Florian Schmidt, Philipp Walch, Katharina Niopek, Tim Heinemann, Roland Eils, Barbara Di Ventura (2014). **Creating functional engineered variants of the single-module non-ribosomal peptide synthetase IndC by T domain exchange.** Molecular BioSystems, 10(7), 1709-1718.

CONFERENCE PROCEEDINGS
10. Stephen Pfohl, Yizhe Xu, Agata Foryciarz, Nikolaos Ignatiadis, Julian Genkins, Nigam H. Shah (2022). **Net benefit, calibration, threshold selection, and training objectives for algorithmic fairness in healthcare.** ACM Conference on Fairness, Accountability, and Transparency (FAccT'22).
11. Nikolaos Ignatiadis, Stefan Wager (2019). **Covariate-Powered Empirical Bayes Estimation.** Advances in Neural Information Processing Systems 32 (NeurIPS 2019).

BOOK CHAPTERS
12. Yizhe Xu, Nikolaos Ignatiadis, Erik Sverdrup, Scott Fleming, Stefan Wager, Nigam H. Shah (2023). **Treatment Heterogeneity with Survival Outcomes.** Book chapter in: Handbook of Matching and Weighting Adjustments for Causal Inference. Edited by José R. Zubizaretta, Elizabeth A. Stuart, Dylan S. Small, and Paul R. Rosenbaum. Chapman and Hall / CRC Press.

PREPRINTS
13. Daniel Xiang, Nikolaos Ignatiadis, Peter McCullagh (2024). **Interpretation of local false discovery rates under the zero assumption.** Working paper.
14. Nikolaos Ignatiadis, Bodhisattva Sen (2023). **Empirical partially Bayes multiple testing and compound χ^2 decisions.** Working paper.
15. Dean Eckles, Nikolaos Ignatiadis, Stefan Wager, Han Wu (2022). **Noise-Induced Randomization in Regression Discontinuity Designs.** Working paper.
16. Nikolaos Ignatiadis, Panagiotis Lolas (2021). **σ-Ridge: group-regularized ridge regression via empirical Bayes noise level cross-validation.** Working paper.

INVITED DISCUSSIONS
International Seminar on Selective Inference (ISSI) December 2020
Discussant of the talk 'Clipper: p-value-free FDR control on high-throughput data from two conditions' by Prof. Jingyi Jessica Li.

PEER REVIEW
Statistics journals
Annals of Statistics (AoS), Bernoulli, Biometrical Journal, Biometrics, Biometrika, Electronic Journal of Statistics (EJS), Journal of the American Statistical Association: Theory & Methods (JASA T&M), Journal of Business & Economic Statistics (JBES), Journal of Causal Inference (JCI), Journal of Computational and Graphical Statistics (JCGS), Journal of the Royal Statistical Society–Series B (JRSS-B), Journal of Statistical Software (JSS), Sankhyā A, Statistical Papers, Statistical Science

Other journals
Bioinformatics, Bioinformatics Advances, BMC Medical Research Methodology, Journal of Cell Science,

Management Science, Nature Protocols, Operations Research, PeerJ

Conferences
AISTATS (2021), NeurIPS (2021, 2022), ICLR (2022)

OTHER ACADEMIC SERVICE	**Co-organizer: International Seminar on Selective Inference** with Will Fithian, Jelle Goeman, Lihua Lei, and Zhimei Ren.	2024 - present

SOFTWARE

R packages in Bioconductor:
- IHW: Independent Hypothesis Weighting for multiple testing with side-information.
- IHWpaper: Companion to the IHW package facilitating reproducibility.

Julia packages in the official registry:
- Aurora.jl: Empirical Bayes mean estimation with nonparametric errors on replicated data.
- Empirikos.jl: Nonparametric empirical Bayes confidence intervals.
- RegressionDiscontinuity.jl: Basic functionality for analyzing sharp regression discontinuity designs.
- SigmaRidgeRegression.jl: σ-Ridge for regression with features that can be partitioned into groups.
- SmoothingSplines.jl: Nonparametric regression using smoothing splines.
- Contributions to Distributions.jl, GLM.jl, MultipleTesting.jl and others.

INDUSTRY EXPERIENCE	**Google AdsMetrics**, Mountain View, USA Data science intern with Omkar Muralidharan, Sujayam Saha and Dennis L. Sun.	Summer 2019

RESEARCH APPOINTMENTS	**Biomedical Informatics**, Stanford, California, USA Research assistant in the group of Prof. Nigam Shah funded by the NHLBI R01 grant 'Applying statistical learning tools to personalize cardiovascular treatment'.	2021 - 2022
	Statistics Department, Stanford, California, USA Research assistant with Prof. Stefan Wager working on empirical Bayes and causal inference problems.	2017 - 2021
	European Molecular Biology Laboratory, Heidelberg, Germany Research assistant in the group of Dr. Wolfgang Huber.	2014 - 2016

TEACHING

Instructor at University of Chicago

STAT 41551: Empirical Bayes.	Winter 2024
STAT 34300: Applied Linear Statistical Methods.	Autumn 2023

Instructor at Columbia University

GR8201: Topics in Theoretical Statistics, Empirical Bayes (jointly with Bodhisattva Sen)	Spring 2023

Instructor at Stanford University

STATS 302: Applied Statistics Ph.D. Qualifying Exam Workshop.	Summer 2020

Teaching Assistant (TA) at Stanford University

STATS 315B: Modern Applied Statistics: Data Mining.	Spring 2021
STATS 361: Causal Inference.	Spring 2020
STATS 305B: Applied Statistics II.	Winter 2020
STATS 315A: Modern Applied Statistics: Learning.	Winter 2019
STATS 300A: Theory of Statistics I.	Fall 2018
STATS 366 (BIOS 221): Modern Statistics for Modern Biology.	Summer 2017 & 2018, Fall 2019
STATS 218: Introduction to Stochastic Processes II.	Spring 2018
STATS 290: Computing for Data Science.	Winter 2018
STATS 305A: Introduction to Statistical Modeling.	Fall 2017
STATS 191: Introduction to Applied Statistics.	Winter 2017
STATS 141 (BIOS 141): Biostatistics.	Fall 2016

Trainer at EMBL (European Molecular Biology Laboratory)

Introductory Course: Statistical Bioinformatics using R and Bioconductor	October 2015

TALKS AND PRESENTATIONS	**Empirical partially Bayes multiple testing and compound χ^2 decisions** BIRS-IASM Workshop: Harnessing the power of latent structure models and modern big data learning

Hangzhou, China, December 2023

Empirical Bayes mean estimation with nonparametric errors via order statistic regression on replicated data
Seminar at the School of Business, University of Kansas
Lawrence, KS, USA, October 2023

Empirical partially Bayes multiple testing and compound χ^2 decisions
Seminar at Department of Statistical Science, Duke University
Durham, NC, USA, September 2023

Noise-Induced Randomization in Regression Discontinuity Designs
New Methodological Developments for Regression Discontinuity Designs at the Joint Statistical Meetings (JSM)
Toronto, Canada, August 2023

Empirical partially Bayes multiple testing and compound χ^2 decisions
2023 Berkeley–Columbia Meeting in Engineering and Statistics, Columbia University
New York, NY, USA, April 2023

Confidence Intervals for Nonparametric Empirical Bayes Analysis
Seminar at Department of Statistics and Data Science, Yale University
New Haven, CT, USA, November 2022

Noise-Induced Randomization in Regression Discontinuity Designs
Econometrics Colloquium at the Economics Department, Columbia University
New York, NY, USA, November 2022

Confidence Intervals for Nonparametric Empirical Bayes Analysis
Statistics Department Seminar at Athens University of Economics and Business (AUEB)
Virtual, October 2022

Covariate-Powered Empirical Bayes Estimation
Seminar (student seminar series) at the Department of Statistics, Columbia University
New York, NY, USA, September 2022

Noise-Induced Randomization in Regression Discontinuity Designs
Second Congress of Greek Mathematicians (SCGM)
Virtual, July 2022

Confidence Intervals for Nonparametric Empirical Bayes Analysis
JASA Theory and Methods Invited Session at the Joint Statistical Meetings (JSM)
Washington, DC, USA, June 2022

Covariate-powered empirical Bayes estimation
New ideas in empirical Bayes at the 5th International Conference on Econometrics and Statistics (EcoSta 2022)
Virtual, June 2022

Noise-Induced Randomization in Regression Discontinuity Designs
Methodological innovations for challenges in health policy and clinical care at the 2022 American Causal Inference Conference
Berkeley, CA, USA, May 2022

Empirical Bayes Mean Estimation With Nonparametric Errors Via Order Statistic Regression on Replicated Data
Statistics Seminar at the Department of Statistics, UC Davis
Davis, CA, USA, April 2022

Nonparametric Empirical Bayes Inference
Statistics and Data Science Seminar at the Department of Statistics and Data Science, Carnegie Mellon University
Virtual, February 2022

Nonparametric Empirical Bayes Inference
Statistics Seminar at the Department of Statistics, University of British Columbia
Virtual, February 2022

Nonparametric Empirical Bayes Inference
Statistics Seminar at the Department of Statistics and Data Science, Wharton School of the University of Pennsylvania
Virtual, February 2022

Nonparametric Empirical Bayes Inference

Seminar at the Department of Decision Sciences, Bocconi University
Milano, Italy, February 2022
Nonparametric Empirical Bayes Inference
Statistics Seminar at the Department of Statistics, UC Davis
Virtual, January 2022
Confidence intervals for nonparametric empirical Bayes analysis and an application to regression discontinuity designs
Statistics Seminar at the Department of Statistics, UCLA
Virtual, January 2022
Nonparametric Empirical Bayes Inference
Seminar at the Data Science Institute, University of Chicago
Chicago, Illinois, USA, January 2022
Confidence Intervals for Nonparametric Empirical Bayes Analysis and an Application to Regression Discontinuity Designs
Seminar at the Department of Statistics and Actuarial Science, University of Waterloo
Virtual, January 2022
Nonparametric Empirical Bayes Inference
Statistics Seminar at the Department of Statistics, Columbia University
Virtual, January 2022
Confidence Intervals for Nonparametric Empirical Bayes Analysis and an Application to the Regression Discontinuity Design
ACMS Colloquium at Department of Applied and Computational Mathematics and Statistics, University of Notre Dame
Notre Dame, Indiana, USA, December 2021
Confidence Intervals for Nonparametric Empirical Bayes Analysis
Advances in Empirical Bayes Methodology at the International Conference on Computational and Methodological Statistics (CMStatistics)
Virtual, December 2021
Noise-Induced Randomization in Regression Discontinuity Designs
Fourth Annual Berkeley-Stanford Econometrics Jamboree at UC Berkeley
Berkeley, CA, USA, November 2021
Noise-Induced Randomization in Regression Discontinuity Designs
Causal Science Conference at Stanford University
Stanford, USA, November 2021
Noise-Induced Randomization in Regression Discontinuity Designs
Causal Inference When Resources Are Limited at the Joint Statistical Meetings (JSM)
Virtual, August 2021
Confidence Intervals for Nonparametric Empirical Bayes Analysis
International Seminar on Selective Inference (ISSI)
Virtual, April 2021
σ-Ridge: group regularized ridge regression via empirical Bayes noise level cross-validation
Statistics Seminar at Vrije Universiteit (VU) Amsterdam campus
Virtual, April 2021
Discussion of 'Clipper: p-value-free FDR control on high-throughput data from two conditions'
Discussant at the International Seminar on Selective Inference (ISSI)
Virtual, December 2020
Bias-Aware Confidence Intervals for Empirical Bayes Analysis
Causality in Statistical Data Science at the Joint Statistical Meetings (JSM)
Virtual, August 2020
Covariate-Powered Empirical Bayes Estimation
Blue Seminar at the European Molecular Biology Laboratory (EMBL)
Heidelberg, Germany, January 2020
Covariate-Powered Empirical Bayes Estimation
11th International Conference on Multiple Comparison Procedures at the National Taiwan University (NTU)
Taipei, Taiwan, December 2019

Bias-Aware Confidence Intervals for Empirical Bayes Analysis

Atlantic Causal Inference Conference at McGill University

Montreal, Canada, May 2019

Covariate powered cross-weighted multiple testing

Statistics Industrial Affiliates Conference at Stanford University

Stanford, CA, USA, February 2019

Covariate-powered cross-weighted multiple testing with FDR Control

Workshop in Post-selection Inference and Multiple Testing at the Institut de Mathématiques de Toulouse

Toulouse, France, February 2018

MultipleTesting.jl: Simultaneous Statistical Inference in Julia

Lightning talk at JuliaCon

Berkeley, CA, USA, June 2017

Data-driven hypothesis weighting increases detection power in genome-scale multiple testing

Genome Biology Seminar at the European Molecular Biology Laboratory (EMBL)

Heidelberg, Germany, July 2016