



Michele SANTACATTERINA

PERSONAL DATA

PLACE AND DATE OF BIRTH: Schio, Italy | 24th of March 1986
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RESEARCH EXPERIENCE

<i>Current</i> 2018 AUG	Postdoctoral Associate, Cornell University Development of novel optimization methods for causal inference Mentors: Prof. Nathan KALLUS , Prof. Thorsten JOACHIMS , Prof. Kilian WEINBERGER
<i>2018 Apr</i> 2013 DEC	PhD student at the Unit of Biostatistics, Karolinska Institutet Study and development of statistical methods based on mathematical programming techniques with application in public health and medical research. Teaching assistant. Advisor: Prof. Matteo BOTTAI
2017 JUN - 2017 SEPT	Visiting Scholar at Cornell Tech Collaborate on research into novel optimization approaches to causal inference. Faculty Sponsor: Prof. Nathan KALLUS
2013 JAN - 2013 NOV	Research assistant at the Unit of Biostatistics, Karolinska Institutet Application of statistical methods in public health research, with focus on HIV research. Collaboration with the Department of Public Health and the Department of Medicine. Writing of grant applications (KID funding). Teaching assistant.
2012 MAR - 2012 DEC	Research assistant, Division of Global Health, Karolinska Institutet Application of statistical methodologies for medical research in collaboration with the Department of Public Health and the Department of Medicine.
2011 SEPT - 2012 FEB	Master's Thesis, Division of Global Health, Karolinska Institutet <i>Access to antiretroviral therapy and treatment effectiveness among injection drug users: results from a Swedish population based study</i> Application of statistical methods to longitudinal and survival data in HIV research. Advisor: Prof. Rino BELLOCCO

Selected Manuscripts

- 2019 | *Kernel Optimal Orthogonality Weighting for Estimating Effects of Continuous Treatments* Kallus, N., and Santacatterina, M. (Working Paper)
Novel optimization method that estimates the effects of continuous treatments.
- 2019 | *Optimal estimation of Generalized Average Treatment Effects using Kernel Optimal Matching* Kallus, N., and Santacatterina, M. (Working Paper)
Formulation of a new general causal estimand and development of an optimization method for its estimation
- 2019 | *CAB: Continuous Adaptive Blending Estimator for Policy Evaluation and Learning* Su, Y., Wang, L., Santacatterina, M., Joachims, T (Accepted to NIPS 19 and ICML 19)
Novel method for policy evaluation and learning.
- 2019 | *More robust estimation of sample average treatment effects using Kernel Optimal Matching in an observational study of spine surgical interventions* Kallus, N., Pennicooke, B., Santacatterina, M. (Submitted)
Extension and application of Kernel Optimal Matching to robustly estimate SATE.
- 2019 | *Optimal balancing of time-dependent confounders for marginal structural models* Kallus, N., and Santacatterina, M. (Submitted)
Novel method that estimates causal effects affected by time-dependent confounders from longitudinal studies.
- 2018 | *Optimal probability weights for estimating causal effects of time-varying treatments with marginal structural Cox models* Santacatterina, M., Garcia-Pareja, C., Bellocco, R., Sönnnerborg, A., Ekström, A.M., Bottai, M. (Statistics in Medicine)
Use of optimal probability weights when estimating treatment effects with longitudinal data. Comparisons, through simulations, with existing methods.
- 2018 | *Optimal probability weights for inference with constrained precision* Santacatterina, M., and Bottai, M. (JASA)
Proposal of a method for obtaining optimal probability weights based on solving a constrained nonlinear optimization problem.
- 2016 | *Inferences and conjectures in clinical trials: a systematic review of generalizability of study findings* Santacatterina, M., and Bottai, M. (J. Intern. Med.)
Systematic review on generalizability and heterogeneity of study findings in randomized clinical trials.

Conferences and Invited Talks

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| 23RD OF MAY 2019 | Atlantic Causal Inference Conference 2019
Organized session: <i>Optimization methods for causal inference</i>
Organized session together with Adam Kapelner, Nathan Kallus, Nikos Ignatiadis and Stefan Wager |
| 24TH OF OCTOBER 2018 | Second TRIPODS PI meeting
Invited Talk: <i>Optimal balancing of time-dependent confounders for marginal structural models</i>
Presentation of properties, simulations and applications of a novel optimization method to control time-dependent confounders. |
| 7TH OF SEPTEMBER 2018 | Cornell - AI Seminar
Invited Talk: <i>Optimal Weighting for Causal Inference</i>
Presentation of novel optimization methods for causal inference. |
| 11TH OF APRIL 2018 | EUROCIM Causal Inference 2018
Invited Talk: <i>Optimal balancing of time-dependent confounders for marginal structural models</i>
Presentation of properties, simulations and applications of a novel optimization method to control time-dependent confounders. |
| 18TH OF OCTOBER 2017 | MELODEM Selection Group Meeting
Invited Talk: <i>Optimal probability weights for inference with constrained precision</i>
Presentation of properties, simulations and applications of optimal probability weights with extension to longitudinal data. |
| 6TH OF SEPTEMBER 2017 | Royal Statistical Society International Conference
Talk: <i>Estimating treatment effects with optimal inverse probability weighting</i>
Presentation of properties, simulations and applications of optimal inverse probability weights to estimate treatment effects. |
| 5TH OF APRIL 2017 | UK Causal Inference Meeting
Poster: <i>Estimating treatment effects with optimal inverse probability weighting</i>
Presentation of properties, simulations and applications of optimal inverse probability weights to estimate treatment effects. |
| 7TH OF SEPTEMBER 2016 | Royal Statistical Society International Conference
Talk: <i>Optimal probability weights for inference with constrained precision</i>
Presentation of properties, simulations and applications of optimal probability weights. |
| 4TH OF SEPTEMBER 2015 | Nordic and Baltic Stata Users Group meeting
Talk: <i>Weight watchers: How to optimize your weight</i>
Presentation of the application of a nonlinear constrained optimization algorithm to control for extreme probability weights. |
| 28TH OF SEPTEMBER 2014 | HIV Nordic conference
Poster: <i>Antiretroviral therapy among HIV-infected people who inject drugs in Sweden: access and treatment response</i>
Presentation about access to and effectiveness of antiretroviral therapy among HIV patients infected through injecting drug use. |

Advising and Mentoring

M.Sc. Students

- 2017 | [Alice Divan](#), M.Sc. in Decision Support and Risk Analysis - Stockholm University (Co-Advisor). *A/B testing in marketing campaigns*
- 2017 | [Claudia Carlucci](#), M.Sc. in Biostatistics - Univeristy of Milano-Bicocca and Karolinska Institutet (Mentor). *Modeling additive interaction with continuous variables: smoking and the risk for rheumatoid arthritis*
- 2015 | [Chiara Chiavenna](#), M.Sc. in Biostatistics - Univeristy of Milano-Bicocca and Karolinska Institutet (Mentor). *Laplace regression with censored data: an overview and application to observational data in cardiovascular epidemiology*

TEACHING EXPERIENCE

- Current** | Teaching Assistant at Karolinska Institutet
- 2015 APR | Preparation of material and teaching of computer laboratory sessions.
- “[Biostatistics I](#)” for the Doctoral Program in Epidemiology,
 - “[Biostatistics II](#)” for the Doctoral Program in Epidemiology,
 - “[Biostatistics I](#)” for the Research School for Clinical Epidemiology, and,
 - “[Biostatistics II](#)” for the Research School for Clinical Epidemiology.
- The courses are given once per semester. They cover notions of statistics and biostatistics and the use of STATA for data analysis.

FUNDING

- 2017 Dec | Karolinska Institutet Doctoral ([KID](#)) funding
- 2013 DEC | Project title: Novel methods for estimating optimal dynamic treatment regimes for HIV-infected patients. 1,280,000 SEK.
Written in collaboration with Prof. [Matteo BOTTAI](#) (PI), Prof. [Anna Mia EKSTRÖM](#), Prof. [Anders SÖNNERBORG](#) and Prof. [Rino BELLOCCO](#).

Other awards and merits

- 2017 Jun | [KI Travel Grant](#)
- 2017 AUG | Visiting Scholar at Cornell Tech. 14,000 sek.
- 2012 Feb | Programme [Extra Plus](#) - Fondazione Cariplo
- 2011 SEPT | Visiting student with the aim of working on the Master’s thesis at the Division of Global Health, Karolinska Institutet. 4,500 EUR.
- 2009 Aug | [Erasmus+](#) Grant
- 2009 FEB | Visiting student at the Department of Mathematics, University of Barcelona. 1,500 EUR.

EDUCATION

Academic Degrees

- 2012 MAR Master in Biostatistics, University of Milano-Bicocca
2009 OCT Main topics: Classical and Bayesian inference, Survival analysis, Longitudinal data analysis, Statistical methods for Epidemiology, and Design of Experiments.
- 2009 SEP Statistics and Computer Science, University of Padova
2006 SEP Selected topics: Probability, Statistical inference, Statistical models, Computational Statistics, Algebra, Linear Optimization, and Information Technology.

Relevant Courses

- 2016 MAR Course [SF3961 “Statistical Inference”](#) at KTH Royal Institute of Technology
Organized and taught by [Prof. Henrik HULT](#).
15-ECTS PhD-level course within the Mathematical Statistics PhD Program at KTH.
- 2015 JUN Course [SF2822 “Applied nonlinear optimization”](#) at KTH Royal Institute of Technology
Organized and taught by [Prof. Anders FORSGREN](#).
7.5-ECTS MSc-level course within the Applied Mathematics Program at KTH.

Other Education

- 2014 DEC Course on [“Regression Models”](#) by John Hopkins University on [COURSERA](#)
Organized and taught by Prof. Brian CAFFO, Prof. Roger D. PENG and Assoc. Prof. Jeff LEEK, Johns Hopkins University.
[Certification and grades.](#)
- 2013 DEC Course on [“Causal inference from observational data”](#) at Karolinska Institutet
Organized by the Swedish Interdisciplinary Graduate School at Karolinska Institutet. Taught by Prof. Miguel HERNÁN, Harvard School of Public Health.
- 2013 JUN Summer School in [“Modern Methods in Biostatistics and Epidemiology”](#), Treviso, Italy
Organized jointly by Harvard School of Public Health and Karolinska Institutet.
Course attended:
[“Causal Inference”](#) by Prof. Andrea ROTNITZKY, Harvard School of Public Health
- 2010 FEB SAS Masterclass in Business Intelligence, Milan, Italy
Organized jointly by SAS and ACCENTURE.
Certification obtained:
SAS Certified Base Programmer for SAS 9
- 2009 AUG Visiting Student, Department of Mathematics, University of Barcelona
2009 FEB Course attended: Probability, Statistical inference.

SERVICE

CURRENT 2017 APR Member of the Steering committee for the [EURO-CIM](#)
CURRENT 2018 AUG Reviewer for the *Journal of the Royal Statistical Society- Series A, Statistics in Medicine, Computational Statistics and Data Analysis, NeurIPS, ICML*

LANGUAGES

ENGLISH: Fluent (C1/2).
ITALIAN: Mother tongue.
SPANISH: Basic knowledge (A2).
SWEDISH: Basic knowledge (A2).

COMPUTER SKILLS

Operative Systems

Advanced user of Linux, MacOS and Windows.

Programming Languages

Advanced: R, STATA and \LaTeX ,

Notions of: Python, SAS, Mathematica, SageMath and Matlab.

CHARACTER AND SKILLS

- Independent
- Cooperative
- Devoted
- Open-minded

OTHER INTERESTS

When I am not reading about statistics, I like to learn more about contemporary history. I also enjoy keeping myself active by playing sports and going to the gym. I especially enjoy running in the forest. It is my way of releasing stress and enjoy life. I love to play and listen to music, especially electronic music. During the past few years I started several electronic music projects that included production using [Ableton Live](#). Finally, together with my wife Alice, I have a dog named [Mister Pom Princess "PK" Cake](#), which keeps me happily busy.