David M. Darmon

Curriculum Vitae

322 W Chestnut Street
West Chester, PA 19380
☎ *(610) 209 3669*
✉ *david.m.darmon@google.com*

Research Interests

Statistical inference for complex systems, information-theoretic analysis of complex systems, information dynamics in biological and neural systems, machine learning, data science, network science.

Appointments

2021–Present **Senior Data Scientist**, Moody's Analytics.

2018–2021 **Assistant Professor of Mathematics**, Monmouth University.

Education

2013–2015 **Ph.D.**, *University of Maryland*, College Park.
Applied Mathematics, Statistics, and Scientific Computation (AMSC)
Advisors: Michelle Girvan (Physics) and William Rand (Marketing)

2010–2013 **M.S.**, *University of Maryland*, College Park.
Applied Mathematics, Statistics, and Scientific Computation

2006–2010 **B.S.**, *Ursinus College*, Collegeville.
Major: Mathematics, Minors: Chemistry and Physics

Teaching Experience

Fall 2018 – Spring 2021 **Monmouth University**.

- Introduction to Computer Programming for Data Science
- Computation and Statistics
- Regression and Time Series Analysis
- Probability Methods for Actuarial Science
- Programming and Technology in Mathematics
- Probability and Statistics I
- Statistics with Applications
- Pre-Calculus Modeling for the Biological Sciences

July 2017 **Workshop Organizer**, Santa Fe Institute.
Developed, organized, and facilitated the hands-on activities for the Santa Fe Institute's Short Course on Networks and Big Data held in New York City in July 2017. Topics included network analysis from the ground up, agent-based modeling, and visualization of complex networks.

Publications

1. DMD, Tomas Watanabe, Christopher Cellucci, and Paul E. Rapp. "On the Operational Utility of Measures of Multichannel EEGs." *Entropy*, 23(11), 1434 (2021).

2. DMD. "Discrete Information Dynamics with Confidence via the Computational Mechanics Bootstrap: Confidence Sets and Significance Tests for Information-Dynamic Measures." *Entropy*, 22(7) (2020).

3. Martin Hilbert, DMD. "Large-Scale Communication is More Complex and Unpredictable with Automated Bots." *Journal of Communication* (2020).

4. Martin Hilbert, DMD. "How Complexity and Uncertainty Grew with Algorithmic Trading." *Entropy*, 22(5) (2020).

5. Amy Trongnetrpunya, Paul Rapp, Chao Wang, DMD, Michelle Costanzo, Dominic E. Nathan, Michael J. Roy, Christopher Cellucci, and David Olin Keyser. "Single-trial mechanisms underlying changes in averaged P300 ERP amplitude and latency in military service members after combat deployment." *Frontiers in Human Neuroscience* 13 (2019).

6. DMD, Christopher J. Cellucci, Paul E. Rapp. "Information Dynamics with Confidence: Using Reservoir Computing to Construct Confidence Intervals for Information-dynamic Measures." *Chaos: An Interdisciplinary Journal of Nonlinear Science* 29.8 (2019).

7. DMD, William Rand, and Michelle Girvan. "Computational landscape of user behavior on social media." *Physical Review E* 98.6 (2018).

8. Claire Gilpin, DMD, Zuzanna Siwy, and Craig Martens. Information Dynamics of a Nonlinear Stochastic Nanopore System. *Entropy*, 20(221) (2018).

9. DMD. "Information-theoretic model selection for optimal prediction of stochastic dynamical systems from data." *Physical Review E* 97.3 (2018).

10. Paul E. Rapp, DMD, Christopher Cellucci, and David O. Keyser. "The physiological basis of consciousness: a clinical ambition and the insufficiency of current philosophical proposals." *Journal of Consciousness Studies*, 25(1-2), 191-205, (2017).

11. Chao Wang, Michelle Costanzo, Paul E. Rapp, DMD, Dominic E. Nathan, Kylee Bashirelahi, Dzung L. Pham, Michael J. Roy, and David O. Keyser. "Disrupted gamma synchrony after mild traumatic brain injury and its correlation with white matter abnormality." *Frontiers in Neurology*, (2017).

12. DMD and Paul Rapp. "Specific transfer entropy and other state-dependent transfer entropies for continuous-state input-output systems." *Physical Review E* 96.2 (2017).

13. Chao Wang, Michelle Costanzo, Paul Rapp, DMD, Kylee Bashirelahi, Dominic Nathan, Christopher Cellucci, Michael Roy, and David Keyser. "Identifying Electrophysiological Prodromes of Post-traumatic Stress Disorder: Results from a Pilot Study." *Frontiers in Psychiatry* 8 (2017).

14. DMD. "Specific Differential Entropy Rate Estimation for Continuous-Valued Time Series." *Entropy* 18(5) (2016).

15. DMD, Elisa Omodei, and Joshua Garland. "Followers Are Not Enough: A Multi-faceted Approach to Community Detection in Online Social Networks." *PloS one* 10(8) (2015).

16. DMD and Michelle Girvan. "Complexity-Regularized Regression for Serially-Correlated Residuals with Applications to Stock Market Data." *Entropy* 17(1) (2015): 1-27.

17. DMD, Jared Sylvester, Michelle Girvan and William Rand, "Understanding the Predictive Power of Computational Mechanics and Echo State Networks in Social Media." *ASE Human Journal* (2013): vol. 2(2), 13 – 14.

18. Paul Rapp, Christopher Cellucci, David Keyser, Adele Gilpin, and DMD, "Statistical Issues in TBI Clinical Studies." *Frontiers in Neurology* (2013): vol. 4.

Book Chapters

1. Jimpei Harada, DMD, Michelle Girvan, and William Rand. "Prediction of Elevated Activity in Online Social Media Using Aggregated and Individualized Models." *Trends in Social Network Analysis*. Springer International Publishing, 2017. 169-187.

Conference Proceedings

1. Jimpei Harada, DMD, Michelle Girvan, and William Rand "Forecasting High Tide: Predicting Times of Elevated Activity in Online Social Media." Proceedings of the 2015 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (2015).
2. DMD, Jared Sylvester, Michelle Girvan, and William Rand, "Predictability of User Behavior in Social Media: Bottom-up vs. Top-down Modeling." *Proceedings of ASE/IEEE International Conference on Social Computing* (2013): 102–107.
3. Paul E. Rapp, DMD, and Christopher J. Cellucci, "Hierarchical Transition Chronometries in the Human central nervous system." *Proceedings of the International Conference on Nonlinear Theory and Applications* (2013).
4. Erik Ferragut, DMD, Craig Shue and Stephen Kelley, "Automatic Construction of Anomaly Detectors from Graphical Models." *2011 IEEE Symposium on Computational Intelligence in Cyber Security* (2011): 9 – 16.

Conference Presentations

1. Martin Hilbert, DMD. "Patterns of Algorithmification: How Dumb and Predictable Bots Make Organization More Complex and Unpredictable." *5th International Conference on Computational Social Science* IC^2S^2 (2019).

2. DMD. "Information Theoretic Model Selection for Reconstruction of Stochastic Dynamical Systems from Data." *Joint Mathematics Meeting* (2018).

3. DMD, Christopher Cellucci, and Paul Rapp. "Specific Transfer Entropy and Its Estimation from Empirical Data." *Dynamics Days 2017* (2017).

4. William Rand, DMD, and Michelle Girvan. "Social Signal Processing: Building Computational Models of Human Behavior in Digital Environments." *Joint Statistical Meeting* (2016).

5. DMD, Erin Uhlfelder, William Rand, and Michelle Girvan, "Finding Predictively Optimal Communities in Dynamic Social Networks." *6th Annual Complexity in Business Conference* (2014).

6. DMD, Elisa Omodei, and Joshua Garland, "Question-Oriented Community Detection in Online Social Networks." *YRNCS Satellite, European Conference on Complex Systems* (2014).

7. William Rand, DMD, Jared Sylvester, and Michelle Girvan, "Will My Followers Tweet? Predicting Twitter Engagement Using Machine Learning." *European Marketing Academy Conference* (2014).

8. Elisa Omodei, DMD, Cesar Flores, Luis Seoane, Kevin Stadler, Jody Wright, Joshua Garland, and Nix Barnett, "Detecting Communities Using Information Flow in Social Networks." *YRNCS Satellite, European Conference on Complex Systems* (2013).

Poster Presentations

1. DMD. "Information Dynamics with Confidence: Using Reservoir Computing to Construct Confidence Intervals for Information-dynamic Measures." *Dynamics Days 2020* (2020).