

CURRICULUM VITAE

Vladas Pipiras

Office: Department of Statistics & OR, CB# 3260, Hanes Hall

The University of North Carolina, Chapel Hill, NC 27599-3260

Phone: (919) 843-2430, E-mail: pipiras@email.unc.edu

Web: <http://pipiras.web.unc.edu>

Personal Information

Lithuanian citizen. U.S. permanent resident

Education

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| 2002 May | Boston University, Boston. Ph.D. in Mathematics (Murad S. Taqqu, advisor) |
| 1997 June | Université Paris 6, Paris, France. M.Sc. (French D.E.A.) in Probability and Applications (Jean Jacod, advisor) |
| 1996 June | Vilnius University, Vilnius, Lithuania. B.Sc. in Mathematics (Vigirdas Mackevičius, advisor) |

Employment

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|-----------|---|
| 2019– | Chair, Department of Statistics and Operations Research, University of North Carolina at Chapel Hill |
| 2012– | Professor, Department of Statistics and Operations Research, University of North Carolina at Chapel Hill |
| 2007–2012 | Associate Professor (early tenure), Department of Statistics and Operations Research, University of North Carolina at Chapel Hill |
| 2002–2007 | Assistant Professor, Department of Statistics and Operations Research, University of North Carolina at Chapel Hill |
| 2008–2010 | Ciência 2007 Researcher, CEMAT (Center of Mathematics and its Applications), Instituto Superior Técnico, Technical University of Lisbon, Portugal |

Invited and Other Positions

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|------------------------|---|
| 2013–2019,
May–July | Senior Fellow of ONR Summer Faculty Research Program, David Taylor Model Basin (NSWCCD), Bethesda, Maryland |
| 2012 | One-month invited professorship at Université Paris-Est Créteil, France. Invitation by S. Jaffard |
| 2011– | An official collaborator for CEMAT (Center of Mathematics and its Applications), Instituto Superior Técnico, Technical University of Lisbon, Portugal |

2006–	Physics Laboratory, ENS Lyon, France, CNRS invited researcher in May, 2006. Multiple invited visits by P. Abry to the same laboratory before and after 2006
2005 May	Department of Mathematics and Statistics, University of Helsinki, Finland, Fractional May 2005. Invitation by I. Norros
2003 Fall	Statistical and Applied Mathematical Sciences Institute (SAMSI), North Carolina, Faculty fellow associated with the program “Network modeling for the Internet”

Grants and Awards

2019–2022	Office of Naval Research grant, “Quantifying extreme ship loads and motions: Statistical challenges and approaches” (PI: Pipiras, \$300,000)
2013–2018, May–July	Senior Fellow of ONR Summer Faculty Research Program, David Taylor Model Basin (NSWCCD), Bethesda, Maryland
2017–2020	National Science Foundation grant, “Statistical models, inference, and computation for multidimensional time series data” (PI: Pipiras, \$200,000)
2017 Fall	Competitive Senior Faculty Research and Scholarly Leave at UNC
2016–2017	Data@Carolina Course Development Grant at UNC (Pipiras, \$7,000)
2013–2015	National Security Agency grant, “Probabilistic models and inference of multifractals” (PI: Pipiras, \$52,000)
2011–2012	Army Research Office grant, “Conference on long-range dependence, self-similarity and heavy tails” (PI: Pipiras, \$15,000)
2010–2013	Member of the team of the FCT (Portuguese Science and Technology Foundation) grant, “Traffic analysis, modeling and measurements for the future management of Internet”, Portugal (\$130,000)
2006–2009	National Science Foundation grant, “Collaborative research: heavy traffic limit models and control analysis for wireless queuing systems - incorporating long range dependence and heavy tails” (PIs: Buche, Ghosh and Pipiras, \$43,000)
2005–2008	National Science Foundation grant, “Random processes and fields: discrete approximations, special wavelet-based decompositions and simulation” (PI: Pipiras, \$105,000)
2004	Junior Faculty Development Award at UNC (\$5,000)

Other Awards

1997–2002	Presidential fellowship, Research assistantship, Boston University
1996–1997	Recipient of a French government stipend, Université Paris 6

Research Interests

Probability and Statistics:

Modeling high-dimensional time series and spatial fields; Network perspectives

Extremal behavior of dynamical systems modeling physical phenomena; Model uncertainty

Sampling and streaming algorithms in connection to “big data” (e.g. networks)

Modeling scaling and self-similar phenomena

Applications to: Economics and Finance, Computer networks, Physical sciences, Engineering, Oceanography, Psychology and Neuroscience

Books

- [B3] *Stable Self-Similar Processes with Stationary Increments* (with M. S. Taqqu). Springer-Briefs, 135 pages, 2017
- [B2] *Long-Range Dependence and Self-Similarity* (with M. S. Taqqu). Cambridge University Press, 688 pages, 2017
- [B1] *A Basic Course in Measure and Probability: Theory for Applications* (with S. Cambanis and M. R. Leadbetter), Cambridge University Press, 374 pages, 2014

Published or Accepted Journal Papers

- [74] “Sampling methods and estimation of triangle count distributions in large networks” (with N. Antunes and T. Guo), *Network Science*, To appear
- [73] “Count time series: A methodological review” (with R. A. Davis, K. Fokianos, S. H. Holan, H. Joe, J. Livsey, R. Lund and N. Ravishanker), *Journal of American Statistical Society*, To appear
- [72] “Sampling-based estimation of in-degree distribution with applications to directed complex networks” (with N. Antunes, S. Bhamidi, T. Guo and B. Wang), *Journal of Computational and Graphical Statistics*, To appear
- [71] “Two sample tests for high-dimensional autocovariances” (with C. Baek, K. Gates and B. Leinwand), *Computational Statistics and Data Analysis*, To appear
- [70] “A square-root second-order extended Kalman filtering approach for estimating smoothly time-varying parameters” (with Z. F. Fisher, S.-M. Chow, P. C. M. Molenaar, B. L. Fredrickson and K. M. Gates), *Multivariate Behavioral Research*, To appear
- [69] “Stationary subspace analysis of nonstationary covariance processes: eigenstructure description and testing” (with M. Pourahmadi and R. Sundararajan), *Bernoulli*, To appear
- [68] “Pitfalls of data-driven peaks-over-threshold analysis: perspectives from extreme ship motions,” *Probabilistic Engineering Mechanics*, 60 (2020), 103053
- [67] “Asymptotics of bivariate local Whittle estimators with applications to fractal connectivity” (with C. Baek and S. Kechagias), *Journal of Statistical Planning and Inference*, 205 (2020), pp. 245–268

- [66] “Modeling bivariate long-range dependence with general phase” (with S. Kechagias), *Journal of Time Series Analysis*, 41 (2020), pp. 268–292
- [65] “Distribution tail structure and extreme value analysis of constrained piecewise linear oscillators” (with V. Belenky, D. Glotzer and T. Sapsis). *Probabilistic Engineering Mechanics*, 57 (2019), pp. 1–13
- [64] “Periodic dynamic factor models: estimation approaches and applications” (with C. Baek and R. Davis), *Electronic Journal of Statistics*, 12 (2018), pp. 4377–4411
- [63] “Modeling periodic autoregressive time series with multiple periodic effects” (with H. Hurd), in F. Chaari, J. Leskow, R. Zimroz, A. Wylomanska, A. Dudek, editors, *Cyclostationarity: Theory and Methods IV*, (2020), pp. 1–18
- [62] “Small and large scale behavior of moments of Poisson cluster processes with application to Internet traffic” (with N. Antunes, P. Abry and D. Veitch). *ESAIM Probability & Statistics*, 21 (2017), pp. 369–393
- [61] “Multivariate integer-valued time series with flexible autocovariances and their application to major hurricane counts” (with J. Livsey, S. Kechagias and R. Lund). *The Annals of Applied Statistics*, 12 (2018), pp. 408–431
- [60] “Domain and range symmetries of operator fractional Brownian fields” (with G. Didier and M. Meerschaert). *Stochastic Processes and Their Applications*, 128 (2018), pp. 39–78
- [59] “Exponents of operator self-similar random fields” (with G. Didier and M. Meerschaert). *Journal of Mathematical Analysis and Applications*, 448 (2017), pp. 1450–1466
- [58] “Sparse seasonal and periodic vector autoregressive modeling” (with C. Baek and R. Davis). *Computational Statistics and Data Analysis*, 106 (2017), pp. 103–126
- [57] “Confidence intervals for exceedance probabilities with application to extreme ship motions” (with D. Glotzer, V. Belenky, B. Campbell and T. Smith). *Revstat*, 15 (2017), pp. 537–563
- [56] “Application of the envelope peaks over threshold (EPOT) method for probabilistic assessment of dynamic stability” (with V. Belenky and B. Campbell). *Ocean Engineering*, 120 (2016), pp. 298–304
- [55] “Estimation of flow distributions from sampled traffic” (with N. Antunes). *ACM Transactions on Modeling and Performance Evaluation of Computing Systems*, 1 (2016), Article No. 11
- [54] “Convex optimization and feasible circulant matrix embeddings in synthesis of stationary Gaussian fields” (with H. Helgason and S. Kechagias). *Journal of Computational and Graphical Statistics*, 25 (2016), pp. 1158–1175
- [53] “Non-Gaussian semi-stable laws arising in sampling of finite point processes” (with R. Chaudhuri). *Bernoulli*, 22 (2016), pp. 1055–1092
- [52] “On integral representations of operator fractional Brownian fields” (with C. Baek and G. Didier). *Statistics & Probability Letters*, 92 (2014), pp. 190–198
- [51] “On distinguishing multiple changes in mean and long-range dependence using local Whittle estimation” (with C. Baek). *Electronic Journal of Statistics*, 8 (2014), pp. 931–964

- [50] “Can Markov switching model generate long memory?” (with C. Baek and N. Fortuna). *Economics Letters*, 124 (2014), pp. 117–121
- [49] “Definitions and representations of multivariate long-range dependent time series” (with S. Kechagias). *Journal of Time Series Analysis*, 36 (2015), pp. 1–25
- [48] “Admission control for multidimensional workload with heavy tails and fractional Ornstein-Uhlenbeck process” (with A. Budhiraja and X. Song). *Advances in Applied Probability*, 47 (2015), pp. 476–505
- [47] “Smoothing windows for the synthesis of Gaussian stationary random fields using circulant matrix embedding” (with H. Helgason and P. Abry). *Journal of Computational and Graphical Statistics* 23 (2014), pp. 616–635
- [46] “Long-range dependence of the two-dimensional Ising model at critical temperature” (with M. S. Taqqu). Chapter 18 (42 pages) in *Benoit Mandelbrot: A Life in Many Dimensions*, World Scientific Publishing Company (2014), edited by M. Frame and N. Cohen.
- [45] “On the Riesz and vaguelet property of L^2 -unbounded transformations of orthogonal wavelet bases” (with G. Didier and S. Jaffard). *Journal of Approximation Theory* 176 (2013), pp. 94–117
- [44] “Statistical tests for a single change in mean against long-range dependence” (with C. Baek). *Journal of Time Series Analysis* 33 (2012), pp. 131–151
- [43] “Heavy traffic approximations of a queue with varying service rates and general arrivals” (with R. Buche and A. Ghosh). *Stochastic Models* 28 (2012), pp. 63–108
- [42] “Exponents, symmetry groups and classification of operator fractional Brownian motions” (with G. Didier). *Journal of Theoretical Probability* 25 (2012), pp. 353–395
- [41] “Wavelet-based analysis of non-Gaussian long-range dependent processes and estimation of the Hurst parameter” (with P. Abry and H. Helgason). *Lithuanian Mathematical Journal* 51 (2011), pp. 287–302
- [40] “Probabilistic sampling of finite renewal processes” (with N. Antunes). *Bernoulli* 17 (2011), pp. 1285–1326
- [39] “Long range dependence analysis of Internet traffic” (with F. Hernandez-Campos, L. Le, J. S. Marron, C. Park, J. Park, F. D. Smith, R. L. Smith, M. Trevero, and Z. Zhu). *Journal of Applied Statistics* 38 (2011), pp. 1407–1433
- [38] “Local and global rank tests for multivariate varying-coefficient models” (with S. G. Donald and N. Fortuna). *Journal of Business and Economics Statistics* 29 (2011), pp. 295–306
- [37] “Integral representations and properties of operator fractional Brownian motions” (with G. Didier). *Bernoulli* 17 (2011), pp. 1–33
- [36] “Synthesis of multivariate stationary series with prescribed marginal distributions and covariance using circulant matrix embedding” (H. Helgason, P. Abry and V. Pipiras). *Signal Processing* 91 (2011), pp. 1741–1758
- [35] “Fast and exact synthesis of stationary multivariate Gaussian time series using circulant embedding” (H. Helgason, P. Abry and V. Pipiras). *Signal Processing* 91 (2011), pp. 1123–1133

- [34] “Regularization and integral representations of Hermite processes” (with M. S. Taqqu). *Statistics & Probability Letters* 80 (2010), pp. 2014–2023
- [33] “Adaptive wavelet decompositions of stationary time series” (with G. Didier). *Journal of Time Series Analysis* 31 (2010), pp. 182–209
- [32] “Semi-additive functionals and cocycles in the context of self-similarity” (with M. S. Taqqu). *Discussiones Mathematicae Probability and Statistics* 30 (2010), pp. 149–177
- [31] “Estimation of parameters in heavy-tailed distribution when its second order tail parameter is known” (with C. Baek). *Journal of Statistical Planning and Inference* 140 (2010), pp. 1957–1967
- [30] “Second order properties of distribution tails and estimation of tail exponents in random difference equations” (C. Baek, V. Pipiras, H. Wendt and P. Abry). *Extremes* 12 (2009), pp. 361–400
- [29] “Multifractal random walks as fractional Wiener integrals” (with P. Abry, P. Chainais and L. Coutin). *IEEE Transactions on Information Theory* 55 (2009), pp. 3825–3846
- [28] “Long range dependence, unbalanced Haar wavelet transformation and changes in mean level” (with C. Baek). *Int. J. of Wavelets, Multiresolution and Information Processing* 14 (2009), pp. 23–58
- [27] “Gaussian stationary processes: adaptive wavelet decompositions, discrete approximations and their convergence” (with G. Didier). *Journal of Fourier Analysis and Applications* 14 (2008), pp. 203–234
- [26] “Small and large scale asymptotics of some Lévy stochastic integrals” (with M. S. Taqqu). *Methodology and Computing in Applied Probability* 10 (2008), pp. 299–314
- [25] “Identification of periodic and cyclic fractional stable motions” (with M. S. Taqqu). *Annales de L’Institut Henry Poincaré* 44 (2008), pp. 612–637
- [24] “Bounds for the covariance of functions of infinite variance stable random variables with applications to central limit theorems and wavelet-based estimation” (V. Pipiras, M. S. Taqqu and P. Abry). *Bernoulli* 13 (2007), pp. 1091–1123
- [23] “On rank estimation in symmetric matrices: the case of indefinite estimators” (with N. Fortuna and S. G. Donald). *Econometric Theory* 23 (2007), pp. 1217–1232
- [22] “Integral representations of periodic and cyclic fractional stable motions” (with M. S. Taqqu). *Electronic Journal of Probability* 12 (2007), pp. 181–206
- [21] “Nonminimal sets, their projections and integral representations of stable processes”. *Stochastic Processes and Their Applications* 117 (2007), pp. 1285–1302
- [20] “Heavy traffic methods in wireless systems: towards modeling heavy tails and long range dependence” (with R. Buche, A. Ghosh and J. Zhang). IMA Volumes in Mathematics and its Applications Series, Vol. 143: Wireless Communications, Springer-Verlag (2007), pp. 53–74
- [19] “Wavelet-based synthesis of the Rosenblatt process” (with P. Abry). *Signal Processing* 86 (2006), pp. 2326–2339
- [18] “Wavelet-based simulation of fractional Brownian motion revisited”. *Applied and Computational Harmonic Analysis* 19 (2005), pp. 49–60

- [17] “Wavelet-type expansion of the Rosenblatt process”. *The Journal of Fourier Analysis and Applications* 10 (2004), pp. 599–634
- [16] “Stable stationary processes related to cyclic flows” (with M. S. Taqqu). *The Annals of Probability* 32 (2004), pp. 2222–2260
- [15] “Dilated fractional stable motions” (with M. S. Taqqu). *Journal of Theoretical Probability* 17 (2004), pp. 51–84
- [14] “Slow, fast and arbitrary growth conditions for renewal reward processes when the renewals and the rewards are heavy-tailed” (V. Pipiras, M. S. Taqqu and J. B. Levy). *Bernoulli* 10 (2004), pp. 121–163
- [13] “Can continuous-time stationary stable processes have discrete linear representations?” (V. Pipiras, M. S. Taqqu and P. Abry). *Statistics & Probability Letters* 64 (2003), pp. 147–157
- [12] “Central limit theorems for partial sums of bounded functionals of infinite-variance moving averages” (with M. S. Taqqu). *Bernoulli* 9 (2003), pp. 833–855
- [11] “Fractional calculus and its connections to fractional Brownian motion” (with M. S. Taqqu). In P. Doukhan, G. Oppenheim, and M. S. Taqqu, editors, *Long-range Dependence: Theory and Applications*. Birkhäuser, 2003, pp. 165–201
- [10] “Estimation of the self-similarity parameter in linear fractional stable motion” (S. Stoev, V. Pipiras and M. S. Taqqu). *Signal Processing* 82 (2002), pp. 1873–1901
- [9] “Deconvolution of fractional Brownian motion” (with M. S. Taqqu). *Journal of Time Series Analysis* 23 (2002), pp. 487–501
- [8] “Decomposition of self-similar stable mixed moving averages” (with M. S. Taqqu). *Probability Theory and Related Fields* 123 (2002), pp. 412–452
- [7] “The structure of self-similar stable mixed moving averages” (with M. S. Taqqu). *The Annals of Probability* 30 (2002), pp. 898–932
- [6] “Are classes of deterministic integrands for fractional Brownian motion on an interval complete?” (with M. S. Taqqu). *Bernoulli* 7 (2001), pp. 873–897
- [5] “Integration questions related to fractional Brownian motion” (with M. S. Taqqu). *Probability Theory and Related Fields* 118 (2000), pp. 251–291
- [4] “The limit of a renewal-reward process with heavy-tailed rewards is not a linear fractional stable motion” (with M. S. Taqqu). *Bernoulli* 6 (2000), pp. 607–614
- [3] “Convergence of weighted sums of random variables with long-range dependence” (with M. S. Taqqu). *Stochastic Processes and Their Applications* 90 (2000), pp. 157–174
- [2] “The Weierstrass-Mandelbrot process provides a series approximation to the harmonizable fractional stable motion” (with M. S. Taqqu). In C. Bandt, S. Graf, and M. Zähle, editors, *Fractal Geometry and Stochastics II*, pp. 161–179. Birkhäuser, 2000
- [1] “Convergence of the Weierstrass-Mandelbrot process to fractional Brownian motion” (with M. S. Taqqu). *Fractals* 8 (2000), pp. 369–384

Conference Papers

- [C29] “Statistical analysis of extreme ship loads: Physical distribution tails, limitations of data-driven approaches and model uncertainty” (with B. Brown), *Proceedings of the 33rd Symposium on Naval Hydrodynamics*, 2020
- [C28] “On extreme value properties of vertical bending moment” (with T. Sapsis, K. Weems and V. Belenky), *Proceedings of the 33rd Symposium on Naval Hydrodynamics*, 2020
- [C27] “Characterizing selective network vulnerability for Alzheimer’s disease by identifying critical connectome spectrum” (with B. Leinwand and G. Wu), *Proceedings of the IEEE International Symposium on Biomedical Imaging*, Iowa City, 2020
- [C26] “Induced edge samplings and triangle count distributions in large networks” (with N. Antunes and T. Guo), *Proceedings of Complex Networks and Their Applications VIII*, Springer, Lisbon, Portugal, 2019
- [C25] “Asymptotic results for multivariate local Whittle estimation with applications” (with M.-C. Düker), *Proceedings of the IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, Guadeloupe, West Indies, 2019
- [C24] “EPOT application and verification” (with K. Weems, V. Belenky, B. Campbell, T. Sapsis), *Proceedings of 17th Intl. Ship Stability Workshop*, Helsinki, Finland, 2019
- [C23] “On extending multifidelity uncertainty quantification methods from non-rare to rare problems” (with B. Brown), *Proceedings of 17th Intl. Ship Stability Workshop*, Helsinki, Finland, 2019
- [C22] “Regularized inversion of flow size distribution” (with N. Antunes and G. Jacinto), *INFOCOM*, 2019
- [C21] “Statistical uncertainty of measured and simulated ship motions” (with V. Belenky, M. Levine and K. Weems), *Proceedings of the 8th Conference on Stochastic Mechanics*, Paros, Greece, 2018
- [C20] “Pitfalls of data-driven peaks-over-threshold analysis: perspectives from extreme ship motions”, *Proceedings of the 8th Conference on Stochastic Mechanics*, Paros, Greece, 2018
- [C19] “Tail structure of roll and metric of capsizing in irregular waves” (with V. Belenky, K. Weems, D. Glotzer and T. Sapsis), *Proceedings of the 32nd Symposium on Naval Hydrodynamics*, Hamburg, Germany, 2018
- [C18] “Extreme-value properties of the split-time metric” (with V. Belenky and K. Weems), *Proceedings of the 13th International Conference on the Stability of Ships and Ocean Vehicles*, Kobe, Japan, 2018
- [C17] “On confidence intervals of mean and variance estimates of ship motions” (with D. Glotzer, V. Belenky, M. Levine and K. Weems), *Proceedings of the 13th International Conference on the Stability of Ships and Ocean Vehicles*, Kobe, Japan, 2018
- [C16] “Statistical uncertainty techniques for assessment of simulation and model test data” (with M. Levine, V. Belenky and K. Weems), *Proceedings of the 30th American Towing Tank Conference*, Bethesda, 2017
- [C15] “Statistical perspectives on some problems arising in Naval Engineering” (with D. Glotzer), *Proceedings of the 30th American Towing Tank Conference*, Bethesda, 2017

- [C14] “Semiparametric, parametric and possibly sparse models for multivariate long-range dependence” (with C. Baek and S. Kechagias), *Proceedings of SPIE: Wavelets and Sparsity XVII*, San Diego, 2017
- [C13] “Modeling broaching-to and capsizing with extreme value theory” (with V. Belenky, K. Weems, K. Spyrou and T. Sapsis), *Proc. of 16th Intl. Ship Stability Workshop*, Belgrade, Serbia, 2017
- [C12] “Skampling for the flow duration distribution” (with N. Antunes and D. Veitch), *Proceedings of 29th International Teletraffic Congress*, Genoa, Italy, 2017
- [C11] “Sampling and censoring in estimation of flow distributions” (with N. Antunes), 2015 IEEE International Conference on Communications
- [C10] “Split-time / critical derivative value approach for evaluation of probability of capsizing of a ship in irregular waves” (with V. Belenky, K. Weems and K. Spyrou). *The 7th International Conference on Computational Stochastic Mechanics (CSM-7)*, Santorini, Greece, 2014
- [C9] “Properties of the tail of envelope peaks and its use for the prediction of the probability of exceedance for ship motions in irregular waves” (with B. Campbell and V. Belenky). *The 7th International Conference on Computational Stochastic Mechanics (CSM-7)*, Santorini, Greece, 2014
- [C8] “On the application of the generalized Pareto distribution for statistical extrapolation in the assessment of dynamic stability in irregular waves” (with B. Campbell and V. Belenky). *The 14th International Ship Stability Workshop (ISSW-14)*, Kuala Lumpur, Malaysia, 2014
- [C7] “Extrapolation and validation aspects of the split-time method” (with V. Belenky, K. Weems, B. Campbell and T. Smith). *The 30th Symp. on Naval Hydrodynamics*, Hobart, Australia, 2014
- [C6] “Split-time method for calculation of probability of capsizing due to pure loss of stability” (with V. Belenky and K. Weems). *Proc. of 13th Intl. Ship Stability Workshop*, Brest, France, 2013
- [C5] “On the statistical uncertainties of time-domain-based assessment of stability failures: confidence interval for the mean and variance of a time series” (with V. Belenky, K. Kent, M. Hughes, B. Campbell and T. Smith). *Proc. of 13th Intl. Ship Stability Workshop*, Brest, France, 2013
- [C4] “Estimation of flow distributions tails from sampled traffic” (with N. Antunes). *Proceedings of IEEE Statistical Signal Processing Workshop*, Ann Arbor, 2012
- [C3] “Inverting flow durations from sampled traffic” (with N. Antunes). *Proceedings of 24th International Teletraffic Congress*, Krakow, Poland, 2012
- [C2] “Heavy traffic limits in a wireless queueing model with long-range dependence” (with R. Buche and A. Ghosh). *Proceedings of 2007 IEEE Conference on Decision and Control*
- [C1] “Extreme values, heavy tails and linearization effect: a contribution to empirical multifractal analysis” (with P. Abry and H. Wendt). *Proceedings of GRETSI 2007 conference*

Preprints

- [75] “Statistical inference for mean and variance of oscillatory processes” (with V. Belenky, D. Glotzer and K. Weems)
- [76] “Latent Gaussian count time series modeling” (with Y. Jia, S. Kechagias, J. Livsey and R. Lund)
- [77] “Cotrending: testing for common deterministic trends in varying means model” (with M.-C. Düker and R. Sundararajan)
- [78] “Penalized estimation and forecasting of multiple subject intensive longitudinal data” (with Z. F. Fisher, Y. Kim and B. L. Fredrickson)
- [79] “Thresholding and graphical local Whittle estimation” (with C. Baek and M.-C. Düker)
- [80] “Detecting functional connectivity changes in fMRI data” (with C. Baek, M. Gampe, B. Leinwand, K. Lindquist, J. Hopfinger and K. Gates)

Unpublished

- [U1] “On the usefulness of wavelet-based simulation of fractional Brownian motion”. Preprint. Available at <http://pipiras.web.unc.edu>
- [U2] “On rank estimation in semidefinite matrices” (with S. G. Donald and N. Fortuna). Preprint. Available at <http://pipiras.web.unc.edu>

Computer Code

Code or links to code for some papers are posted at <https://pipiras.web.unc.edu/code/>

Teaching

University of North Carolina at Chapel Hill:

Undergraduate Teaching:

Stor 155 - Introduction to Statistics (Fall 2002, Spring 2005, Spring 2007, Spring 2008, Fall 2010, Spring 2012, Spring 2014, Fall 2014)

Stor 435 - Introduction to Probability Theory (Spring 2020, Fall 2018, Fall 2005, Fall 2006, Fall 2007, Spring 2011, Spring 2013, Spring 2015, Spring 2016, Fall 2016)

Stor 456 - Statistical Methods II (Spring 2004, Spring 2005, Spring 2013).

Graduate Teaching:

Stor 634 - Measure and Integration Theory (Fall 2003, Fall 2005, Fall 2011, Fall 2013)

Stor 635 - Probability Theory (Spring 2008, Spring 2016)

Stor 754 - Time Series and Multivariate Analysis (Spring 2015)

Stor 831 - Advanced Probability: Weak Convergence, Empirical Processes (Fall 2013)

Stor 836 - Stochastic Analysis (Spring 2003)

Stor 890 - Special Topics: Topics in Time Series Analysis (Spring 2017)

Stor 890 - Special Topics: High-Dimensional Time Series (Spring 2019, Spring 2021)

Stor 891 - Special Topics: Wavelets in Statistics and Probability (Fall 2004)

Stor 891 - Special Topics: Long-Range Dependence and Self-Similarity (Falls 2006, 2012)

Boston University: Probability seminar, a series of lectures on “Stable non-Gaussian processes and their connection to non-singular flows” (Fall, 2001); Probability seminar, a series of lectures on “Fractional calculus and its connections to fractional Brownian motion” (Spring 2000)

Post Docs

Z. Fisher (2020-), through Carolina Population Center, jointly with K. Bollen (Psychology and Neuroscience) and R. Hummer (Sociology)

Ph.D. Students

Sole advisor:

Y. Kim (started in Fall 2019). Dissertation topics: multiple subject high-dimensional time series; categorical high-dimensional time series

D. Glotzer (graduated in Spring 2018, started as Assistant Professor at Meredith College). Dissertation topics: extreme value analysis and uncertainty quantification with applications to ship motions

S. Kechagias (graduated in Spring 2015, started at SAS). Dissertation topics: multivariate long-range dependence and applications; simulation of multidimensional models and optimization

R. Chaudhuri (graduated in Spring 2014, started at JPMorgan Chase, now at IBM New Delhi). Dissertation topics: semi-stable non-Gaussian laws arising in sampling of finite renewal processes; numerical evaluation of semi-stable densities

C. Baek (graduated in Spring 2010, first Assistant Professor at Ohio University, now at Sungkyunkwan University, Korea). Dissertation topics: heavy tails in random difference equations; long-range dependence and changes in mean

G. Didier (graduated in Spring 2007, currently Associate Professor at Tulane University). Dissertation topics: adaptive wavelet decompositions; operator fractional Brownian motions

Co-advisor:

D. Patel (started in Fall 2019). Co-advised with Prof. S. Bhamidi. Dissertation topics: networks and time series

B. Leinwand (started in Fall 2018). Co-advised with Prof. G. Wu. Dissertation topics: weighted dense networks

Other:

M.-C. Düker, visiting PhD student, Fall 2018 – Fall 2019, Ruhr Universität Bochum

B. Brown, RA under a grant, Spring 2019 –

Member of a number of Ph.D. (excluding advisees) committees:

C. Mosso, K. O'Connor, Z. Fisher (Psychology and Neuroscience), B. Brown, M. He, R. Fan, S. Chakraborty (2018), Y. Liu (2017), E. Friedlander (2018), T. Henry (2017; Psychology and Neuroscience), X. Chen (2017), J. Jin (2017), R. Wu (2016), A. Majumder (2015), X. Wang (2014), J. Chen (2013), V. Maroulas (2008), M. Trovero (2007), F. Mitha (2003)

M.Sc. Students

I. Robson (single cell RNAseq time course data modeling, 2019/2020)
K. Prakhya (dynamic covariance estimation in high dimensional time series; jointly with C. Ji, 2016/2017)
S. Sarangi (option pricing with long memory volatility models; jointly with C. Ji, 2011/2012)

Several other MS students as part of the consulting course Stor 765: T. Henry (2016/2017), R. Scott (2013/2014), J. Liu (2012/2013), T. Xu (2011/2012). Reader for: J. Zappa (2015), K. Ward (2004)

Undergraduate Honors and Research Projects

T. Pham (neural networks and time series, Fall 2020)
M. Gampe (change points in fMRI, Fall 2018, Spring 2019)
R. West (financial time series, Fall 2018)
Y. Zhou (time series analysis, Fall 2017)
T. Guo (sampling of networks, Fall 2017, 2018, Spring 2019)
E. Qian and K. Xie (spatio-temporal extremes, Spring 2017)
B. Wang (sampling and streaming algorithms, Fall 2016)
A. Katsevich (inference in high-dim. linear models, Fall 2014, Spring 2015)
R. Wei (Bayesian computations, Fall 2013)
Y. Wang (Statistics in life insurance, Fall 2013)
W. Boquist (multifractals, Spring 2013)
X. Du (sampling in computer networks, Fall 2011)

Several other undergraduate students writing internship reports through Stor 493: Z. Chen (Best Practices, LLC; Summer, 2016), K. Gardner (Volvo Group; Spring, 2016), W. McDonald (Web Decisions; Summer, 2015), W. Zheng (Epic Games; Summer, Fall 2014), N. Ball (NC OMMISS; Spring 2013)

Service to the Department at UNC

Chair and member of two reappointment committees (2018); Co-chair of Colloquium committee (2016-2017); Member of MDS committee (2016-2017); Member (2) of Mentoring committees (2016-2019); Member of Instructional Mentoring committee (2016-2017); Associate Chair (2014-2016); Director of the Undergraduate Studies and the Mathematical Decision Sciences (MDS) program (2010-2016); Chair of the hiring committee (2015-2016); Chair (1) and member (1) of PTR committees (2015); Member of promotion (2) and reappointment (1) committees (2014); Faculty advisor for the MDS program (2003-2008); Co-chair of the teaching scheduling committee (2004-2008); Member of the graduate curriculum committee (2006-2008); Chair of the Statistics Colloquia (2007-2008); Bookchair (2002-2004)

Service to the University at UNC

Member of the Dean's advisory committee (2020 Fall-2021 Spring); Member of a data science subcommittee for undergraduate education (2019 Fall); Member of a task force for Curriculum 2019: Producing Citizen-Scholars (2017 Spring); Member of the Administrative Board of the General College (2014-2017), with service on the curriculum and appeals committees; The Packard Fellowships for Science and Engineering internal reviewer for UNC-CH (2015)

Professional Service

2020 October	Co-organizer of a 5-day meeting on "Statistical modeling for large complex time dependent systems", Banff International Research Station, Canada (postponed)
2020-	Serving on the Bernoulli Society Publication Committee
2018	On the program committee of joint 2018 IMS Annual Meeting and 12th International Vilnius Conference on Probability Theory and Mathematical Statistics, Vilnius, Lithuania
2014 February	Co-organizer of a 5-day meeting on "Multifractal analysis: from theory to applications and back", Banff International Research Station, Canada
Assoc. Editor	<i>Statistics: A Journal of Theoretical and Applied Statistics</i> (2020–) <i>Lithuanian Mathematical Journal</i> (2019–) <i>Stochastic Processes and Their Applications</i> (2018–) <i>REVSTAT</i> (2014–2018) <i>Advances in Statistics</i> (2013–2014) <i>Journal of Probability and Statistics</i> (2013–2014)
2013, 2014, 2015	UNC organizer of DataFest2013, 2014, 2015, an undergraduate competition in data analysis. Web: http://stat.duke.edu/datafest
Twice	Serving on Statistics grants review panel at National Science Foundation (NSF)
Twice	Serving on Probability and Statistics grants review panel at National Security Agency (NSA)

2012 April	Co-organizer of “International conference on long-range dependence, self-similarity and heavy tails”, Research Triangle Park, North Carolina, USA. Web: http://lrd2012.web.unc.edu/
Other	Reviewer for US promotion cases (2), French habilitation theses (1), Portuguese habilitation theses (1), Chinese promotion cases (1)

Professional Affiliations

IMS

Consulting

U.S. Navy (2015)

Law firm (2020)

Referee for

Journals (Multiple times for a number of these journals):

The Annals of Applied Probability, The Annals of Probability, The Annals of Statistics, Applied and Computational Harmonic Analysis, Applied Mathematical Modeling, Applied Probability, Bernoulli, Brazilian Journal of Probability and Statistics, Bulletin of the Iranian Mathematical Society, EBP volume, Econometric Theory, Electronic Communications in Probability, Electronic Journal of Probability, Electronic Journal of Statistics, Extremes, FITraMen 2008, High Frequency, IEEE Transactions on Information Theory, IEEE Transactions on Signal Processing, International Journal of Offshore and Polar Engineering, ITISE 2017, Journal of Applied Statistics, International Journal of Statistics and Management Systems, Journal of American Statistical Association, Applied Probability, Journal of Computational and Graphical Statistics, Journal of Financial Econometrics, Journal of Fourier Analysis and Applications, Journal of Integral Equations, Journal of Mathematical Analysis and Applications, Journal of Multivariate Analysis, Journal of Selected Topics in Signal Processing, Journal of Stochastic Analysis and Applications, Journal of Theoretical Probability, Mathematics of Operations Research, Mathematical Problems in Engineering, Physica D: Nonlinear Phenomena, Potential Analysis, Probability and Mathematical Statistics, Probability Theory and Related Fields, Proceedings of the American Mathematical Society, Proceedings of the Royal Society A, Psychometrika, Quantitative Finance, Queueing Systems, REVSTAT Statistical Journal, Rocky Mountain Journal of Mathematics, SIAM Journal of Numerical Analysis, SIAM Journal on Scientific Computing, SIAM/ASA Journal on Uncertainty Quantification, SPE2011, Signal Processing, Stochastic Models, Stochastic Processes and Their Applications, Stochastics, Statistics and Probability Letters, Statistica Sinica, Turkish Journal of Mathematics

Book proposals (Multiple times for several of these publishers):

Chapman & Hall/CRC Press, Elsevier, Springer

Workshop proposals:

BIRS

Grant agencies (Multiple times for a number of these agencies):

Army Research Office (ARO)

Israel Science Foundation (ISF)

National Science Agency (NSA)

Netherlands Organisation for Scientific Research (NWO)

Book chapters:

Contemporary ideas for ship stability (2018, Elsevier)

Talks and Poster Presentations Since 2010

“Sampling-based estimation of in-degree distribution in directed complex networks”, University of North Carolina, Chapel Hill, November, 2020 (Zoom talk)

“Statistical analysis of extreme ship loads: Physical distribution tails, limitations of data-driven approaches and model uncertainty”, 33rd Symposium on Naval Hydrodynamics (SNH), October, 2020 (Zoom talk)

“Asymptotic results for multivariate local Whittle estimation with applications”, IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP), Guadeloupe, West Indies, December, 2019

“Gaussian copula vector autoregressive modeling”, Joint Statistical Meetings, Denver, July, 2019

“Linear regression: the old, the new and applications in Naval Architecture”, David Taylor Model Basin - NSWCCD, Bethesda, Maryland, July, 2019

“Pitfalls of data-driven peaks-over-threshold analysis: perspectives from extreme ship motions”, International Conference on Extreme Value Analysis, Zagreb, Croatia, July 2019

“On extending multifidelity uncertainty quantification methods from non-rare to rare problems”, Intl. Ship Stability Workshop, Helsinki, Finland, June 2019

“Eigenstructure description and testing in stationary subspace analysis”, UC Davis, February, 2019

“Sampling-based estimation of in-degree distribution in directed complex networks”, George Mason University, November, 2018

“Sampling-based estimation of in-degree distribution in directed complex networks”, Michigan State University, November, 2018

“Asymptotics of bivariate local Whittle estimators with some applications”, AMS meeting, University of Michigan, October, 2018

“Latent Gaussian count time series modeling”, Poster, NBER-NSF Time Series Conference, UC San Diego, 2018

“Data-driven quantification of model uncertainty”, David Taylor Model Basin - NSWCCD, Bethesda, Maryland, August, 2018

“Latent Gaussian count time series modeling”, Poster, 12th International Vilnius Conference on Probability Theory and Mathematical Statistics and 2018 IMS Annual Meeting on Probability and Statistics, Vilnius, Lithuania, July, 2018

“Small and large scale behavior of moments of Poisson cluster processes”, Conference in honor of Prof. D. Surgailis, Vilnius, Lithuania, July, 2018

“Asymptotics of bivariate local Whittle estimators with some applications”, CMO, Oaxaca, Mexico, June, 2018

“Several aspects of modeling univariate and multivariate periodic time series”, Census Bureau, May, 2018

“Some extreme value problems arising with ship motions”, American University, April, 2018

“Sampling and inversion methods in several “big data” applications”, Columbia University, April, 2018

“Estimating probabilities of extreme values and rare events with applications in Naval Architecture”, David Taylor Model Basin - NSWCCD, Bethesda, Maryland, March, 2018

“Some extreme value problems arising with ship motions”, Texas A&M University, March, 2018

“Chasing change points in an fMRI data set”, UNC Psychology and Neuroscience Quant Forum, October, 2017

“Statistical perspectives on some problems arising in Naval Engineering”, the 30th American Towing Tank Conference, Bethesda, October, 2017

“Some extreme value problems arising with ship motions”, MIT, September, 2017

“Periodic dynamic factor models: estimation approaches and applications”, Poster, NBER-NSF Time Series Conference, Northwestern University, September, 2017

“Distributions and extreme value analysis of critical response rate and split-time metric in nonlinear random oscillators”, David Taylor Model Basin - NSWCCD, Bethesda, Maryland, August, 2017

“Semiparametric, parametric and possibly sparse models for multivariate long-range dependence”, SPIE: Wavelets and Sparsity XVII, San Diego, August, 2017

“Semiparametric, parametric and possibly sparse models for multivariate long-range dependence”, Joint Statistical Meetings, Baltimore, August, 2017

“Semiparametric, parametric and possibly sparse models for multivariate long-range dependence”, European Meeting of Statisticians, Helsinki, Finland, July, 2017

“A bivariate long-range dependent time series model with general phase”, Indiana University, AMS Sectional Meeting, April, 2017

“Sparse seasonal and periodic vector autoregressive modeling”, Sungkyunkwan University, Korea, October, 2016

“A bivariate long-range dependent time series model with general phase”, University of Cincinnati, September, 2016

“Sparse seasonal and periodic vector autoregressive modeling”, Joint Statistical Meetings, Chicago, August, 2016

“Statistical uncertainty and stochastic dynamics questions related to ship motions in irregular seas”, David Taylor Model Basin - NSWCCD, Bethesda, Maryland, July, 2016

“Bivariate long-range dependent time series models with general phase”, Recent developments in statistics for complex dependent data, Loccum, Germany, August, 2015

“Extreme values of response of dynamical systems akin to ship motions”, David Taylor Model Basin - NSWCCD, Bethesda, Maryland, July, 2015

“Bivariate long-range dependent time series models with general phase”, IISER Time Series Conference, Pune, India, May, 2015

“On circulant matrix embeddings in synthesis of stationary Gaussian fields”, AMS meeting at Michigan State University, March, 2015

“Quadratic programming in synthesis of stationary Gaussian fields”, Clemson University, November, 2014

“Quadratic programming in synthesis of stationary Gaussian fields”, Boston University, November, 2014

“Estimating exceedance probabilities for extreme ship motions in irregular waves”, David Taylor Model Basin - NSWCCD, Bethesda, Maryland, July, 2014

“Definitions and representations of multivariate long-range dependent series”, the workshop on “Recent Advances and Trends in Time Series Analysis: Nonlinear Time Series, High Dimensional Inference and Beyond”, the Banff International Research Station, April, Canada, 2014

“Definitions and representations of multivariate long-range dependent series”, NBER-NSF Time Series Conference, Federal Reserve, Washington DC, September, 2013

“On distinguishing multiple changes in mean and long-range dependence using local Whittle estimation”, Triangle Econometrics Conference, Research Triangle Park, North Carolina, December, 2012

“On distinguishing multiple changes in mean and long-range dependence using local Whittle estimation”, International Conference on Advances in Interdisciplinary Statistics and Combinatorics, University of North Carolina at Greensboro, October, 2012

“Smoothing windows for the synthesis of Gaussian stationary random fields using circulant matrix embedding”, Portuguese Mathematical Society Meeting, Algarve, Portugal, July, 2012

“On distinguishing multiple changes in mean and long-range dependence using local Whittle estimation”, International Workshop on Applied Probability, Jerusalem, Israel, June, 2012

“Adaptive wavelet decompositions of stochastic processes and some applications”, Multifractal Analysis Seminar, Universite Paris-Est Creteil, France, May, 2012

“Smoothing windows for the synthesis of Gaussian stationary random fields using circulant matrix embedding”, Poster, International Conference on Long-Range Dependence, Self-Similarity and Heavy Tails, Research Triangle Park, North Carolina, April, 2012

“Statistical tests for changes in mean against long-range dependence”, University of North Carolina, Econometrics Seminar, Department of Economics, March, 2011

“Synthesis of Gaussian and non-Gaussian stationary time series using circulant matrix embedding”, University of North Carolina, Internal Seminar, Department of Statistics and OR, November, 2010

“Physical models for long-range dependence”, Banff International Research Station, Canada, Meeting on “The Mathematical Genesis of the Phenomenon called $1/f$ noise”, June, 2010

Computing and Statistical Software

MATLAB, R, Python

Languages

Lithuanian, English, Portuguese, French, Russian

Updated January, 2021