Michael Weylandt, Ph.D.

IC Post-Doctoral Research Fellow
University of Florida
UF Informatics Institute
Gainesville, FL 32611

Phone (713) 204-9366
Email michael.weylandt@ufl.edu
Website https://michaelweylandt.github.io
Github michaelweylandt
ORCID 0000-0002-0950-3881

Education and Training

Sandia National Laboratories
October 2022 - Present
Postdoctoral Appointee
Mentors: Laura P. Swiler (Causal Modeling for Climate Applications)
J. Derek Tucker (Statistical Sciences)

University of Florida
October 2020 - September 2022
Intelligence Community Post-Doctoral Fellow
Advisor: George Michailidis

Rice University
August 2015 - September 2020
Ph.D., Statistics: September 2020
M.A., Statistics: August 2019
Advisor: Katherine B. Ensor

Princeton University
September 2008 - June 2012
Bachelor of Science in Engineering, *cum laude*: awarded June 2012
Concentration (Major): Operations Research and Financial Engineering
Advisor: Ramon van Handel
Certificate (Minor): Finance
Honor Societies: *Sigma Xi*, *Tau Beta Pi*

Honors and Awards

10. Best Poster Award, 2022 Conference on New Advances in Statistics and Data Science (NASDS), Honolulu, HI. (May 24-26, 2022)
9. James R. Thompson, Ph.D. Student Award (September 9, 2020). ($1,000)
8. Intelligence Community Post-Doctoral Research Fellowship (May 5, 2020). $150,000 + travel funds awarded over 2 years.
7. Winner of the *ASA Section on Business and Economic Statistics (B&E) 2020 Student Paper Competition*. ($500.)
6. Future Faculty Fellows Program, Rice University School of Engineering (August 20, 2019). $4,000 awarded over 1 year.
5. Student Travel Award - IEEE Data Science Workshop (DSW) 2019. ($750.)
4. Winner of the *ASA Section on Statistical Learning and Data Science (SLDS) 2019 Student Paper Competition*. (Top 5 of 65 papers submitted; $1000.)
3. NSF Graduate Research Fellowship (March 17, 2017). $102,000 awarded over 3 years.
2. Kennedy Institute for Information Technology 2015/16 BP Graduate Fellowship (November 8, 2016). $7,500 awarded over 1 year.

1. Ken Kennedy Institute Computer Science and Engineering Enhancement Fellowship (September 8, 2015). $15,000 awarded over 4 years.

Publications

Submitted

14. C.O. Little[‡], **M. Weylandt**[‡], and G.I. Allen. "To the Fairness Frontier and Beyond: Identifying, Quantifying, and Optimizing the Fairness-Accuracy Pareto Frontier." ArXiv: 2206.00074

13. **M. Weylandt** and G. Michailidis. "A Coupled CP Decomposition for Principal Components Analysis of Symmetric Networks." ArXiv: 2202.04719

12. **M. Weylandt** and G.I. Allen. "Debiasing Projections for Fair Principal Components Analysis."

11. M. Navarro, G.I. Allen, and **M. Weylandt**. "Network Clustering for Latent State and Changepoint Detection" ArXiv: 2111.01273

10. **M. Weylandt**, Y. Han, and K.B. Ensor. "Multivariate Modeling of Natural Gas Spot Trading Hubs Incorporating Futures Market Realized Volatility." ArXiv: 1907.10152; SSRN: 3425531

    Winner of the *ASA Section on Business and Economic Statistics (B&E) 2020 Student Paper Competition*

9. A.P. Drager, **M. Weylandt**, G. Chuyong, D. Kenfack, D.W. Thomas, and A.E. Dunham."Ecological correlates of reproductive status in a guild of Afrotropical understory trees." BiorXiv: 10.1101/2021.01.14.426416

Published

8. **M. Weylandt**, G. Michailidis, and T.M. Roddenberry. "Sparse Partial Least Squares for Coarse Noisy Graph Alignment." *SSP 2021: Proceedings of the 2021 IEEE Statistical Signal Processing Workshop*, pp.561-565. 2021. DOI: 10.1109/SSP49050.2021.9513753. ArXiv: 2104.02810

7. **M. Weylandt**, T.M. Roddenberry, and G.I. Allen. "Simultaneous Grouping and Denoising via Sparse Convex Wavelet Clustering." *DSLW 2021: Proceedings of the IEEE Data Science and Learning Workshop 2021*. pp.1-8. 2021. DOI: 10.1109/DSLW51110.2021.9523413. ArXiv: 2012.04762

6. **M. Weylandt** and G. Michailidis. "Automatic Registration and Clustering of Time Series." *ICASSP 2021: Proceedings of the 2021 IEEE International Conference on Acoustics, Speech and Signal Processing*, pp.5609-5613. 2021. DOI: 10.1109/ICASSP39728.2021.9414417 ArXiv: 2012.04756

5. J.S. Morris, M.M. Hassan, Y.E. Zohner, Z. Wang, L. Xiao, A. Rashid, A. Haque, R. Abdel-Wahad, Y.A. Mohamed, K.L. Ballard, R.A. Wolff, B. George, L. Li, G.I. Allen, **M. Weylandt**, D. Li, W. Wang, K. Raghav, J. Yao, H.M. Amin, and A.O. Kaseb. "HepatoScore14: Measures of biological heterogeneity significantly improve prediction of hepatocellular carcinoma risk." *Hepatology* 73(6), pp. 2278-2292. 2021. DOI: 10.1002/hep.31555 PubMed: 32931023

4. **M. Weylandt.** "Multi-Rank Sparse and Functional PCA: Manifold Optimization and Iterative Deflation Techniques." *CAMSAP 2019: Proceedings of the IEEE 8th International Workshop on Computational Advances in Multi-Sensor Adaptive Processing*, pp.500-504. 2019. DOI: 10.1109/CAMSAP45676.2019.9022486 ArXiv: 1907.12012 (Selected for Oral Presentation)

[‡]Equal contribution.

3. **M. Weylandt**, J. Nagorski, and G.I. Allen. "Interactive Visualizations and Fast Computation for Convex Clustering via Algorithmic Regularization." *Journal of Computational and Graphical Statistics* 29(1), pp. 87-96. 2020. DOI: 10.1080/10618600.2019.1629943 ArXiv: 1901.01477 PubMed: 32982130

   Winner of the *ASA Section on Statistical Learning and Data Science (SLDS) 2019 Student Paper Competition* (Top 5 of 65 papers submitted)

2. **M. Weylandt**. "Splitting Methods for Convex Bi-Clustering and Co-Clustering." *DSW 2019: Proceedings of the IEEE Data Science Workshop 2019*, pp.237-244. 2019. DOI: 10.1109/DSW.2019.8755599 ArXiv: 1901.06075 (Selected for Oral Presentation)

1. G.I. Allen and **M. Weylandt**. "Sparse and Functional Principal Components Analysis." *DSW 2019: Proceedings of the IEEE Data Science Workshop 2019*, pp.11-16. 2019. DOI: 10.1109/DSW.2019.8755778 ArXiv: 1309.2895 (Selected for Oral Presentation)

In Preparation

M. Weylandt. "Non-Parametric Time Series Graphical Model Structure Learning via Complex-Valued Gaussian Graphical Models."

M. Weylandt, L. Liao, and G.I. Allen "Modern Multivariate Analysis: Sparsity, Smoothness, and Structure in High-Dimensional Multivariate Analysis"

Other Professional Writing

M. Weylandt. Ph.D. Thesis: *Computational and Statistical Methodology for Highly-Structured Data* (`Link`)

L. Damiano, B. Peterson, and **M. Weylandt**. "A Tutorial on Hidden Markov Models using `Stan`." *StanCon 2018* DOI: 10.5281/zenodo.1284341 (Direct link; supplemental materials)

Software Packages

Published

3. `clustRviz`: *Interactive Visualizations and Fast Computation for Convex Clustering* [with J. Nagorski and G.I. Allen]. Available on `GitHub`; website.

2. `ExclusiveLasso`: *Generalized Linear Models with the Exclusive Lasso Penalty*. [with G.I. Allen and F. Campbell] Available on `GitHub`; website.

1. *`xtsPlots`: Additional Plotting Tools for `xts` Objects*: Enhanced plotting functionality for `xts` data. Available on `GitHub`. [Developed during GSoC 2012]

Under Development

`lariat`: *Algorithmic Regularization Paths for Variable Selection*. [with G.I. Allen and Y. Hu]

`BayesHMM`: *Frequentist and Bayesian Inference for Hierarchical Hidden Markov Models Using `Stan`*. [with B. Peterson and L. Damiano (GSoC 2018)] Available on `GitHub`.

`MoMA`: *Modern Multivariate Analysis: PCA, PLS, CCA, and LDA with Sparsity, Smoothness, and Structure* [with L. Liao and G.I. Allen (GSoC 2018-2019)]. Available on `GitHub`; website.

`sgdnet`: *Sparse Linear Models for Big Data via Stochastic Average Gradient* [with J. Larsson, Q. Lu, and T.D. Hocking (GSoC 2018-2019)] Available on GitHub.

`classo`: *Complex Lasso and Complex Graphical Lasso*

Presentations and Talks

Seminar Presentations

4. *Multivariate Analysis of Large-Scale Network Series*. Department of Mathematics, University of Houston. May 9th, 2022. Houston, TX, USA.
3. *Multivariate Analysis of Large-Scale Network Series*. Department of Statistics, Rutgers University. April 27th, 2022. New Brunswick, NJ, USA.
2. *Convex Clustering: Methods, Theory, Algorithms, and Visualizations*. Statistical Learning Seminar, Lund University, Wrocław University, & University of Burgundy. January 29, 2021. Online.
1. *Algorithmic Regularization for Efficient Large-Scale Statistical Machine Learning*. Machine Learning Lunch Seminar, Rice University. September 26, 2018. Houston, TX.

Invited Conference Presentations

12. *Statistical Analysis of Multiple Network Structures and Signals*. Seventh Annual Intelligence Community Academic Research Symposium. September 15, 2021. Online.
11. *Sparse Partial Least Squares for Coarse Noisy Graph Alignment*. IEEE Statistical Signal Processing Workshop 2021. July 11-14, 2021. Rio de Janiero / Online.
10. *Dimension Reduction and Changepoint Detection in Network Series*. 4th International Conference on Econometrics and Statistics. June 24-26, 2021. Hong Kong / Online.
9. *Simultaneous Grouping and Denoising via Sparse Convex Wavelet Clustering*. IEEE Data Science and Learning Workshop 2021. June 5-6, 2021. Toronto, ON / Online.
8. *Multivariate Modeling of Natural Gas Spot Trading Hubs Incorporating Futures Market Realized Volatility*. Joint Statistical Meetings (JSM) 2020. August 2 - 6, 2020. Online.
7. *Multi-Rank Sparse and Functional PCA: Manifold Optimization and Iterative Deflation Techniques*. IEEE Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP) 2019. December 15 - 18, 2019. Le Gosier, Guadeloupe, French West Indies.
6. *Dynamic Visualization and Fast Computation for Convex Clustering via Algorithmic Regularization*. Joint Statistical Meetings (JSM) 2019. July 27 - August 1, 2019. Denver, CO. (Slides)
5. *Splitting Methods for Convex Bi-Clustering and Co-Clustering*. IEEE Data Science Workshop (DSW) 2019. June 2 - 5, 2019. Minneapolis, MN.
4. *Sparse and Functional Principal Components Analysis*. IEEE Data Science Workshop (DSW) 2019. June 2 - 5, 2019. Minneapolis, MN.
3. *A tutorial on Hidden Markov Models using Stan*. StanCon 2018. January 10-12, 2018. Asilomar, CA.
2. *Tail Risk Estimation for U.S. Natural Gas: A Multivariate Bayesian EVT Approach*. ISI World Statistics Conference (WSC) 2017. July 16-21, 2017. Marrakech, Morocco.
1. *Moving Beyond Markowitz: Modern Statistical Approaches to Portfolio Optimization*. Sixth Annual Eubank Conference on Real-World Markets. April 25-26, 2016. Rice University, Houston, TX.

Contributed Conference Presentations

4. *Sparse and Functional Principal Components Analysis*. Data Science, Statistics, and Visualization (DSSV) 2019. August 13-15, 2019. Kyoto, Japan.

3. *Dynamic Visualization and Fast Computation for Convex Clustering via Algorithmic Regularization*. European Meeting of Statisticians (EMS) 2019. July 22-26, 2019. Palermo, Italy.

2. *Convex Optimization for High-Dimensional Portfolio Construction*. R/Finance 2017. May 19-20, 2017. Chicago, IL. (`Slides`)

1. *Real-Time Portfolio Monitoring with* `R`. R/Finance 2012. May 11-12, 2012. Chicago, IL (`Slides`)

Other Conference Presentations

2. *Automatic Registration and Clustering of Time Series*. ICASSP 2021. June 6-10. Toronto, ON / Online.

   Lightning presentation, followed by poster session.

1. *Finding Low-Dimensional Structure in High-Dimensional Data*: Discussion of "Big Data and Visualization: Challenges and Opportunities". ISI World Statistics Conference (WSC) 2017. July 16-21, 2017. Marrakech, Morocco.

   G.I. Allen was the original invited discussant, but was unable to attend last-minute.

Contributed Poster Presentations

3. "Multivariate Analysis of Large-Scale Network Series." **M. Weylandt**, G. Michailidis. 2022 Conference on New Advances in Statistics and Data Science (NASDS). May 24-26, 2022. Honolulu, HI.

   Winner of the *NASDS 2022 Best Poster Award*

2. "A Bayesian Realized-Volatility Approach to Volatility Modeling in US Natural Gas Markets." **M. Weylandt**, Y. Han, and K.B. Ensor. Rice Data Science Conference 2018. October 8-9, 2018. Houston, TX.

1. "Convex Optimization for High-Dimensional Portfolio Construction." **M. Weylandt** and K.B. Ensor. Rice Oil & Gas High-Performance Computing Conference 2017. March 15-16, 2017. Houston, TX.

Other Presentations

2. *Bayesian Analysis with* `Stan` *and* `R`. Houston `R` Users' Group. December 6, 2016. Houston, TX.

1. *Multilevel Statistical Analysis for Nested Data* [with G.I. Allen]. Neurological Research Institute Mini-Workshop. July 29, 2016. Houston, TX.

Teaching Experience

Short Courses

7. *Bayesian Inference and Volatility Modeling using* `Stan` [with L. Damiano]. R/Finance 2019. May 17-18, 2019. Chicago, IL.

6. *Data Science Bootcamp: Introduction to* `R` *and the* `tidyverse`. Ken Kennedy Institute ('K2I'), Rice University. August 6, 2018. Houston, TX.

5. *Bayesian Inference and Volatility Modeling using* `Stan` [with L. Damiano]. R/Finance 2018. June 1-2, 2018. Chicago, IL.
4. *Introduction to Quantitative Financial Analytics using* `R`. Eighth Annual Eubank Conference on Real-World Markets. April 23, 2018. Rice University, Houston, TX. (`Materials`)
3. *Technical Workshop in* `R`. Jones Graduate School of Business . April 14, 2018. Rice University, Houston, TX. (`Materials`)
2. *Advanced Bayesian Time Series Analysis using* `Stan` [with T. Harte]. R/Finance 2017. May 19-20, 2017. Chicago, IL.
1. *Modern Bayesian Tools for Time Series Analysis* [with T. Harte]. R/Finance 2016. May 20-21, 2016. Chicago, IL. (`Materials`)

Teaching Assistantships

4. STAT 600: Graduate Seminar in Statistics (Spring 2017; Instructor: M. Vannucci)
3. STAT 444/640: Data Mining and Statistical Learning (Fall 2016; Instructor: G.I. Allen)
2. STAT 421/621: Applied Time Series and Forecasting (Spring 2016; Instructor: K.B. Ensor)
1. STAT 449/649: Quantitative Financial Risk Management (Fall 2015; Instructor: O. Melnikov)

Professional Service

Reviewer for: *Journal of Computational and Graphical Statistics* (2021-2022, 3x); *Computational Statistics and Data Analysis* (2021, 2x); *Applied Stochastic Models in Business & Industry* (2019, 1x); *WIREs Computational Statistics* (2019-2021, 4x); *R Journal* (2021-2022, 3x); ASA Business & Economics Student Paper Competition (2021, 1x); *Computo* (2022, 1x); *IEEE Signal Processing Letters* (2022, 1x); *IEEE Transactions on Signal Processing* (2022, 2x)

Sessions Chaired: Joint Statistical Meetings (2016, 2019), European Meeting of Statisticians (2019)

Sessions Organized: Joint Statistical Meetings (2022)

Departmental and University Service

Machine Learning Lunch Seminar (Lead Organizer): Spring 2018 – Spring 2020. (`Link`)

Statistics Department Graduate Student Committee: Fall 2015 – Spring 2020.

Outreach and Mentoring Activities

Google Summer of Code ("GSoC") Mentoring

8. Student: Luofeng (Luke) Liao. Project: *MoMA: Modern Multivariate Analysis in R*. GSoC 2019. [Continuation of GSoC 2018 Project] (`Final project report`; `code`.)
7. Student: Qincheng (Daisy) Lu. Project: *`sgdnet`: Efficient Regularized GLMs for Big Data*. GSoC 2019. (`Final project report`; `code`.)

6. Student: Luis Antonio Damiano. Project: *Full Bayesian Inference for Hidden Markov Models*. GSoC 2018. (`Final project report`; `code`.)
5. Student: Luofeng (Luke) Liao. Project: *MoMA: Modern Multivariate Analysis in R*. GSoC 2018.
4. Student: Johan Larsson. Project: *Sparse Linear Models for Big Data with SAGA*. GSoC 2018. (`Final project report`; `code`.)
3. Student: Luis Antonio Damiano. Project: *Bayesian Hierarchical Hidden Markov Models Applied to Financial Time Series*. GSoC 2017. (`Final project report`; `code`.)
2. Student: Xia Zhang. Project: *Graphical Models for Mixed Multi-Modal Data*. GSoC 2017. (`Final project report`; `code`.)
1. Student: Anton Samoylov. Project: *`xtsdf`: High Performance Time Series Infrastructure for Multiple Data Types*. GSoC 2013

Rice Research Experiences in Computational and Data Engineering ("RECODE") Mentoring

2. Student: Dan Englund. Project: *Support for Sparse, Generalized, and Integrative Convex Clustering in `clustRviz`*. RECODE 2020
1. Student: Yue Zhuo. Project: *Dynamic and Interactive Graphics for Convex Clustering and Bi-Clustering in `clustRviz`*. RECODE 2020

Rice Undergradute Data Science Summer Program ("RUDSSP") Mentoring

1. Student: William Guo. Project: *How Long to Back-Test? Analysis of the Development of Financial Trading Strategies*. RUDSSP 2017

Professional Memberships

American Statistical Association (ASA), Institute of Mathematical Statistics (IMS), American Finance Association (AFA), Institute of Electrical and Electronics Engineers (IEEE), IEEE Signal Processing Society (SPS)

Non-Academic Employment

Analyst — Morgan Stanley, New York, NY — August 2013 - August 2015

Quantitative analyst in Morgan Stanley's asset management division with responsibility for valuation and risk modeling in traditional (equity, fixed income, global macro) and alternatives businesses. Projects included foreign exchange and energy derivatives valuation, equity volatility modeling, and liquid alternatives risk measurement. Advised on firm-wide model development and control policy and built accompanying model inventory and reproducible research frameworks.

US Foundation Fellow — Sherborne School, Sherborne, Dorset — September 2012 - July 2013

Teaching fellow at an all-boys independent boarding school in southwest England. Courses taught included IB Higher Level Mathematics and A-Level Mathematics and Further Maths. (Statistics at all levels, core mathematics curriculum, and Numerical Methods).

Developer	R Foundation for Statistical Computing Google Summer of Code 2012	June 2012 - August 2012

Contributed to time-series infrastructure for the open-source statistical package `R` with primary interest in visualization schema and secondary effort in continuous-time statistics and multiply typed data structures. Work funded through the Google Summer of Code 2012. Mentored by Josh Ulrich and Jeff Ryan.

Quantitative Intern	PlatinumPartners LP New York, NY	June 2011 - January 2012 June 2010 - September 2010

Development of quantitative fundamental trading strategies across a variety of markets and asset classes within the context of a multi-strategy, market-neutral hedge fund. Primary responsibility for the development of idiosyncratic volatility strategies from initial testing to automated, large scale implementation.