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## Gustavo Didier

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New Orleans, LA 70118

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### Research Interests

- random processes and fields (fractional/self-similar, anomalous diffusion)
- high-dimensional probability, random matrices and (time series) applications
- wavelets and applied harmonic analysis
- mathematical biology (nanobiophysics) and signal processing (network traffic, neuroscience)

### Education

- 2002 - 2007      **University of North Carolina at Chapel Hill, USA.**  
Ph.D. and M.S. advisor: Vladas Pipiras.
- 2000 - 2002      **Institute for Pure and Applied Mathematics, Brazil.**  
M.S. advisor: Aloisio Araujo.
- 1994 - 2000      **Federal University of Rio de Janeiro, Brazil.**  
B.A. and M.S. advisor: Jorge C. Batista.

### Professional Experience

- 2013/7 - present    Associate professor. Mathematics Department, Tulane University.
- 2007/7 - 2013/6    Assistant professor. Mathematics Department, Tulane University.
- 2024/7 - 2024/8    CNRS invited visiting researcher. École Normale Supérieure de Lyon, Physics Lab.
- 2022/6 - 2022/8    CNRS invited visiting researcher. École Normale Supérieure de Lyon, Physics Lab.
- 2021/9              Visiting scholar (by courtesy). Mathematics Department, University of Michigan – Ann Arbor.
- 2021/7 - 2021/8    CNRS invited visiting researcher. École Normale Supérieure de Lyon, Physics Lab.
- 2019/6 - 2019/7    CNRS invited visiting researcher. École Normale Supérieure de Lyon, Physics Lab.

2018/6 - 2018/7 CNRS invited visiting researcher. École Normale Supérieure de Lyon, Physics Lab.

2017/6 - 2017/7 CNRS invited visiting researcher. École Normale Supérieure de Lyon, Physics Lab.

2015/6 - 2015/7 CNRS invited visiting researcher. École Normale Supérieure de Lyon, Physics Lab.

2014/1 - 2014/8 Visiting researcher. École Normale Supérieure de Lyon, Physics Lab.

2013/9 - 2013/12 Visiting researcher. Department of Statistics and Probability, Michigan State University.

2011/1 - 2011/6 Visiting researcher. École Normale Supérieure de Lyon, Physics Lab.

2008/7 Visiting researcher. Institute for Pure and Applied Mathematics, Rio de Janeiro, Brazil.

2004/9 - 2007/6 Research assistant (with Vlas Pipiras). University of North Carolina at Chapel Hill.

2004/6 - 2005/5 Research assistant (with Robert Rodriguez). SAS Institute Inc., Cary, NC.

2004/1 - 2004/5 Research assistant (with Harry L. Hurd). University of North Carolina at Chapel Hill.

2002/4 - 2002/7 Visiting instructor. Department of Economics, Federal University of Rio de Janeiro.

1997/10 - 1998/3 Research assistant (with J. C. Batista). Federal University of Rio de Janeiro.

## External support

- (PI) “High-dimensional fractal analysis”. Simons Foundation collaboration grant for mathematicians, award no. 714014 (2020–2025). Amount awarded: \$42,000.
- (co-investigator: with John Fricks, Penn State University) “Forward and inverse methods for stochastic models of diffusing particles in complex biofluids”. Army Research Office, prime award no. W911NF-14-1-0475, Biomathematics subdivision (2014–2017). Amount awarded: 25% of \$384,926.
- (co-investigator: with John Fricks, Penn State University) “Statistical inference and stochastic simulation for microrheology”. Army Research Office, Short-Term Innovative Research (STIR) program, prime award no. W911NF-12-1-0512, Biomathematics subdivision (2012–2013). Amount awarded: 40% of \$50,000.
- (PI) “On multivariate long range dependence”. Louisiana Board of Regents award LEQSF(2008-11)-RD-A-23, Research Competitiveness Subprogram (2008–2012). Amount awarded: \$51,789.

## Internal support

- Carol Lavin Bernick Faculty Grant (2019).
- COR International Travel Grant (2011, 2019).

## Preprints (journal and conference papers)

- [4] Wendt, H., Didier, G., Carlsson, M., Troedsson, E. and Abry, P. (2025), ‘Multiscale demixing for multivariate self-similarity estimation’, pp. 1–4. *Under review*.
- [3] Wendt, H., Didier, G., Carlsson, M., Troedsson, E. and Abry, P. (2025), ‘Multiscale approximate eigenvectors for multivariate self-similarity estimation’, pp. 1–5. *Under review*.
- [2] Abry, P., Didier, G., Orejola, O. and Wendt, H. (2025), ‘A spectral clustering-type algorithm for the consistent estimation of the Hurst distribution in moderately high dimensions’, pp. 1–38. *Under review*.
- [1] Fontugne, R., Abry, P., Fukuda, K., Cho, K., Didier, G. and Wendt, H. (2024), ‘Eigenvalue-based multivariate selfsimilarity analysis of Internet traffic: A case study’, pp. 1–5. *Under review*.

## Journal publications and forthcoming papers

- [31] Abry, P., Didier, G., Orejola, O. and Wendt, H. (2025), ‘On the empirical spectral distribution of large wavelet random matrices based on mixed-Gaussian fractional measurements in moderately high dimensions’. *Electronic Journal of Probability*, **30**, pp. 1–48.
- [30] Abry, P., Boniece, B. C., Didier, G. and Wendt, H. (2024), ‘On high-dimensional wavelet eigenanalysis’. *Annals of Applied Probability*, **34**(6), pp. 5287–5350.
- [29] Lucas, C.-G., Didier, G., Wendt, H. and Abry, P. (2024), ‘Multivariate selfsimilarity: Multiscale eigen-structures for selfsimilarity parameter estimation’. *IEEE Transactions on Signal Processing*, **72**, pp. 1739–1749.
- [28] Didier, G., Glatt-Holtz, N. E., Holbrook, A. J., Magee, A. F. and Suchard, M. A. (2024), ‘On the surprising effectiveness of a simple matrix exponential derivative approximation, with application to global SARS-CoV-2’. *Proceedings of the National Academy of Sciences of the U.S.A.*, **121**(3), e231898912.
- [27] Abry, P., Boniece, B. C., Didier, G. and Wendt, H. (2023), ‘Wavelet eigenvalue regression in high dimensions’. *Statistical Inference for Stochastic Processes* **26**(1), 1–32.
- [26] Didier, G. and Nguyen, H. (2022), ‘The generalized Langevin equation in harmonic potentials: anomalous diffusion and equipartition of energy’. *Communications in Mathematical Physics* **393**(2), pp. 909–954.

- [25] Boniece, B. C. and Didier, G. (2022), ‘On operator fractional Lévy motion: integral representations and time reversibility’. *Advances in Applied Probability* **54**(2), pp. 493–535.
- [24] Zhang, K. and Didier, G. (2021), ‘Asymptotic theory for the detection of mixing in anomalous diffusion’. *Journal of Mathematical Physics* **62**, 063301.
- [23] Boniece, B. C., Didier, G. and Sabzikar, F. (2021), ‘Tempered fractional Brownian motion: wavelet estimation, modeling and testing’. *Applied and Computational Harmonic Analysis*, **51**, March, pp. 461–509.
- [22] Didier, G., Kanamori, S. and Sabzikar, F. (2021), ‘On multivariate fractional random fields: tempering and operator-stable laws’. *Journal of Mathematical Analysis and Applications*, **495**(1), 124659.
- [21] Didier, G. and Nguyen, H. (2020), ‘Asymptotic analysis of the mean squared displacement under fractional memory kernels’. *SIAM Journal on Mathematical Analysis*, **52**(4), pp. 3818–3842.
- [20] Boniece, B. C., Didier, G. and Sabzikar, F. (2020), ‘On fractional Lévy processes: tempering, sample path properties and stochastic integration’. *Journal of Statistical Physics*, **178**(4), pp. 954–985.
- [19] Abry, P., Wendt, H., Jaffard, S. and Didier, G. (2019), ‘Multivariate scale free temporal dynamics: From spectral (Fourier) to fractal (wavelet) analysis’. *Comptes Rendus [de l’Académie des Sciences] Physique*, **20**(5), July–August, pp. 489–501.
- [18] Abry, P., Didier, G. and Li, H. (2019), ‘Two-step wavelet-based estimation for Gaussian mixed fractional processes’. *Statistical Inference for Stochastic Processes*, **22**(2), July, pp. 157–185.
- [17] Zhang, K., Crizer, K. P. R., Schoenfish, M. H., Hill, D. B. and Didier, G. (2018), ‘Fluid heterogeneity detection based on the asymptotic distribution of the time-averaged mean squared displacement in single particle tracking experiments’. *Journal of Physics A: Mathematical and Theoretical*, **51** 445601.  
[**remark:** paper selected for the *Journal of Physics A Highlights of 2018* collection]
- [16] Abry, P. and Didier, G. (2018), ‘Wavelet eigenvalue regression for  $n$ -variate operator fractional Brownian motion’. *Journal of Multivariate Analysis*, **168**, November, pp. 75–104.
- [15] Didier, G., Meerschaert, M. M. and Pipiras, V. (2018), ‘Domain and range symmetries of operator fractional Brownian fields’. *Stochastic Processes and their Applications*, **128**(1), pp. 39–78.
- [14] Abry, P. and Didier, G. (2018), ‘Wavelet estimation for operator fractional Brownian motion’. *Bernoulli*, **24**(2), pp. 895–928. [‘supplementary material’, published online by *Bernoulli*, pp. 1–15].

- [13] Wendt, H., Didier, G., Combrexelle, S. and Abry, P. (2017), ‘Multivariate Hadamard self-similarity: testing fractal connectivity’. *Physica D: Nonlinear Phenomena*, **356–357**, pp. 1–36.
- [12] Didier, G. and Zhang, K. (2017), ‘The asymptotic distribution of the pathwise mean squared displacement in single particle tracking experiments’. *Journal of Time Series Analysis*, **38**(3), May, pp. 395–416. [‘supporting information’, published online by *Journal of Time Series Analysis*, pp. 1–7.]
- [11] Didier, G., Meerschaert, M. M. and Pipiras, V. (2017), ‘Exponents of operator self-similar random fields’. *Journal of Mathematical Analysis and Applications*, **448**(2), pp. 1450–1466.
- [10] Frecon, J., Didier, G., Pustelnik, N. and Abry, P. (2016). ‘Non-linear wavelet regression and branch and bound minimization for the full identification of bivariate operator fractional Brownian motion’, *IEEE Transactions on Signal Processing*, **64**(15), pp. 4040–4049.
- [9] Baek, C., Didier, G. and Pipiras, V. (2014), ‘On integral representations of operator fractional Brownian fields’. *Statistics and Probability Letters*, **92**, pp. 190–198.
- [8] Didier, G. and Fricks, J. (2014), ‘On the wavelet-based simulation of anomalous diffusion’. *Journal of Statistical Computation and Simulation*, **84**(4), pp. 697–723.
- [7] Didier, G., Jaffard, S. and Pipiras, V. (2013), ‘On the Riesz property of  $L^2$ -unbounded transformations of orthogonal wavelet bases’. *Journal of Approximation Theory*, vol.176, December, pp. 94–117.
- [6] Didier, G. and McKinley, S. A., Hill, D. B. and Fricks, J (2012), ‘Statistical challenges in microrheology’. *Journal of Time Series Analysis*, **33**(5), September, pp. 724–743.
- [5] Didier, G. and Pipiras, V. (2012), ‘Exponents, symmetry groups and classification of operator fractional Brownian motions’. *Journal of Theoretical Probability*, **25**(2), pp. 353–395.
- [4] Didier, G. and Pipiras, V. (2011), ‘Integral representations and properties of operator fractional Brownian motions’. *Bernoulli*. **17**(1), pp. 1–33.
- [3] Didier, G. and Pipiras, V. (2010), ‘Adaptive wavelet decompositions of stationary time series’. *Journal of Time Series Analysis*, **31**(3), May, pp. 182–209.
- [2] Belloni, A. and Didier, G. (2008), ‘On the Behrens-Fisher problem: a globally convergent algorithm and a finite sample study of the Wald, LR and LM Tests’. *Annals of Statistics*, **36**(5), pp. 2377–2408.
- [1] Didier, G. and Pipiras, V. (2008), ‘Gaussian stationary processes: discrete approximations, adaptive wavelet decompositions and their convergence’. *Journal of Fourier Analysis and Applications*, **14**(2), April, pp. 203–234.

## Conference papers (peer-reviewed)

- [19] Orejola, O., Didier, G., Wendt, H. and Abry, P. (2024), ‘Identifying high-dimensional self-similarity based on spectral clustering applied to large wavelet random matrices’. *32<sup>nd</sup> European Signal Processing Conference (EUSIPCO)*, Lyon, France, pp. 1–5.
- [18] Lucas, C.-G., Abry, P., Wendt, H. and Didier, G. (2023), ‘Epileptic seizure prediction from eigen-wavelet multivariate self-similarity analysis of multi-channel EEG signals’. *31<sup>st</sup> European Signal Processing Conference (EUSIPCO)*, Helsinki, Finland, pp. 1–5.
- [17] Lucas, C.-G., Abry, P., Wendt, H., Didier, G. and Orejola, O. (2023), ‘Bootstrap based test for the unimodality of estimated Hurst exponents: performance assessment in a high-dimensional analysis setting’, pp. 1–4. *XXIX<sup>ème</sup> Colloque Francophone de Traitement du Signal et des Images (GRETSI)*, Grenoble, France, pp. 1–5.
- [16] Lucas, C.-G., Wendt, H., Abry, P. and Didier, G. (2022), ‘Multivariate time-scale bootstrap for testing the equality of selfsimilarity parameters’. *XXVIII<sup>ème</sup> Colloque Francophone de Traitement du Signal et des Images (GRETSI)*, Nancy, France, pp. 1–5.
- [15] Orejola, O., Didier, G., Abry, P. and Wendt, H. (2022), ‘Hurst multimodality detection based on large wavelet random matrices’. *30<sup>th</sup> European Signal Processing Conference (EUSIPCO)*, Belgrade, Serbia, pp. 1–5.
- [14] Lucas, C.-G., Abry, P., Wendt, H. and Didier, G. (2022), ‘Drowsiness detection from polysomnographic data using multivariate selfsimilarity and eigen-wavelet analysis’. *44<sup>th</sup> Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC 2022)*, Glasgow, U.K., pp. 1–5.
- [13] Lucas, C.-G., Abry, P., Wendt, H. and Didier, G. (2022), ‘Counting the number of different scaling exponents in multivariate scale-free dynamics: clustering by bootstrap in the wavelet domain’. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Singapore, pp. 5513–5517.
- [12] Lucas, C.-G., Abry, P., Wendt, H. and Didier, G. (2021), ‘Bootstrap for testing the equality of selfsimilarity exponents across multivariate time series’. *29<sup>th</sup> European Signal Processing Conference (EUSIPCO)*, Dublin, Ireland, pp. 1–5.
- [11] Catrambone, V., Abry, P., Valenza, G., Wendt, H., Didier, G. and Barbieri, R. (2020), ‘Multiscale eigen analysis on EEG and heartbeat dynamics: a pilot study’. *11<sup>th</sup> Conference of the European Study Group on Cardiovascular Oscillations (ES-GCO)*, Pisa, Italy, pp. 1–2.
- [10] Boniece, B. C., Wendt, H., Didier, G. and Abry, P. (2019), ‘Wavelet-based detection and estimation of fractional Lévy signals in high dimensions’. *8<sup>th</sup> IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, Le Gosier, Guadeloupe, pp. 1–5.

- [9] Boniece, B. C., Didier, G., Wendt, H. and Abry, P. (2019), ‘On multivariate non-Gaussian scale invariance: fractional Lévy processes and wavelet estimation’. *27<sup>th</sup> European Signal Processing Conference (EUSIPCO)*, A Coruña, Spain, pp. 1–5.
- [8] Didier, G., Wendt, H. and Abry, P. (2019), ‘Detection and estimation of delays in bivariate self-similarity: bootstrapped complex wavelet coherence’. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Brighton, U.K., pp. 1–5.
- [7] Wendt, H., Abry, P. and Didier, G. (2019), ‘Bootstrap-based bias reduction for the estimation of the self-similarity exponents of multivariate time series’. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Brighton, U.K., pp. 1–5.
- [6] Abry, P. and Wendt, H. and Didier, G. (2018), ‘Detecting and estimating multivariate self-similar sources in high-dimensional mixtures’. *IEEE Statistical Signal Processing Workshop*, Freiburg, Germany, pp. 1–5.
- [5] Boniece, B. C., Sabzikar, F. and Didier, G. (2018), ‘Tempered fractional Brownian motion: wavelet estimation and modeling of turbulence in geophysical flows’. *IEEE Statistical Signal Processing Workshop*, Freiburg, Germany, pp. 1–5.
- [4] Wendt, H., Abry, P. and Didier, G. (2018), ‘Wavelet domain bootstrap for testing the equality of bivariate self-similarity exponents’. *IEEE Statistical Signal Processing Workshop*, Freiburg, Germany, pp. 1–5.
- [3] Combrexelle, S., Wendt, H., Didier, G. and Abry, P. (2017), ‘Multivariate scale-free dynamics: testing fractal connectivity’. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, New Orleans, USA, pp. 1–5.
- [2] Frecon, J., Fontugne, R., Didier, G., Pustelnik, N., Fukuda, K. and Abry, P. (2016), ‘Non-linear regression for bivariate self-similarity identification – application to anomaly detection in Internet traffic based on a joint scaling analysis of packet and byte counts’. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Shanghai, China, pp. 1–5.
- [1] Didier, G., Helgason, H. and Abry, P. (2015), ‘Demixing multivariate-operator self-similar processes’. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Brisbane, Australia, pp. 1–5.

## Other publications

- [3] “Studies in stochastic processes: adaptive wavelet decompositions and operator fractional Brownian motions”. *Ph.D. thesis, University of North Carolina at Chapel Hill*. Advisor: V. Pipiras. (2007).
- [2] Batista, J. C. and Didier, G. (2001), ‘Real and effective exchange rates with double-weighting scheme for Brazilian manufactured products’, *Boletim de Conjuntura*, vol. 20, no. 3, p. 59–66. Rio de Janeiro, Brazil.

- [1] “The geography of Brazilian competition patterns and the effects of changes in relative prices on Brazilian exports”. *M.S. thesis, Federal University of Rio de Janeiro*. Advisor: J. C. Batista. (2000).

## Presentations

(**I**: invited), (**P**: accepted paper)

- 2024/08 (P) “Identifying high-dimensional self-similarity based on spectral clustering applied to large wavelet random matrices”. *32<sup>nd</sup> European Signal Processing Conference (EUSIPCO)*, Lyon, France.
- 2024/06 (I) “Random matrices and spectral clustering for modeling high-dimensional self-similar systems”. *International Symposium on Non-parametric Statistics*, Braga, Portugal.
- 2024/05 (I) “Random matrix theory”.  $3 \times 2$ -hour lectures at the *Math Mini Summer School*, Tulane University, New Orleans, LA (organizers: Hongfei Chen, Ekaterini Gkogkou and Guido Mazzuca).
- 2023/10 (I) “Wavelet random matrices and high-dimensional fractals”. *Statistics and Probability colloquium*, Michigan State University, East Lansing, Michigan.
- 2023/07 (I) “Wavelet random matrices and high-dimensional fractals”. 1-hour lecture at the summer school *Harmonic and Multifractal Analyses: from Mathematics to Quantitative Neuroscience*, at the Centre de Recherches Mathématiques, Montréal, Canada.
- 2022/08 (P) “Hurst multimodality detection based on large wavelet random matrices”. *30<sup>th</sup> European Signal Processing Conference (EUSIPCO)*, Belgrade, Serbia.
- 2022/06 (I) “Wavelet random matrices and high-dimensional eigenanalysis”. *2022 Institute of Mathematical Statistics Annual Meeting*, London, U.K.
- 2021/07 (I) “On scaling in high dimensions” [online]. *10<sup>th</sup> World Congress in Probability and Statistics*, Seoul, South Korea.
- 2019/12 (P) “Wavelet-based detection and estimation of fractional Lévy signals in high dimensions”. *8<sup>th</sup> IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP)*, Le Gosier, Guadeloupe.
- 2019/10 (I) “On scaling in high dimensions”. *Biostatistics seminar*, LSUHSC, New Orleans, LA.
- 2019/06 (I) “On scaling in high dimensions”. *Third International Congress on Actuarial Science and Quantitative Finance*, Manizales, Colombia.

- 2018/07 (I) “Tempered fractional Brownian motion: wavelet estimation, modeling and testing”. Séminaire de traitement du signal, Physics Lab, ENS-Lyon, France.
- 2018/06 (P) “Tempered fractional Brownian motion: wavelet estimation and modeling of turbulence in geophysical flows” [poster]. IEEE Statistical Signal Processing Workshop (SSP), Freiburg, Germany.
- 2018/04 (I) “On multidimensional scaling”. Statistics seminar, Iowa State University, Ames, IA.
- 2018/04 (I) “On multidimensional scaling”. Mathematics colloquium, University of Tennessee, Knoxville, TN.
- 2017/11 (I) “On multidimensional scaling”. Statistics seminar, Arizona State University, Tempe, AZ.
- 2017/03 (P) “Multivariate scale-free dynamics: testing fractal connectivity”. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), New Orleans, LA.
- 2016/09 (I) “Scaling laws and asymptotics in single particle modeling”. Statistics colloquium, University of Virginia, VA.
- 2016/09 (I) “Scaling laws and asymptotics in single particle modeling”. Statistical Science and Operations Research seminar, Virginia Commonwealth University, VA.
- 2016/07 “Scaling laws and asymptotics in single particle modeling”. SIAM Conference on the Life Sciences, Boston, MA.
- 2016/02 “Scaling laws in biodiffusion” [poster]. Current topic workshop: *Modeling and inference: from single molecules to cells*, Mathematical Biosciences Institute, Columbus, OH.
- 2015/09 (I) “Modeling operator self-similarity”. Biostatistics seminar, LSUHSC, New Orleans, LA.
- 2015/06 (I) “Modeling operator self-similarity”. *Séminaire Cristolien d’Analyse Multifractale*, Université Paris XII – Val de Marne, Créteil, France.
- 2014/03 (I) “Self-similarity, symmetry and anisotropy in the multivariate and multiparameter settings” *Séminaire Cristolien d’Analyse Multifractale*, Université Paris XII – Val de Marne, Créteil, France.
- 2014/04 (I) “Time and spectral domain analysis of biodiffusion”. Séminaire des mathématiques, Université Bretagne-Sud, Vannes, France.
- 2014/02 (I) “Self-similarity, symmetry and anisotropy in the multivariate and multiparameter settings”. Workshop *Multifractal Analysis: From Theory to Applications and Back*, Banff International Research Station, Canada.

- 2013/11 (I) “Probabilistic and inferential aspects of self-similarity in the multivariate and multiparameter settings”. Statistics and Probability colloquium, Michigan State University, East Lansing, Michigan.
- 2013/09 (I) “Time and spectral domain analysis of biodiffusion”. Probability seminar, Michigan State University, East Lansing, Michigan.
- 2013/08 “Time and spectral domain analysis of biodiffusion” [poster]. Workshop for Young Researchers in Mathematical Biology, Mathematical Biosciences Institute, Columbus, Ohio.
- 2012/12 (I) “Time and spectral domain analysis of biodiffusion”. Louisiana ASA Chapter Meeting, Baton Rouge, LA.
- 2012/10 “Probabilistic and inferential aspects of self-similarity in the multivariate setting”. AMS Fall Southeastern Section Meeting, New Orleans, LA.
- 2012/07 “Probabilistic and inferential aspects of self-similarity in the multivariate setting”. 8<sup>th</sup> World Congress of Probability and Statistics, Istanbul, Turkey.
- 2012/04 (I) “Statistical challenges in Biophysics”. Louisiana ASA Chapter Meeting, New Orleans, LA.
- 2011/10 (I) “On the simulation of anomalous diffusion”. Sandia National Labs, Albuquerque, NM.
- 2011/09 (I) “Self-similarity and long range dependence: some recent developments for the multivariate setting”. Penn State Department of Statistics colloquium, University Park, PA.
- 2011/07 “On the simulation of anomalous diffusion”. 7<sup>th</sup> International Congress on Industrial and Applied Mathematics, Vancouver, Canada.
- 2011/06 “Self-similarity and long range dependence: some recent developments for the multivariate setting”. 35<sup>th</sup> Stochastic Processes and their Applications, Oaxaca, Mexico.
- 2011/01 “Self-similarity and long range dependence: some recent developments for the multivariate setting”. Joint Mathematics Meetings, New Orleans-LA, USA.
- 2010/11 (I) “Subdiffusions in microrheological experiments”. LSU Biostatistics Seminar, New Orleans-LA, USA.
- 2010/10 (I) “Self-similarity and long range dependence: some recent developments for the multivariate setting”. Joint Mathematics and Statistics Seminar, Iowa State University, Ames-IA, USA.
- 2010/08 “Exponents and symmetry groups of operator fractional Brownian motions”. 73<sup>rd</sup> Annual Meeting of the Institute of Mathematical Statistics, Gothenburg, Sweden.

- 2010/03 “Subdiffusion detection in microrheological experiments”. ENAR 2010 Spring Meeting, New Orleans-LA, USA.
- 2010/03 “Exponents and symmetry groups of operator fractional Brownian motions”. Seminar on Stochastic Processes 2010, Orlando-FL, USA.
- 2009/11 (I) “Self-similarity and LRD: some basic connections and recent developments for the multivariate setting”. LSU Biostatistics Seminar, New Orleans-LA, USA.
- 2009/08 “Multivariate long range dependence and operator self-similarity”. Joint Statistical Meeting 2009, Washington-DC, USA.
- 2009/07 “On operator fractional Brownian motions”. 33<sup>rd</sup> Conference on Stochastic Processes and Their Applications, Berlin, Germany.
- 2008/08 “On operator fractional Brownian motions”. 11<sup>th</sup> Meeting of New Researchers in Statistics and Probability. University of Colorado and NCAR, Boulder-CO, USA.
- 2008/07 (I) “On operator fractional Brownian motions”. Stochastic Processes Seminar. Institute for Pure and Applied Mathematics, Rio de Janeiro, Brazil.
- 2006/08 (I) “Adaptive wavelet decompositions of stationary time series”. 69<sup>th</sup> Annual Meeting of the Institute of Mathematical Statistics, Rio de Janeiro, Brazil.
- 2006/06 “Adaptive wavelet decompositions of stationary (Gaussian) processes” [poster]. Graybill Conference, 2006, Fort Collins-CO, USA.
- 2005/06 “Gaussian stationary processes: discrete approximations, special wavelet decompositions and simulation”. 30<sup>th</sup> Conference on Stochastic Processes and their Applications, 2005, Santa Barbara-CA, USA.
- 2001/08 “Relative prices and Brazilian exporting performance”. 9<sup>th</sup> Brazilian School of Time Series and Econometrics, 2001, Belo Horizonte, Brazil.

## Service

- 2023/8 - 2026/7 TU Mathematics Department Director of Graduate Studies.
- 2021/8 - 2024/7 TU School of Science and Engineering promotion and tenure (P&T) committee.
- 2015/8 - 2018/7 TU Graduate Council.
- 2021/8 - 2022/7 TU Mathematics Department graduate studies committee.
- 2014/8 - 2015/7 TU Mathematics Department graduate studies committee.
- 2009/8 - 2010/7 TU Mathematics Department undergraduate studies committee.
- 2018/10 - 2019/2 TU Mathematics Department hiring committee in Statistics.

2017/10 - 2018/2 TU Mathematics Department hiring committee in Statistics.  
 2014/10 - 2015/2 TU Mathematics Department hiring committee in Statistics.  
 2012/1 - 2012/3 TU Mathematics Department hiring committee in Analysis.  
 2015/8 - 2022/5 TU Mathematics Department colloquium coordinator.  
 2012/8 - 2013/5 TU Mathematics Department colloquium coordinator.  
 2016/7 Co-organizer (with John Fricks, Penn State) of the special session “Linking single particle tracking experiments to stochastic diffusion models”, SIAM Conference on the Life Sciences, Boston, MA.  
 2012/10 Co-organizer (with Greg Forest, UNC-Chapel Hill) of the special session “Diffusion in Biology”, AMS Fall Southeastern Section meeting, Tulane University, New Orleans, LA.

### Honors and awards

2006 IMS Laha travel award for the paper “Gaussian stationary processes: discrete approximations, adaptive wavelet decompositions and their convergence”, with V. Pipiras.  
 2006 NSF Travel Funding for the 69<sup>th</sup> Annual Meeting of the IMS.  
 2005 30<sup>th</sup> Conference on Stochastic Processes and Their Applications travel award.  
 1998/3 - 2000/2 CAPES (Brazilian federal funding agency) M.S. Fellowship.  
 1997 Honors Degree, B.A., Federal University of Rio de Janeiro.

### Teaching experience (instructor with full course responsibility)

(U: undergraduate; G: graduate)

- Federal University of Rio de Janeiro:

*Calculus II* (U, 2002).

- Tulane University:

*Statistics for Business and Economics* (U, Fall 2007);

*Introduction to Probability Theory* (upper-level U, Fall 2010, Fall 2011, Fall 2014, Fall 2020);

*Introduction to Statistical Inference* (upper-level U, Spring 2009, Spring 2013);

*Real Analysis I* (upper-level U, Fall 2020, Fall 2021);

*Complex Analysis* (upper-level U/G, Fall 2019);

*Measure Theory* (**G**, Fall 2008);

*High-Dimensional Probability Theory* (**G**, Spring 2019);

*Mathematical Statistics* (**G**, Fall 2009, Fall 2010, Fall 2011, Spring 2015, Spring 2016, Spring 2017, Spring 2018, Spring 2019, Spring 2020, Spring 2021, Spring 2022);

*Probability Theory I* (**G**, Fall 2014, Fall 2015, Fall 2016, Fall 2017, Fall 2018, Fall 2019, Fall 2022);

*Time Series Analysis* (**G**, Spring 2008, Spring 2013);

*Stochastic Processes* (**G**, Spring 2010, Spring 2012, Fall 2021).

- University of North Carolina at Chapel Hill:

*Basic Statistics* (**U**, Fall 2005, Spring 2006, Fall 2006, Spring 2007).

### Students mentored (with month and year of graduation)

Ph.D.:

- Oliver Orejola (May 2024). Thesis title: *Essays on random matrix theory and applications*.
- Benjamin Cooper Boniece (August 2019). Thesis title: *On scale invariance and wavelet analysis: transience, operator fractional Lévy motion, and high-dimensional inference*.
- Hui Li (August 2017). Thesis title: *Wavelet-based estimation for Gaussian and non-Gaussian mixed fractional processes*.
- Kui Zhang (May 2017). Thesis title: *Asymptotic theory for the statistical analysis of anomalous diffusion in single particle tracking experiments*.

M.S:

- Binqi Huang (May 2016), Renyue Tan (May 2016), Yujie Suo (December 2014), Jianning Zhao (May 2013), Peter Bierhorst (May 2012), Andrea Hebert (jointly with Chad Bhatti; May 2008).

Honors thesis:

- Shengying Wang (second and third readers: Damir B. Khismatullin - Biomedical Engineering, Kathleen Carlin - English; Spring 2013).

Senior seminar project:

- Anika Gilman (May 2023), John T. Kanzler (May 2021), Amir Shalabi (May 2020), Linhui He (May 2017), James Bernazzani (May 2016), Robert McKay (May 2015), Rachel Christoph (December 2014), Jessica Feagles (jointly with John Liukkonen; May 2013), Stefan Schembor (May 2013), Lu Liang (May 2012), Matthew Roser (May 2010), Richard J. Hayes (December 2007).

## Professional activities

- Referee for *ALEA*, *Applied and Computational Harmonic Analysis* (2), *Applied Probability Journals* (3), *Australian and New Zealand Journal of Statistics*, *Bernoulli* (4), *Canadian Journal of Statistics*, *Computational Statistics and Data Analysis*, *Electronic Communications in Probability*, *Electronic Journal of Probability* (2), *Frontiers of Mathematics in China*, *IEEE Transactions on Information Theory*, *IEEE Transactions on Signal Processing* (2), *2016 IEEE Workshop on Statistical Signal Processing*, *International Journal of Biomathematics*, *Journal of Business and Economic Statistics*, *Journal of Statistical Computation and Simulation* (2), *Journal of Fourier Analysis and Applications*, *Journal of Mathematical Physics*, *Journal of Mathematical Research with Applications*, *Journal of Statistical Physics*, *Journal of the American Statistical Association* (2), *Journal of the Korean Statistical Society* (2), *Journal of Multivariate Analysis*, *Journal of the Royal Statistical Society - Series B*, *Journal of Theoretical Probability*, *Journal of Time Series Analysis* (2), *Journal of Wavelet Theory and Applications*, *Mathematical Methods in the Applied Sciences*, *New Journal of Physics*, *Physics Letters A*, *Séminaire et Congrès – Société Mathématique de France*, *Statistical Science*, *Statistics and Computing*, *Statistics and Probability Letters*, *Stochastic Models*, *Stochastic Processes and their Applications* (3). [total: 50]