

CURRICULUM VITAE

Michael Wolf

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EDUCATION

- 1991–1996 **Ph.D. in Statistics**, Stanford University, Stanford, U.S.A.
- 1991–1995 **Master of Science in Statistics**, Stanford University, Stanford, U.S.A.
- 1988–1991 **Vordiplom in Mathematics**, Augsburg University, Augsburg, Germany

EMPLOYMENT

- 2005–present **Full Professor**, Department of Economics,
University of Zurich, Zurich, Switzerland
- 2004–2005 **Associate Professor**, Department of Economics and Business,
Pompeu Fabra University, Barcelona, Spain
- 2001–2004 **Assistant Professor**, Department of Economics and Business,
Pompeu Fabra University, Barcelona, Spain
- 1998–2001 **Assistant Professor**, Department of Statistics and Econometrics,
Carlos III University of Madrid, Madrid, Spain
- 1996–1998 **Adjunct Assistant Professor**, Department of Statistics,
University of California, Los Angeles, U.S.A.

EDITORIAL BOARDS

- 2014–2016 Associate Editor for *Statistics & Probability Letters*
- 2004–2007 Associate Editor for *The Annals of Statistics*

ACADEMIC AWARDS AND HONORS

- 2019 Keynote speaker: 4th Vienna Workshop on High-Dimensional Time Series in Macroeconomics and Finance, Vienna, Austria
- 2018 Keynote speaker: High-dimensional Statistics and Random Structures, Barcelona, Spain
- 2017 Keynote speaker: Third International Workshop in Financial Econometrics, Arraial d’Ajuda, Brazil
- 2013 • Keynote speaker: First International Workshop in Financial Econometrics, Natal, Brazil
• Keynote speaker: 2nd Rimini Time Series Workshop, Rimini, Italy
- 2012 Keynote speaker: 23rd (EC)² Conference, Maastricht, Holland
- 2008 Gumbel Lecture, Cologne, Germany
- 2003–2007 *Distinci de la Generalitat per a la Promoci de la Recerca Universitri*
Distinction and Research Grant of the Government of Catalonia
- 1991 Fulbright Travel Grant

BOOKS

1. Politis, D.N., Romano, J.P., and Wolf, M. (1999). *Subsampling*. Springer, New York.

PUBLICATIONS

1. Ledoit, O. and Wolf, M. Analytical nonlinear shrinkage of large-dimensional covariance matrices. *Annals of Statistics*, forthcoming.
2. De Nard, G., Ledoit, O., and Wolf, M. Factor models for portfolio selection in large dimensions: The good, the better and the ugly. *Journal of Financial Econometrics*, forthcoming.
3. Ledoit, O., Wolf, M., and Zhao, Z. (2019). Efficient sorting: A more powerful test for cross-sectional anomalies. *Journal of Financial Econometrics*, 17:645–686.
4. Engle, R.F., Ledoit, O., and Wolf, M. (2019). Large dynamic covariance matrices. *Journal of Business & Economic Statistics*, 37:363–375.
5. DiCiccio, C.J., Romano, J.P., and Wolf, M. (2019). Improving weighted least squares inference. *Econometrics and Statistics*, 10:96–119.

6. Romano, J.P. and Wolf, M. (2018). Multiple testing of one-sided hypotheses: Combining Bonferroni and the bootstrap. In Kreinovich, V., Sriboonchitta, S., and Chakpitak N., editors, *Predictive Econometrics and Big Data*, pages 78–94. Springer International Publishing.
7. Bruder, S. and Wolf, M. (2018). Balanced bootstrap joint confidence bands for structural impulse response functions. *Journal of Time Series Analysis*, 39:641–664.
8. Ledoit, O. and Wolf, M. (2018). Optimal estimation of a large-dimensional covariance matrix under Stein’s loss. *Bernoulli*, 24:3791–3832.
9. Ledoit, O. and Wolf, M. (2017). Nonlinear shrinkage of the covariance matrix for portfolio selection: Markowitz meets Goldilocks. *Review of Financial Studies*, 30:4349–4388.
10. Ledoit, O. and Wolf, M. (2017). Numerical implementation of the QuEST function. *Computational Statistics & Data Analysis*, 115: 199–223.
11. Sterchi, M. and Wolf, M. (2017). Weighted least squares and adaptive least squares: Further empirical evidence. In Kreinovich, V., Sriboonchitta, S., and Huynh, V.-N., editors, *Robustness in Econometrics*, pages 135–167. Springer International Publishing.
12. Romano, J.P. and Wolf, M. (2017). Resurrecting weighted least squares. *Journal of Econometrics*, 197:1–19.
13. Romano, J.P. and Wolf, M. (2016). Efficient computation of adjusted p -values for resampling-based stepdown multiple testing. *Statistics & Probability Letters*, 113:38–40.
14. Ledoit, O. and Wolf, M. (2015). Spectrum estimation: a unified framework for covariance matrix estimation and PCA in large dimensions. *Journal of Multivariate Analysis*, 139:360–384.
15. Wolf, M. and Wunderli, D. (2015). Bootstrap joint prediction regions. *Journal of Time Series Analysis*, 36:352–376.
16. Bell, D.R., Ledoit, O., and Wolf, M. (2014). A new portfolio formation approach to mispricing of marketing performance indicators: an application to customer satisfaction. *Customer Needs and Solutions*, 1:263–276.
17. Romano, J.P., Shaikh, A.M., and Wolf, M. (2014). A practical two-step method for testing moment inequalities. *Econometrica*, 82:1979–2002.
18. Romano, J.P. and Wolf, M. (2013). Testing for monotonicity in expected asset returns. *Journal of Empirical Finance*, 23:93–116.
19. Wolf, M. (2013). Subsampling tests of parameter hypotheses and overidentifying restrictions with possible failure of identification. *International Journal of Approximate Reasoning*, 54:769–792.
20. Ledoit, O. and Wolf, M. (2012). Nonlinear shrinkage estimation of large-dimensional covariance matrices. *Annals of Statistics*, 40:1024–1060.

21. Wolf, M. and Wunderli, D. (2011). Fund-of-funds construction by statistical multiple testing methods. In Scherer, B. and Winston, K., editors, *The Oxford Handbook of Quantitative Asset Management*, pages 116–135. Oxford University Press, Oxford.
22. Ledoit, O. and Wolf, M. (2011). Robust performance hypothesis testing with the variance. *Wilmott Magazine* September, 86–89.
23. Romano, J.P., Shaikh, A.M., and Wolf, M. (2011). Consonance and the closure method in multiple testing. *International Journal of Biostatistics* 7, Issue 1, Article 12.
24. Romano, J.P. and Wolf, M. (2010). Balanced control of generalized error rates. *Annals of Statistics*, 38:598–633.
25. Romano, J.P., Shaikh, A.M., and Wolf, M. (2010). Multiple testing. *The New Palgrave Dictionary of Economics*, Online Edition. Edited by S.N. Durlauf and L.E. Blume. Palgrave Macmillan, 2010.
26. Romano, J.P., Shaikh, A.M., and Wolf, M. (2010). Hypothesis testing in econometrics. *Annual Review of Economics*, 2:75–104.
27. Bittman, R.M., Romano, J.P., Vallarino, C., and Wolf, M. (2009). Optimal testing of multiple hypotheses with common effect direction. *Biometrika*, 96:399–410.
28. Romano, J.P., Shaikh, A.M., and Wolf, M. (2008). Control of the false discovery rate under dependence using the bootstrap and subsampling. (Invited paper with discussion.) *TEST*, 17:417–442.
29. Ledoit, O. and Wolf, M. (2008). Robust performance hypothesis testing with the Sharpe ratio. *Journal of Empirical Finance*, 15:850–859.
30. Romano, J.P., Shaikh, A.M., and Wolf, M. (2008). Formalized data snooping based on generalized error rates. *Econometric Theory*, 24:404–447.
31. Afshartous, D. and Wolf, M. (2007). Avoiding data snooping in multilevel and mixed effects models. *Journal of the Royal Statistical Society, Series A*, 170:1035–1059.
32. Romano, J.P. and Wolf, M. (2007). Control of generalized error rates in multiple testing. *Annals of Statistics*, 35:1378–1408.
33. Wolf, M. (2007). Resampling vs. shrinkage for benchmarked managers. *Wilmott Magazine* Volume 1, 76–81.
34. Romano, J.P. and Wolf, M. (2006). Improved nonparametric confidence intervals in time series regressions. *Journal of Nonparametric Statistics*, 18:199–214.
35. Romano, J.P. and Wolf, M. (2005). Stepwise multiple testing as formalized data snooping. *Econometrica*, 73:1237–1282.
36. Gonzalo, J. and Wolf, M. (2005). Subsampling inference in threshold autoregressive models. *Journal of Econometrics*, 127:201–224.

37. Romano, J.P. and Wolf, M. (2005). Exact and approximate stepdown methods for multiple hypothesis testing. *Journal of the American Statistical Association*, 100:94–108.
38. Ledoit, O. and Wolf M. (2004). Honey, I shrunk the sample covariance matrix. *Journal of Portfolio Management*, 30(4):110–119.
39. Politis, D.N., Romano, J.P., and Wolf M. (2004). Inference for autocorrelations in the possible presence of a unit root. *Journal of Time Series Analysis*, 25:251–263.
40. Kokoszka, P. and Wolf, M. (2004). Subsampling the mean of heavy-tailed dependent observations. *Journal of Time Series Analysis*, 25:217–234.
41. Ledoit, O. and Wolf M. (2004). A well-conditioned estimator for large-dimensional covariance matrices. *Journal of Multivariate Analysis*, 88:365–411. (Editor’s Choice)
42. Ledoit, O. and Wolf, M. (2003). Improved estimation of the covariance matrix of stock returns with an application to portfolio selection. *Journal of Empirical Finance*, 10:603–621.
43. Ledoit, O., Santa-Clara, P., and Wolf, M. (2003). Flexible multivariate GARCH modeling with an application to international stock markets. *Review of Economics and Statistics*, 85:735–747.
44. Ledoit, O. and Wolf, M. (2002). Some hypothesis tests for the covariance matrix when the dimension is large compared to the sample size. *Annals of Statistics*, 30:1081–1102.
45. Romano, J.P. and Wolf, M. (2002). Explicit nonparametric confidence intervals for the variance with guaranteed coverage. *Communications in Statistics – Theory and Methods* 31:1231–1250.
46. Romano, J.P. and Wolf, M. (2001). Subsampling intervals in autoregressive models with linear time trend. *Econometrica*, 69:1283–1314.
47. Politis, D.N., Romano, J.P., and Wolf, M. (2001). On the asymptotic theory of subsampling. *Statistica Sinica*, 11:1105–1124.
48. Delgado, M., Rodriguez-Poo, J., and Wolf, M. (2001). Subsampling inference in cube root asymptotics with an application to Manski’s maximum score estimator. *Economics Letters*, 73:241–250.
49. Politis, D.N., Romano, J.P., and Wolf, M. (2000). Subsampling, symmetrization, and robust interpolation. *Communications in Statistics – Theory and Methods* 29:1741–1758.
50. Romano, J.P. and Wolf, M. (2000). Finite-sample nonparametric inference and large-sample efficiency. *Annals of Statistics* 28:756–778.
51. Romano, J.P. and Wolf, M. (2000). A more general Central Limit Theorem for m -dependent random variables with unbounded m . *Statistics and Probability Letters*, 47:115–124.

52. Wolf, M. (2000). Stock returns and dividend yields revisited: A new way to look at an old problem. *Journal of Business and Economic Statistics*, 18:18–30.
53. Romano, J.P. and Wolf, M. (1999). Inference for the mean in the heavy-tailed case. *Metrika*, 50:55–69.
54. Politis, D.N., Romano, J.P., and Wolf, M. (1999). Weak convergence of dependent empirical measures with application to subsampling and confidence bands. *Journal of Statistical Planning and Inference*, 79:179–191.
55. Politis, D.N., Romano, J.P., and Wolf, M. (1997). Subsampling for heteroskedastic time series. *Journal of Econometrics*, 81:281–317.

AD HOC REVIEWING (Selective List)

- American Economic Review
- Annals of Applied Probability
- Annals of Applied Statistics
- Annals of Statistics
- Annals of the Institute of Statistical Mathematics
- Bernoulli
- Biometrika
- Computational Statistics & Data Analysis
- Econometric Reviews
- Econometrica
- Econometrics Journal
- European Journal of Finance
- Management Science
- Journal of the American Statistical Association
- Journal of Applied Econometrics
- Journal of Banking and Finance
- Journal of Business and Economic Statistics
- Journal of Econometrics
- Journal of Empirical Finance
- Journal of Machine Learning
- Journal of Multivariate Analysis
- Journal of Nonparametric Statistics
- Journal of Risk
- Journal of Statistical Planning and Inference
- Journal of Time Series Analysis
- Oxford Bulletin of Economics and Statistics
- Review of Economics and Statistics

- Review of Economic Studies
- Review of Financial Studies
- SIAM Journal on Matrix Analysis and Applications
- Statistica Sinica
- Statistical Science
- Statistics & Probability Letters
- Scandinavian Journal of Statistics
- Science
- TEST

CONFERENCE PRESENTATIONS

- 4th Vienna Workshop on High-Dimensional Time Series in Macroeconomics and Finance, Vienna, Austria (2019); [Keynote Speaker](#)
- 29th (EC)² Conference on Big Data Econometrics with Applications, Rome, Italy (2018)
- High Voltage Econometrics, Palermo, Italy (2018)
- High-dimensional Statistics and Random Structures, Barcelona, Spain (2018); [Keynote Speaker](#)
- Big Data in Financial Markets, Cambridge, U.K. (2018)
- ECONVN2018: The First International Econometric Conference of Vietnam, Ho Chi Minh City, Vietnam (2018)
- The 11th Conference of Thailand Econometric Society, Chiang Mai, Thailand (2018)
- New Developments in Econometrics and Time Series, Rome, Italy (2107)
- Third International Workshop in Financial Econometrics, Arraial d’Ajuda, Brazil (2017); [Keynote Speaker](#)
- Trends in Econometrics: Big Data, Machine Learning and Financial Econometrics, Rio de Janeiro, Brazil (2017)
- CRETE 2017: The 16th Conference on Research on Economic Theory and Econometrics, Milos, Greece (2017)
- 10th International Conference on Multiple Comparison Procedures, Riverside, U.S.A. (2017)
- 3rd Vienna Workshop on High-Dimensional Time Series in Macroeconomics and Finance, Vienna, Austria (2017)
- Workshop on Advances in Time Series Econometrics, Bologna, Italy (2017)
- Derivatives and Volatility 2017: The State of the Art, New York, U.S.A. (2017)
- The 10th Conference of Thailand Econometric Society, Chiang Mai, Thailand (2017)
- 9th Annual SoFiE Conference, Hong Kong (2016)
- The 3rd Vietnam International Conference in Finance, Da Nang, Vietnam (2016)
- Econometrics Summer Workshop, Warwick, UK (2016)
- The 9th Conference of Thailand Econometric Society, Chiang Mai, Thailand (2016)
- Workshop on Financial Econometrics: Challenges and Directions for Future Research, Rio de Janeiro, Brazil (2015)

- Econometric Study Group Bristol Conference, Bristol, UK (2015)
- 2nd Vienna Workshop on High-Dimensional Time Series in Macroeconomics and Finance, Vienna, Austria (2015)
- Workshop on Time Series Analysis in Macro and Finance, Barcelona, Spain (2015)
- The 8th Conference of Thailand Econometric Society, Chiang Mai, Thailand (2015)
- 11th International Vilnius Conference on Probability Theory and Mathematical Statistics, Vilnius, Lithuania (2014)
- 2nd Conference of the International Society for NonParametric Statistics, Cádiz, Spain (2014)
- 10th International Symposium on Econometric Theory and Applications (SETA 2014), Taipei, Taiwan (2014)
- Second NUS-Stanford Workshop in Quantitative Finance: Statistical Issues, Singapore (2014)
- The 7th Conference of Thailand Econometric Society, Chiang Mai, Thailand (2014)
- cemap Workshop on High-Dimensional Econometric Models, London, UK (2013)
- First International Workshop in Financial Econometrics, Natal, Brazil (2013); [Keynote Speaker](#)
- 59th ISI World Statistics Congress, Hong Kong (2013)
- 29th European Meeting of Statisticians, Budapest, Hungary (2013)
- 2nd Rimini Time Series Workshop, Rimini, Italy (2013); [Keynote Speaker](#)
- 6th Annual SoFiE Conference, Singapore (2013)
- 1st Vienna Workshop on High-Dimensional Time Series in Macroeconomics and Finance, Vienna, Austria (2013)
- Marie Curie ITN — Conference on Financial Risk Management & Risk Reporting, Konstanz, Germany (2013)
- Humboldt-Copenhagen Conference 2013, Berlin, Germany (2013)
- The 6th Conference of Thailand Econometric Society, Chiang Mai, Thailand (2013)
- 23rd (EC)² Conference on Hypothesis Testing, Maastricht, Holland (2012); [Keynote Speaker](#)
- Computing & Statistics (ERCIM 2012), Oviedo, Spain (2012)
- Workshop on New Developments in Econometrics and Time Series, Rome, Italy (2012)
- ESEM 2012, Malaga, Spain (2012)
- IMS Program Random Matrix Theory and its Applications II, Singapore (2012)
- 2012 FMA Asian Conference, Phuket, Thailand (2012)
- 1st Conference of the International Society for NonParametric Statistics, Chalkidiki, Greece (2012)
- SMTDA 2012, Chania, Greece (2012)
- Workshop on Uncertainty and Forecasting in Macroeconomics, Eltville, Germany (2012)
- CIREQ Econometrics Conference on High-Dimensional Problems in Econometrics, Montreal, Canada (2012)
- 9th International Conference on Computational Management Science, London, U.K. (2012)

- The 5th Conference of Thailand Econometric Society, Chiang Mai, Thailand (2012)
- MCP Conference 2011, Washington D.C., U.S.A. (2011)
- AFE 2011 Conference, Samos, Greece (2011)
- 2011 FMA European Conference, Porto, Portugal (2011)
- The 4th Conference of Thailand Econometric Society, Chiang Mai, Thailand (2011)
- The XXVth International Biometric Conference, Florianópolis, Brazil (2010)
- ATINER Mathematics 2010, Athens, Greece (2010)
- SMTDA 2010, Chania, Greece (2010)
- The 3rd Conference of Thailand Econometric Society, Chiang Mai, Thailand (2010)
- Computational and Financial Econometrics (CFE'09), Limassol, Cyprus (2009)
- LQG Spring Conference, London, U.K. (2009)
- Asset Management Forum, Zurich, Switzerland (2008)
- Forecasting in Rio, Rio de Janeiro, Brazil (2008)
- Computational and Financial Econometrics (CFE'08), Neuchâtel, Switzerland (2008)
- Workshop on Bootstrap and Time Series, Kaiserslautern, Germany (2008)
- IQPC — Hedge Fund Conference, Barcelona, Spain (2007)
- MCP Conference 2007, Vienna, Austria (2007)
- Hedge 2006, London, U.K. (2006)
- Mathematical and Statistical Methods for Insurance and Finance, Salerno, Italy (2006)
- IMS Annual Meeting, Rio de Janeiro, Brazil (2006)
- Exploratory Workshop on Specification Testing, Santander, Spain (2005)
- IASC: Computational Statistics & Data Analysis, Limmasol, Cyprus (2005)
- Statistics for Dependent Data, Paris, France (2005)
- Stochastic Finance 2004, Lisbon, Portugal (2004)
- Joint Statistical Meetings, San Francisco, U.S.A. (2003)
- New Frontiers in Financial Volatility Modeling, Florence, Italy (2003)
- EUMOptFin I, Semmering, Austria (2003)
- ESEM 2002, Venice, Italy (2002)
- CLAPEM, La Habana, Cuba (2001)
- Resampling Methods in Econometrics, Montreal, Canada (2001)
- European Meeting of Statisticians, Funchal, Madeira (2001)
- ESEM 1999, Santiago de Compostela, Spain (1999)

INVITED SEMINARS

- Aarhus University, Aarhus, Denmark
- Banco de Portugal, Lisbon, Portugal
- Cambridge University, Cambridge, U.K.
- Chulalongkorn University, Bangkok, Thailand
- DIW, Berlin, Germany
- Erasmus University, Rotterdam, Holland

- ETHZ, Zurich, Switzerland
- Fundação Getúlio Vargas, Rio de Janeiro, Brazil
- Harvard University, Cambridge, U.S.A.
- Humboldt Universität zu Berlin, Berlin, Germany
- Imperial College, London, U.K.
- Institut für Höhere Studien, Vienna, Austria
- Massachusetts Institute of Technology, Cambridge, U.S.A.
- Nanyang Technological University, Singapore
- Oxford University, Oxford, U.K.
- Pontifícia Universidade Católica, Rio de Janeiro, Brazil
- Singapore Management University, Singapore
- Stanford University, Stanford, U.S.A.
- Technische Universität Wien, Vienna, Austria
- Tilburg University, Tilburg, Holland
- Tinbergen Institute, Amsterdam, Holland
- Universidad de Cantabria, Santander, Spain
- Universidad Carlos III, Madrid, Spain
- Universidad Rey Juan Carlos, Madrid, Spain
- Universidad de Zaragoza, Zaragoza, Spain
- Universit Bocconi, Milan, Italy
- Universit di Bologna, Bologna, Italy
- Universit Tor Vergata, Rome, Italy
- Universitat Pompeu Fabra, Spain
- Universität Augsburg, Augsburg, Germany
- Universität Bonn, Bonn, Germany
- Universität Dortmund, Dortmund, Germany
- Universität Göttingen, Göttingen, Germany
- Universität Hamburg, Hamburg, Germany
- Universität Konstanz, Konstanz, Germany
- Universität Mannheim, Mannheim, Germany
- Universität Regensburg, Regensburg, Germany
- Universität Wien, Vienna, Austria
- Université Catholique de Louvain, Louvain-la-Neuve, Belgium
- Université de Genève, Geneva, Switzerland
- Université Libre de Bruxelles, Brussels, Belgium
- Université de Toulouse, Toulouse, France
- University College London, London, UK
- University of California, Los Angeles, U.S.A.
- University of California, San Diego, U.S.A.
- University of California, Riverside, U.S.A.
- University of Miami, Miami, U.S.A.

- University of Pennsylvania, Philadelphia, U.S.A.
- University of Science and Technology, Hong Kong, China
- University of Southern California, Los Angeles, U.S.A.
- University of York, York, U.K.

TEACHING EXPERIENCE

REGULAR COURSES

- University of Zurich, Ph.D. courses
 - Econometrics for Research Students, Part I
 - Econometrics for Research Students, Part II
- University of Zurich, graduate courses
 - Advanced Statistics
 - Nonparametric Methods
 - Time Series Analysis
- University of Zurich, undergraduate courses
 - Statistics
 - Introduction to Empirical Research in Economics
- University Pompeu Fabra, Ph.D. courses
 - Mathematical Methods
- Universitat Pompeu Fabra, MBA courses
 - Statistics
- University Pompeu Fabra, undergraduate courses
 - Econometrics I
 - Statistics
- University Carlos III, Ph.D. courses
 - Resampling Methods
- University Carlos III, undergraduate courses
 - Econometrics I
 - Nonparametric Statistics
 - Statistics III
 - Time Series Methods II
- UCLA, Ph.D. courses
 - Empirical Research in Finance (joint with Prof. Olivier Ledit)
- UCLA, undergraduate courses
 - Statistics 50

- Statistics 152C
- Statistics 154A, 154B

INVITED COURSES

- Bocconi University, undergraduate courses
 - Data Analysis
- IE Business School, MBA courses
 - Quantitative Methods for Business
- Singapore Management University, Ph.D. courses
 - Financial Econometrics
- Stanford University, undergraduate courses
 - Introduction to Statistical Inference
- University of Sankt Gallen, Ph.D. courses
 - Resampling Methods
- University Tor Vergata, Ph.D. courses
 - Resampling Methods