

# Gabriel Wallin, PhD

Email: [g.wallin@lancaster.ac.uk](mailto:g.wallin@lancaster.ac.uk)

<https://www.lancaster.ac.uk/math/people/gabriel-wallin>

Personal website: <http://gabrielwallin.github.io>

LinkedIn: [linkedin.com/in/gabrielwallin/](https://www.linkedin.com/in/gabrielwallin/)

School of Mathematical Sciences

Lancaster University, UK



## ACADEMIC POSITIONS

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### **Lancaster University**

Lecturer (Assistant Professor), School of Mathematical Sciences.

Lancaster, UK

2023–Current

### **The London School of Economics and Political Science**

Postdoctoral researcher and Visiting Teacher, Department of Statistics.

London, UK

2021–2024

### **Université Côte d’Azur & Inria**

Postdoctoral Researcher, Department of Mathematics.

Nice, France

2020–2021

## EDUCATION

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### **Umeå University**

Ph.D. in Statistics. Thesis: Extensions of the kernel method of test score equating.

Umeå, Sweden

2015–2020

### **The London School of Economics and Political Science**

Visiting Research Student in Statistics.

London, UK

2019

### **Umeå University**

M.Sc. in Statistics.

Umeå, Sweden

2014–2015

### **Umeå University**

B.Sc. in Statistics

Umeå, Sweden

2011–2014

## RESEARCH INTERESTS

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### • **Latent Variable Modeling**

Item response theory, exploratory factor analysis, latent class analysis.

### • **Statistical machine learning algorithms in psychometrics**

Proximal algorithms, gradient-based algorithms, statistical learning with sparsity.

### • **Assessment development and analysis**

Test score equating, differential item functioning, outlier detection, causal modeling in education.

## PUBLICATIONS IN PEER-REVIEWED JOURNALS

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1. **Wallin, G.** & Wiberg, M. (2024). Smoothing of bivariate test score distributions - Model selection targeting test score equating. Accepted for publication in Journal of Educational and Behavioral Statistics.

2. **Wallin, G.**, Chen, Y., Moustaki, I. (2024). DIF Analysis with Unknown Groups and Anchor Items. *Psychometrika*, 89(1), 267-295.
3. **Wallin, G.** & Wiberg, M. (2023). Model Misspecification and Robustness of Observed-Score Test Equating Using Propensity Scores. *Journal of Educational and Behavioral Statistics*, 48(5), 603-635.
4. Liu, X., **Wallin, G.**, Chen, Y., Moustaki, I. (2023). Rotation to Sparse Loadings using  $L^p$  Losses and Related Inference Problems. *Psychometrika*, 88(2), 527-553.
5. **Wallin, G.** & Wiberg, M. (2021). How Important is the Choice of Bandwidth in Kernel Equating? *Applied Psychological Measurement*, 45, 518-535.
6. Altıntaş, Ö. & **Wallin, G.** (2021). Equality of Admission Tests Using Kernel Equating Under the Non-Equivalent Groups With Covariates Design. (2021). *International Journal of Assessment Tools in Education*, 8, 729-743.
7. **Wallin, G.** & Wiberg, M. (2019). Kernel Equating Using Propensity Scores for Nonequivalent Groups. *Journal of Educational and Behavioral Statistics*, 44, 390-414.

## PEER-REVIEWED BOOK CHAPTERS

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1. González, J. & **Wallin, G.** (2021). An Illustration on the Quantile-Based Calculation of the Standard Error of Equating in Kernel Equating. In Wiberg, M., Molenaar, D., González, J., Böckenholt, U. & Kim, J-S. (Eds.) (2021). *Quantitative Psychology: The 85th Annual Meeting of the Psychometric Society, virtual, 2021*. New York: Springer.
2. **Wallin, G.** & Wiberg, M. (2021). Equating Nonequivalent Groups using Propensity Scores – Model Misspecification and Sensitivity Analysis. In Wiberg, M., Molenaar, D., González, J., Böckenholt, U. & Kim, J-S. (Eds.) (2021). *Quantitative Psychology: The 85th Annual Meeting of the Psychometric Society, virtual, 2021*. New York: Springer.
3. **Wallin, G.** (2020). Extensions of the Kernel Method of Test Score Equating. Statistical Studies, 55. *PhD thesis*. URL: <https://umu.diva-portal.org/smash/get/diva2:1378833/FULLTEXT01.pdf>.
4. **Wallin, G.** & Wiberg, M. (2020). Model Selection for Presmoothing of Bivariate Score Distributions in Kernel Equating. In Wiberg, M., Molenaar, D., González, J., Böckenholt, U. & Kim, J-S. (Eds.) (2020). *Quantitative Psychology: The 84th Annual Meeting of the Psychometric Society, Santiago, Chile, 2019*. New York: Springer.
5. **Wallin, G.**, Häggström, J. & Wiberg, M. (2018). How to select the bandwidth in kernel equating - An evaluation of five different methods. In Wiberg, M., Culpepper, S., Janssen, R., González, J., & Molenaar, D. (Eds.) (2018). *Quantitative Psychology: The 82nd Annual Meeting of the Psychometric Society, Zurich, Switzerland, 2017*. New York: Springer.
6. **Wallin, G.** & Wiberg, M. (2017). Non-equivalent groups with covariates design using propensity scores for kernel equating. In L. A. van der Ark, M. Wiberg, S. A. Culpepper, J. A. Douglas, & W.-C Wang (Eds.) (2017), *Quantitative psychology – 81st annual meeting of the psychometric society, Asheville, North Carolina, 2016*. New York: Springer.

## BOOK REVIEWS

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1. **Wallin, G.** (2024). *Review of An Introduction to R and Python for Data Analysis: A Side-By-Side Approach* (by Taylor R. Brown). The American Statistician.

## GRANTS AND SCHOLARSHIPS

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- Research Award. Umeå School of Business, Economics and Statistics. 10,000 SEK 2022
- International Postdoc. Swedish Research Council. 3,150,000 SEK 2021
- Research Scholarship. Faculty of Social Science, Umeå University. 40,000 SEK 2019
- Research Scholarship. Kempe Foundation. 25,000 SEK 2018

- Research Scholarship. Umeå School of Business, Economics and Statistics. 40,000 SEK 2018
- Travel Grant. Wallenberg Foundation. 4,200 SEK 2018
- Travel Grant. Kempe Foundation. 5,000 SEK 2017
- Research Scholarship. The Student union at Umeå University. 8,500 SEK 2017
- Travel Grant. Wallenberg Foundation. 8,000 SEK 2017
- Travel Grant. Faculty of Social Sciences at Umeå University. 8,000 SEK 2016
- Research Scholarship. The Student union at Umeå University. 10,000 SEK 2016

## PROFESSIONAL ACTIVITIES

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- **Consulting Editor** 2024-  
*British Journal of Mathematical and Statistical Psychology.*
- **Website committee member** 2023-  
*Psychometric Society.*
- **Committee member** 2024-  
*Young Statisticians, Royal Statistical Society.*
- **Executive Committee member** 2024-  
*STOR-i Centre for Doctoral Training, Lancaster University.*
- **Responsible for the National Associates Scheme** 2024-  
*STOR-i, Lancaster University.*
- **Seminar Organiser** 2024-  
*STOR-i, Lancaster University.*
- **Department lead: North West Social Science Doctoral Training Partnership** 2024-  
*Lancaster University.*
- **Journal Reviewer**  
*Annals of Applied Statistics*  
*The American Statistician*  
*Psychometrika*  
*Computational Statistics and Data Analysis*  
*British Journal of Mathematical and Statistical Psychology*  
*Applied Psychological Measurement*  
*Behavior Research Methods*  
*TEST*  
*Educational and Psychological Measurement*  
*Discover Education*
- **Program Committee Member** 2024  
*International Meeting of the Psychometric Society (IMPS). Prague, Czech Republic.*
- **Student Mentor** 2024  
*International Meeting of the Psychometric Society (IMPS). Prague, Czech Republic.*
- **STEM Ambassador** 2024-  
*STEM Learning*
- **Reviewer** 2023  
*National Council on Measurement in Education, Annual Meeting. Chicago, United States.*
- **Local Organizing Committee Member** 2022  
*Institute of Mathematical Statistics (IMS), Annual Meeting. London, UK.*
- **Reviewer for PhD travel award** 2022  
*International Meeting of the Psychometric Society*

- **Member of the jury for best poster presentation** 2022  
*International Meeting of the Psychometric Society*
- **Conference Chair** 2020–2023  
*International Meeting of the Psychometric Society*  
*National Council on Measurement in Education*
- **Board Member** 2018–2020  
*Umeå School of Business, Economics and Statistics*  
*The Graduate Student Association at the Faculty of Social Sciences at Umeå University*
- **Committee member** 2018–2019  
*The Graduate Student Committee of the Psychometric Society*

## AWARDS AND NOMINATIONS

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- **Recipient of the Umeå School of Business, Economics and Statistics Research Award** 2022  
*Umeå University*
- **Recipient of the LSE Class Teacher Award** 2022  
*London School of Economics and Political Science*
- **Pedagogical Prize Nomination** 2017  
*Umeå School of Business, Economics and Statistics*

## CONFERENCE TALKS AND INVITED PRESENTATIONS

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**International Meeting of the Psychometric Society** Prague, Czech Republic  
Contributed talk: A Change-Point IRT Model with Application to Speededness Detection. 2024

**Data Science Seminar Series** Lancaster University, UK  
Invited talk: Rotation to Sparse Loadings using Lp Losses and Related Inference Problems. 2024

**Statistics Seminar Series** Lancaster University, UK  
Invited talk: DIF Analysis with Unknown Groups and Anchor Items. 2023

**International Meeting of the Psychometric Society** Maryland, USA  
Contributed talk: DIF Analysis with Unknown Groups and Anchor Items. 2023

**European Congress of Methodology**  
Contributed talk: Local Equating of Test Scores using Propensity Scores: A New Method for Non-Equivalent Test Groups With

**Nordstat conference** Gothenburg, Sweden  
Contributed talk: Rotation to Sparse Loadings using Lp Losses and Related Inference Problems. 2023

**Annual Meeting of the National Council on Measurement in Education** Chicago, USA  
Contributed talk: A General Item Response Theory Framework for Latent DIF Detection. 2023

**Social Statistics Research Seminar** London, LSE  
Invited talk: Fairness and Interpretability in Educational Testing and Psychological Surveys. 2022

**Computational Psychometrics Research Seminar** Prague, Czech Republic  
Invited talk: A Flexible IRT Framework For Latent DIF Detection. 2022

**International Meeting of the Psychometric Society** Bologna, Italy  
Contributed talk: On Multivariate Outlier Detection. 2022

<b>Cramér Society Research Seminar</b> Invited talk: Two-way outlier detection for item response data.	Sweden (Virtual) 2022
<b>Social Statistics Research Seminar</b> Invited talk: Test score equating of nonequivalent groups using propensity scores.	London, LSE 2022
<b>International Meeting of the Psychometric Society</b> Contributed talk: Simultaneous Clustering of Test-takers and Items for Item Response Data.	Virtual 2021
<b>Computational Psychometrics Research Seminar</b> Invited talk: Equating non-equivalent test groups using covariates.	Prague, Czech Republic (Virtual) 2021
<b>International Meeting of the Psychometric Society</b> Contributed talk: Equating non-equivalent groups using propensity scores.	Virtual 2020
<b>MAASAI Research Seminar</b> Invited talk: Comparability of nonequivalent test groups in large-scale assessments.	Nice, France 2020
<b>International Meeting of the Psychometric Society</b> Invited talk: Presmoothing method and model selection in kernel equating.	Santiago, Chile 2019
<b>Frontier Research in Educational Measurement</b> Contributed talk: Revisiting the Bahadur representation of sample quantiles for equating.	Oslo, Norway 2018
<b>International Meeting of the Psychometric Society</b> Contributed talk: Optimal bandwidth selection in kernel equating for different test types.	Zürich, Switzerland 2017
<b>Annual Meeting of the National Council on Measurement in Education</b> Contributed talk: Bandwidth selection in kernel equating.	San Antonio, the US 2017
<b>The Winter Conference in Statistics</b> Contributed talk: Selecting bandwidths in kernel equating with different tests and test distributions.	Åre, Sweden 2017
<b>International Meeting of the Psychometric Society</b> Contributed talk: Propensity scores in kernel equating for non-equivalent groups.	Asheville, the US 2016

## TEACHING

- **RSS volunteer as Lecturer and Course Responsible** at African Institute for Mathematical Sciences, Cameroon  
2024  
*Data mining and Unsupervised Learning.*
- **Guest Lecturer** at the London School of Economics  
2024  
*MSc-level course on quantitative methods at the Dept. of Sociology.*
- **Lecturer and Course Responsible** at Lancaster University  
2023-  
*MSc: Statistical Learning, Unsupervised Learning. BSc: Project Skills.*
- **Lecturer and Teaching Assistant** at The London School of Economics  
2021-2024  
*MY455/MY555: Multivariate Analysis and Measurement (Lecturer)*  
*ST201: Statistical Models and Data Analysis (TA)*  
*ST205: Sample Surveys and Experiments (TA)*  
*ST109: Elementary Statistical Theory I (TA)*
- **Lecturer and Course Responsible** at Umeå University  
2018  
*Sampling: Design and Analysis*
- **Lecturer** at Umeå University  
2017-2019

## *Probability and Statistical Inference*

- **Lecturer** at Umeå University 2017–2019  
*Basic Statistics*
- **Teaching Assistant** at Umeå University 2017  
*Statistics for Journalists*
- **Teaching Assistant** at Umeå University 2014–2017  
*Basic Statistics*

## SUPERVISION

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- **Project Supervisor, Lancaster University** 2024
- Title: Fantastic Cheats and Where to Find Them.  
Student: Joe Rutherford  
Hihly commended in the RSS Statistical Excellence Award for Early-Career Writing
- Title: Let the cat out of the bag.  
Student: Kristina Grolmusova
- **Academic Advisor, Lancaster University** 2023 –  
Advisor to around 15 MSc Data Science students per year.
- **Bachelor Thesis Supervisor, Umeå University** 2018  
Thesis topic: Kernel smoothing techniques with applications to educational testing.  
Students: Jonas Jonsson; Samuel Brändström
- **Master Thesis Supervisor, Umeå University** 2015 –2020  
Yearly quantitative advisor to business students writing their master's thesis.

## PEDAGOGICAL COURSES

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- **Teaching in higher education** at Umeå University  
*3 ECTS (2 weeks)*
- **Learning in higher education** at Umeå University  
*4.5 ECTS (3 weeks)*
- **Didactics for university teachers** at Umeå University  
*3 ECTS (2 weeks)*

## REFERENCES

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**Irini Moustaki**

London, UK

Professor of Statistics, London School of Economics and Political Science

**Yunxiao Chen**

London, UK

Assistant Professor of Statistics, London School of Economics and Political Science

**Marie Wiberg**

Umeå, Sweden

Professor of Statistics, Umeå University