Philip Thompson

Curriculum Vitae

Krannert School of Management, 403 W. State Street,
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Research Interests

○ **Robust high-dimensional statistics & statistical learning:**
tractable algorithms for outlier/heavy-tailed robust statistics and statistical learning

○ **Stochastic gradient descent & stochastic optimization:**
robustness, adaptation and variance-reduction in stochastic iterative methods

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Professional Experience

2020– **Assistant Professor**, Purdue University, Krannert School of Management

2019 **Research Associate**, University of Cambridge, Centre for Mathematical Sciences, Statistical Laboratory, under supervision of Prof. Richard Samworth

2017–2019 **Fond. Math. Jacques Hadamard Post-doc Fellow**, ENSAE & l'École Polytechnique, Laboratory of Statistics, under supervision of Prof. Arnak Dalalyan

2016–2017 **Post-doc Fellow**, Center for Mathematical Modelling - University of Chile, Optimization and Equilibrium group, under supervision of Prof. Alejandro Jofré

Education

2011–2015 **Ph.D. in Mathematics**, IMPA

○ 1 year visit at the Center for Mathematical Modelling (CMM)

○ Qualifying oral exams: Optimization and Probability

○ **Ph.D. Thesis:** "*Stochastic variational inequalities: convergence and complexity analysis,*" under supervision of Prof. Alfredo Iusem and Prof. Alejandro Jofré

2008–2010 **M.Sc. in Mathematics**, IMPA, under supervision of Prof. Marcelo Viana

2002–2007 **B.Sc. in Electronics Engineering**, ITA, São José dos Campos, Brazil

○ GPA: 84%, Class position: 5th out of 23 students, Exam admission rate: 1.58%, 131 out of 8287)

○ 1 year visit at the German Aerospace Center (DLR)

○ **B.Sc. Thesis:** "*Target separation in SAR image with the MUSIC algorithm,*" under supervision of Dr. Rolf Scheiber (DLR)

Publications

- A spectral least-squares-type method for heavy-tailed corrupted regression with unknown covariance & heterogeneous noise, **submitted** (with R.I. Oliveira and Z.F.-Rico), 2022
- Sample average approximation with heavier tails II: localization in stochastic convex optimization and persistence results for the Lasso, **accepted at Mathematical Programming** (with R.I. Oliveira), 2023
- Sample average approximation with heavier tails I: non-asymptotic bounds with weak assumptions and stochastic constraints, **Mathematical Programming**, 1-48, 2022 (with R.I. Oliveira)
- Outlier-robust sparse/low-rank least-squares regression and robust matrix completion, arXiv:2012.06750, **under revision**, 2021
- Stochastic line-search for stochastic approximation: adaptation to Lipschitz constant, **Stochastic Programming Society Newsletter**, 2021.
- Outlier-robust estimation of a sparse linear model using ℓ_1-penalized Huber's M-estimator, **NeurIPS 2019**, (with A. Dalalyan).
- Variance-based extragradient method with line search for stochastic variational inequalities, **SIAM Journal on Optimization**, 29 (1), 175-206, 2019 (with A. Iusem, A. Jofré and R.I. Oliveira), *Winner of the 2019 Dupaková-Prekopá Student Paper Prize.*
- Incremental constraint projection methods for monotone stochastic variational inequalities, **Mathematics of Operations Research**, 44 (1), 236-263, 2019 (with A. Iusem and A. Jofré).
- On variance reduction for stochastic smooth convex optimization with multiplicative noise, **Mathematical Programming**, 174, 253-292, 2019 (with A. Jofré).
- Restricted eigenvalue property for corrupted Gaussian designs, submitted, Submitted (with A. Dalalyan), 2018
- Extragradient method with variance reduction for stochastic variational inequalities, **SIAM Journal on Optimization**, 27 (2), 686-724, 2017 (with A. Iusem, A. Jofré and R.I. Oliveira).
- Estimador MUSIC: resolvendo um problema de Probabilidade com Álgebra Linear, 2009,**Matemática Universitária**.
- Target separation in SAR image with the MUSIC algorithm, **Proceedings of the IEEE International Geoscience and Remote Sensing Symposium**, 2007, (with M. Nannini and R. Sheiber).

Referee service

- Applied Intelligence
- Annals of Statistics
- COLT (Proceedings Conference on Learning Theory)
- Computational Optimization and Applications
- Electronics Journal of Statistics
- Journal of Machine Learning Research

- ○ Journal of the American Statistical Association
- ○ Journal of Optimization Theory and Applications
- ○ Journal of the Royal Statistical Society - Series B
- ○ Management Science
- ○ Mathematical Programming
- ○ Numerical Algorithms
- ○ Operations Research
- ○ Optimization Methods & Software
- ○ Set-valued and Variational Analysis
- ○ SIAM Journal on Optimization
- ○ Statistical Papers

Honors & Awards

2019 Winner of the 2019 Dupaková-Prekopá Student Paper Prize

2019 Research Associate position at University of Cambridge (hosted by PI with a EPSRC grant)

2017 Fondation Mathématique Jacques Hadamard Postdoctoral Fellowship laureation (international competition with 3 placements in the area of mathematics of information)

2010 Warwick Postgraduate Research Scholarship (respectfully declined), University of Warwick - UK

2010 CAPES-Fulbright PhD scholarship (respectfully declined)

2007 Honors Mention in Mathematics (ITA)

2006 Research scholarship (for the best 3 students of ITA's Electronic Engineer class of 2006), German Aerospace Center

Grants

2020-2022 Yearly grant from Krannert School of Management, Purdue University

2020-2025 Start-up grant of approx. U$8.000, 00 from Krannert School of Management, Purdue University

2019 Travel Grant from University of Cambridge, NeurIPS 2019, Vancouver, Canada

2019 Travel Grant from Universit at Wien, Department of Statistics and Operations Research Seminar, Vienna, Austria

2019 Travel Grant from IMPA, XIII Brazilian Workshop on Continuous Optimization, Rio de Janeiro, Brazil

2019 Travel grant from ICERM-Brown University: Workshop on Optimization Methods for Computer Vision and Image Processing 2019, Providence, USA

2019 Travel grant from Purdue University, Krannert School of Management, Quantitative Methods Seminar

2019   Travel grant from London School of Economics, Department of Mathematics Seminar

2018   Travel grant from CREST: 11th International Conference of the ERCIM WG on Computational and Methodological Statistics, Pisa, Italy

2018   Travel grant from CREST: International Congress of Mathematicians (ICM) 2018 and XXII Brazilian School of Probability (EBP), Rio de Janeiro, Brazil

2018   Travel grant from CREST: International Symposium on Mathematical Programming (ISMP) 2018, Bordeaux, France

2017   Travel grant from CRM-IMPA: 1st CRM-IMPA Joint Workshop (Satellite Meeting of the Mathematical Congress of the Americas), Centre de Recherches Mathématiques, Montréal, Canada

2017   Travel grant from CMM: SIAM Conference on Optimization, Vancouver, Canada

2017   Travel grant from SAMSI: SAMSI Workshop on the Interface between Statistics and Optimization (WISO), Duke University, Durham, USA

2017   Research visiting grant from IMPA: February, IMPA, Rio de Janeiro, Brazil

2016   Research visiting grant from IMPA: May-June, IMPA, Rio de Janeiro, Brazil

2016   Travel grant from IMPA: Workshop on Analysis and Applications of Stochastic Systems, Rio de Janeiro, Brazil

2016   Research visiting grant from IMPA: Jan-Feb, IMPA, Rio de Janeiro, Brazil

2016   Travel grant from IPAM-UCLA: IPAM-UCLA Workshop on Optimization and Equilibrium in Energy Economics, Los Angeles, USA

2014   Travel grant from CIME-EMS: CIME-EMS Summer School, Cetraro, Italy, European Mathematical Society

2008   Travel grant from CNPq: Second Symposium in Scattering and Spectral Theory, Serrambi, Brazil

Presentations

2022   Center for Mathematical Modelling (by invitation) - Uni. de Chile - Santiago - Chile

2022   Dept. Applied Mathematics and Statistics Seminar (by invitation) - Johns Hopkins University - Baltimore - USA

2022   INFORMS Annual Meeting, Session "Robustness in AI and Optimization" - Indianapolis - USA

2022   ICCOPT (by invitation) - Lehigh University - USA

2022   IMPA Seminar - IMPA - Brazil

2022   Statistics Seminar (by invitation) - Bristol University - UK

2022   Workshop "Robustness and Resilience in Stochastic Optimization and Statistical Learning: Mathematical Foundations" (by invitation) - Erice - Italy

2021   Purdue Probability Seminar (by invitation) - West Lafayette - USA

2021   SIAM optimization conference (by invitation) - Spokane - USA

2021   BIRS Workshop: Optimization under Uncertainty: Learning and Decision Making (Online) (by invitation) - Banff - Canada

2020   Guang Cheng's research group Statistics Seminar (by invitation) - Purdue University - West Lafayette - USA

2019   NeurIPS 2019 - Vancouver - Canada

2019   Universität Wien, Department of Statistics and Operations Research (by invitation) - Vienna - Austria

2019   XIII Brazilian Workshop on Continuous Optimization (by invitation) - Rio de Janeiro - Brazil

2019   Statmathappli 2019 - Fréjus - France

2019   XV International Conference on Stochastic Programming (by invitation) - Trondheim - Norway (Winner of the Dupaková-Prekopá Student Paper Prize)

2019   Purdue University, Krannert School of Management - Quantitative Methods Seminar (by invitation) - West Lafayette - USA

2019   London School of Economics, Department of Mathematics Seminar (by invitation) - London - UK

2018   11th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMStatistics) (by invitation) - Pisa - Italy. Organizers: Guillaume Lecué, Matthieu Lerasle, Adrien Saumard

2018   PGMO Days - Paris, Saclay - France

2018   International Workshop Machine Learning and AI - Télecom ParisTech - Paris - France

2018   XXII Brazilian School of Probability (EBP) - Rio de Janeiro - Brazil

2018   International Symposium on Mathematical Programming (ISMP) (by invitation) - Bourdeaux - France. Chair: Jorge Nocedal (Northwestern). Some co-spearkers: Léon Bottou, Frank Curtis, Jorge Nocedal, Uday Shanbhag, R. Bollapragada

2018   CREST-CMAP ENSAE-École Polytechnique Statistics Seminar (by invitation) - Paris, Saclay - France. Organizers: Alexandre Tsybakov, Cristina Butucea, Éric Moulines and Mathieu Rosenbaum

2017   PGMO Days - Paris, Saclay - France

2017   31th Colóquio Brasileiro de Matemática (by invitation) - Rio de Janeiro - Brazil

2017   SIAM Conference on Optimization - Vancouver - Canada

2017   Optimization and Equilibrium, Two-days Workshop (by invitation) - Concepción - Chile

2017   Workshop on Variational and Stochastic Analysis (by invitation) - Santiago - Chile

2017   Workshop on the Interface of Statistics and Optimization (WISO), Poster - Durham - USA

2016   XX Brazilian School of Probability - São Carlos - Brazil

2016   International Conference on Stochastic Programming (ICSP) - Búzios - Brazil

2016	Workshop on Analysis and Applications of Stochastic Systems (by invitation) - Rio de Janeiro - Brazil
2015	Universidade Federal de São Paulo: Applied Mathematics Seminar - São José dos Campos - Brazil
2015	Center for Mathematical Modelling: Optimization Seminar - Santiago - Chile
2015	University of Southampton: CORMSIS Seminar - Southampton - UK
2015	International Symposium on Mathematical Programming (ISMP) - Pittsburgh - USA
2015	Instituto Nacional de Matemática Pura e Aplicada (IMPA): Optimization Seminar - Rio de Janeiro - Brazil
2014	Instituto Nacional de Matemática Pura e Aplicada (IMPA): Optimization Seminar - Rio de Janeiro - Brazil
2007	IEEE International Geoscience and Remote Sensing Symposium - Barcelona - Spain
2006	German Aerospace Center (DLR), Institut für Hochfrequenztechnik und Radarsysteme - Oberpfaffenhofen - Germany

Service in Purdue

- ○ Spring 2023 Co-chair of Workshop "Statistics and Optimization in Data Science @ Krannert"
- ○ Fall 2022 Member of PhD Thesis defense
- ○ Fall 2022 Proposals Reviewer - Krannert School Doctoral Fellowship Awards for Excellence
- ○ Fall 2022 Seminar Chair
  Invited the speakers: Wei Sun (Purdue), Paul Valiant (Purdue), Ilias Diakonikolas (Wisconsin-Madison), Yichen Zhang (Purdue), Yining Wang (Uni. Texas at Dallas), Mateo Diaz (Caltech), Ben Grimmer (Johns-Hopkins), Avetik Karagulyan (KAUST), George Lan (Georgia Tech), Steve Hanneke (Purdue), Dmitriy Drusvyatskiy (Uni. Washington), Uday Shanbhag (PennState).
- ○ Spring 2022 Member of PhD Thesis qualifying exam
- ○ Member of the PhD admission Committee: 2021
- ○ Fall 2021 Seminar Chair
  Invited the speakers: Stanislav Minsker (USC), Po-Ling Loh (Uni. of Cambridge), Francesco Orabona (Boston Uni.), Gabor Lugosi (Pompeu Fabra), Nathan Kallus (Cornell), Mert Gürbüzbalaban (Rutgers), Frank E. Curtis (Lehigh Uni.), Roberto I. Oliveira (IMPA)
- ○ Member of the Hiring Committee: 2022
- ○ Fall 2021 Member of PhD Thesis qualifying exam
- ○ Member of the PhD admission Committee: 2021
- ○ Quantitative Methods Digital marketing and seminar website: 2021-2022

Conference Participation

2021	Computational Complexity of Statistical Inference Boot Camp - Simon Institute for the Theory of Computing - Berkeley - USA
2019	Estimation of entropies and other functionals: Statistics meets information theory - Cambridge - UK
2018	Meeting in Mathematical Statistics 2018 - Fréjus - France

2018   Horizon Math: Intelligence Artificielle - Paris - France

2018   9ème Séminaire Itzykson "Computational and information-theoretic phase transitions in large-scale inference problems" by L. Massoulié, L. Zdeborova and A. Montanari - Paris - France

2018   Journée AFIA-SFdS @ IHP - Paris - France

2018   International Congress of Mathematicians (ICM) - Rio de Janeiro - Brazil

2018   CRITEO Machine Learning in the Real World - Paris - France

2018   LPSM Kick-off Conference - Paris - France

2018   Workshop on Statistical Inference in Energy Markets - Institut Henri Poincaré - Paris - France

2018   Statistics/Learning at Paris-Saclay (3rd Edition) at IHES - Bures-sur-Yvette - France

2017   Journée francilienne d'accueil des Post-Doctorants at IHES - Bures-sur-Yvette - France

2017   XXI Brazilian School of Probability - Rio de Janeiro - Brazil

2017   1st CRM-IMPA Joint Workshop: Challenges at the interface of optimization and stochastic processes (Satellite Meeting of the Mathematical Congress of the Americas) - Montréal - Canada

2017   School and Workshop Equilibria in Games: existence, selection and dynamics, Center for Mathematical Modeling, Uni. Chile - Santiago - Chile

2016   XVIII CLAIO: Latin-Iberoamerican Conference on Operations Research, PUC - Santiago - Chile

2016   Workshop on Analysis and Applications of Stochastic Systems, IMPA - Rio de Janeiro - Brazil

2016   Coloquio Optimización A mediodía de Optimización y análisis variacional, Center for Mathematical Modeling - Santiago - Chile

2016   Coloquio Optimización A mediodía de Optimización y análisis variacional, Center for Mathematical Modeling - Santiago - Chile. Speakers: D. Bertsekas, A. Dontchev and R.T. Rockafellar

2016   Workshop on Optimization and Equilibrium in Energy Economics (IPAM-UCLA) - Los Angeles - USA

2014   High Dimensional Phenomena in Probability, Statistics and Signal Processing, IMPA - Rio de Janeiro - Brazil. Speakers: A. Bandeira, A. Belloni, R. I. Oliveira, H. Rauhut, E. Richard and J. Tropp

2014   Optimization meets General Equilibrium theory, dynamic contract and finance, CMM - Santiago - Chile

2014   Centralized and Distributed Multi-agent Optimization: Models and Algorithms, Centro Internazionale Matematico Estivo/European Mathematical Society Summer School - Cetraro - Italy. Organizers: F. Facchinei and J-S. Pang

2014   International Symposium in Generalized Convexity and Monotonicity, IMPA - Rio de Janeiro - Brazil

2014	2nd International Conference on Variational Analysis and Optimization, CMM - Santiago - Chile
2013	XI International Seminar on Optimization and Related Areas - Lima - Peru
2012	IX Brazilian Workshop on Continuous Optimization - Luiz Correa - Brazil
2012	International Symposium on Mathematical Programming - Berlin - Germany
2012	International Conference on Frontiers of Mathematics - Rio de Janeiro - Brazil
2009	27th Colóquio Brasileiro de Matemática - Rio de Janeiro - Brazil
2009	Conferência em Homenagem ao Prof. Elon Lima em ocasião aos seus 80 anos - Rio de Janeiro - Brazil
2009	Encontro Matemática Brasil-Franca - Rio de Janeiro - Brazil
2009	Conferência em Homenagem ao Prof. Elon Lima em ocasião aos seus 80 anos - Rio de Janeiro - Brazil
2008	Second Symposium on Scattering and Spectral Theory - Recife - Brazil
2008	AMS - SBM First Joint Meeting - Rio de Janeiro - Brazil
2007	26th Colóquio Brasileiro de Matemática - Rio de Janeiro - Brazil

Teaching Experience

Fall 2022	**Assistant Professor**, MGMT 69900 - Research PhD thesis (PhD level), Purdue University, Krannert School of Management, West Lafayette, USA
Fall 2022	**Assistant Professor**, MGMT 30500 - Business Statistics (undergraduate level), Purdue University, Krannert School of Management, West Lafayette, USA
Spring 2022	**Assistant Professor**, MGMT 69000 - Stochastic Iterative Algorithms (PhD level), Purdue University, Krannert School of Management, West Lafayette, USA
Spring 2022	**Assistant Professor**, MGMT 30500 - Business Statistics (undergraduate level), Purdue University, Krannert School of Management, West Lafayette, USA
Summer 2021	**Assistant Professor**, MGMT 5900 - High-Dimensional Data Analysis (masters level), Purdue University, Krannert School of Management, West Lafayette, USA
Summer 2021	**Assistant Professor**, MGMT 5900 - High-Dimensional Data Analysis (masters level), Purdue University, Krannert School of Management, West Lafayette, USA
Spring 2021	**Assistant Professor**, MGMT 30500 - Business Statistics (undergraduate level), Purdue University, Krannert School of Management, West Lafayette, USA
Fall 2020	**Assistant Professor**, MGMT 69900 - Research PhD thesis (PhD level), Purdue University, Krannert School of Management, West Lafayette, USA
Summer 2020	**Assistant Professor**, MGMT 69900 - Research PhD thesis (PhD level), Purdue University, Krannert School of Management, West Lafayette, USA
Spring 2020	**Assistant Professor**, MGMT 30500 - Business Statistics (undergraduate level), Purdue University, Krannert School of Management, West Lafayette, USA

Spring 2020	**Assistant Professor**, MGMT 59000 - PhD Seminar: High-dimensional Statistics and Stochastic Optimization (PhD level), Purdue University, Krannert School of Management, West Lafayette, USA
2018	**Fond. Math. Jacques Hadamard Post-doc Fellow**, PhD Seminar, ENSAE, Laboratory of Statistics, Palaiseau, Paris Area, France
2016	**Post-doc Fellow**, Optimization Methods, Center for Mathematical Modelling, IMPA, Rio de Janeiro, Brazil
2014	**PhD Student TA**, Statistical Methods, IMPA, Rio de Janeiro, Brazil
2014	**PhD Student TA**, Computational Methods in Optimization, IMPA, Rio de Janeiro, Brazil

Course Project

o **MGMT 38900 - Using R for Business Analytics**
Designing a new course for the undergraduate Business Analytics and Information Management program in Krannert. The main objective of the course will be to introduce the students to the R language with hands-on business projects using analytics/machine learning techniques.

o **MGMT 59000 - Multivariate Analysis for Business**
Designing a new course for the Business Analytics and Information Management program in Krannert's masters program. This course will complement the Data Mining, Machine Learning and Predictive Analytics courses of the BAIM program with additional celebrated methods and algorithms used in machine learning and statistics for the analysis of large data sets.

o **MGMT 69000 - Stochastic iterative methods**
Designing a full semester PhD course on stochastic gradient descent and its variants. This will include personal lecture notes and bibliography survey. Motivated students will be encouraged and suggested open questions oriented towards possible publications.

Complementary education

2015	Mini-course: Introduction to Asymptotic Geometric Analysis, Lecturer: C. Hugo Jimenez, IMPA
2014	Centralized and Distributed Multi-agent Optimization: Models and Algorithms, CIME-EMS Summer School in applied mathematics. Speakers: Zhi-Quan Luo, Angelia Nédic, J.-S. Pang and G. Scutari
2014	Mini-course: Randomness, Matrices and High Dimensional Problems, Lecturers: A.Bandeira and R. Oliveira, 10th Regional Meeting on Probability and Mathematical Statistics, IMPA
2014	Mini-course: High-dimensional estimation: Econometric models, Lecturer: A. Belloni, 10th Regional Meeting on Probability and Mathematical Statistics, IMPA
2014	Mini-course: Concentration inequalities with applications, Lecturer: G. Lugosi, 10th Regional Meeting on Probability and Mathematical Statistics, IMPA

Languages

- **English:** Fluent
- **Portuguese:** Native
- **Spanish:** Professional Level
- **French:** A1/A2

Computing skills

- **R**: fair
- **Python**: fair
- **Latex**: fair
- **Excel**: basic
- **Minitab**: basic