Nikolaos Ignatiadis - CV

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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.

EDUCATION

Stanford University — Stanford, California, USA
- **Ph.D. in Statistics.** (GPA 4.24) — 09/2016 – present
  Thesis advisor: Stefan Wager

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
- **B.Sc. Molecular Biotechnology**, Grade 1.0 — 2010 - 2013

AWARDS

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, Stanford — 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.

JOURNAL PUBLICATIONS

1. Ignatiadis, N., Saha, S., Sun D. L. and Muralidharan, O. (2021). **Empirical Bayes mean estimation with nonparametric errors via order statistic regression on replicated data.** Journal of the American Statistical Association (forthcoming).
2. Ignatiadis, N. and Huber, W. (2021). **Covariate powered cross-weighted multiple testing.** Journal of the Royal Statistical Society: Series B, 83, 720-751.
3. Karacosta, L. G., Anchang, B., Ignatiadis, N., *et al.* (2019). **Mapping lung cancer epithelial-mesenchymal transition states and trajectories with single-cell resolution.** Nature Communications, 1010, 5887.
4. Ignatiadis, N., Klaus, B., Zaugg, J. B. and Huber, W. (2016). **Data-driven hypothesis weighting increases detection power in genome-scale multiple testing.** Nature Methods, 13(7), 577-580.
5. Beer, R., Herbst, K., Ignatiadis, N., Kats, I., *et al.* (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

6. Ignatiadis, N. and Wager, S. (2019). **Covariate-Powered Empirical Bayes Estimation.** Advances in Neural Information Processing Systems 32 (NeurIPS 2019)

PREPRINTS

7. Ignatiadis, N. and Wager, S. (2021). **Confidence Intervals for Nonparametric Empirical Bayes Analysis.** arXiv:1902.02774, Major revision submitted to Journal of the American Statistical Association.
8. Eckles, D., Ignatiadis, N., Wager, S. and Wu, H. (2021). **Noise-Induced Randomization in Regression Discontinuity Designs.** arXiv:2004.09458, Submitted to Econometrica.

9. Ignatiadis, N. and Lolas, P. (2021). σ-**Ridge: group-regularized ridge regression via empirical Bayes noise level cross-validation.** arXiv:2010.15817.

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.

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, Lasso.jl, MultipleTesting.jl and others.

INDUSTRY EXPERIENCE	**Google AdsMetrics**, Mountain View, USA	Summer 2019

Data science intern with Omkar Muralidharan, Sujayam Saha and Dennis L. Sun.

RESEARCH APPOINTMENTS	**Biomedical Informatics**, Stanford, California, USA	2021 - Present

Research assistant in the group of Prof. Nigam Shah funded by the NHLBI R01 grant 'Applying statistical learning tools to personalize cardiovascular treatment'.

European Molecular Biology Laboratory, Heidelberg, Germany   2014 - 2016
Research assistant in the group of Dr. Wolfgang Huber.

TALKS AND PRESENTATIONS	**Noise-Induced Randomization in Regression Discontinuity Designs.**	August 2021

Joint Statistical Meetings (JSM): Causal Inference When Resources Are Limited
Virtual presentation

σ-Ridge: group regularized ridge regression via empirical Bayes noise level cross-validation.   April 2021
Statistics seminar at Vrije Universiteit (VU) Amsterdam campus
Virtual presentation

Confidence Intervals for Nonparametric Empirical Bayes Analysis.   April 2021
International Seminar on Selective Inference (ISSI)
Virtual presentation

Bias-Aware Confidence Intervals for Empirical Bayes Analysis.   August 2020
Joint Statistical Meetings (JSM): Causality in Statistical Data Science
Virtual presentation

Covariate-Powered Empirical Bayes Estimation.   January 2020
Blue seminar at the European Molecular Biology Laboratory
European Molecular Biology Laboratory (EMBL), Heidelberg, Germany

Covariate-Powered Empirical Bayes Estimation.   December 2019
11th International Conference on Multiple Comparison Procedures
National Taiwan University (NTU), Taipei, Taiwan

Bias-Aware Confidence Intervals for Empirical Bayes Estimation.   May 2019
Atlantic Causal Inference Conference (ACIC)
McGill University, Montreal, Canada

Covariate powered cross-weighted multiple testing.   February 2019
Statistics Industrial Affiliates Conference
Stanford University, California, USA

Covariate-powered cross-weighted multiple testing with FDR Control.   February 2018
Workshop: Post-selection Inference and Multiple Testing
Institut de Mathématiques de Toulouse, Toulouse, France

MultipleTesting.jl: Simultaneous Statistical Inference in Julia.   June 2017
Lightning talk at JuliaCon
Berkeley, California, USA

TEACHING

Instructor at Stanford
STATS 302: Applied Statistics PhD Qualifying Exam Workshop.   Summer 2020

Teaching Assistant (TA) at Stanford
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

PROFESSIONAL
SERVICE

Journal peer review
Annals of Statistics, Bernoulli, Bioinformatics, Biometrics, Biometrika, Electronic Journal of Statistics, Journal of the American Statistical Association, Operations Research, PeerJ, Statistical Science

Conference peer review
AISTATS 2021