Curriculum vitae

Julie BESSAC, Computational Statistician

Data, Analysis, and Visualization Group
Computational Science Center
National Renewable Energy Laboratory, Golden, CO, USA

Adjunct Professor
Department of Mathematics
Virginia Tech, Blacksburg, VA, USA

French citizen, US permanent resident (Green card holder)
E-mail: Julie.Bessac@nrel.gov
Alternate e-mail: jbessac@vt.edu

Research Interests and Experiences

Applied statistics and machine learning: spatiotemporal and multivariate statistical modeling; deep learning and machine learning; probabilistic prediction and simulation; probabilistic forecast evaluation; clustering; statistical extreme value theory and uncertainty quantification

Applications: geophysical and environmental phenomena (weather and climate in particular surface wind, surface temperature, drought indexes, subgrid-scale modeling, soil sciences); data compression and reduction; energy systems

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1 Resume

1.1 Education

2011–2014 Ph.D. in Applied Mathematics, Université de Rennes 1, France

2010–2011 Master's in Probability and Statistics, Université de Rennes 1 and École Normale Supérieure de Cachan (Auditeur libre), Antenne de Bretagne, France

2009–2010 Agrégation de Mathématiques, Université de Rennes 1 and École Normale Supérieure de Cachan, Antenne de Bretagne, France

2007–2009 Graduate (Bachelor's and Master's) in Mathematics, Université de Rennes 1, France
Magistère de Mathématiques (Auditeur libre) École Normale Supérieure de Cachan, Antenne de Bretagne, France

2005–2007 Classes Préparatoires aux Grandes Écoles (Intensive training in Mathematics and Physics) Brest, France

1.2 Positions Held

2023–... Computational Statistician, Computational Science Division, National Renewable Energy Laboratory, Golden, CO, USA

2022–... Adjunct Professor, Department of Mathematics, Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, VA, USA

2022–2023 Computational Statistician, Mathematics and Computer Science Division (primary appointment), Argonne National Laboratory, Lemont, IL, USA

2021–2023 Joint Appointee, Environmental Science Division (secondary appointment), Argonne National Laboratory, Lemont, IL, USA

2018–2023 Scientist at Large, Consortium for Advanced Science and Engineering (CASE), University of Chicago, Chicago, IL, USA

2017–2022 Assistant Computational Statistician, Mathematics and Computer Science Division (primary appointment), Argonne National Laboratory, Lemont, IL, USA

2014–2017 Postdoctoral appointee, supervised by Mihai Anitescu and Emil Constantinescu, Argonne National Laboratory, Lemont, IL, USA

2011–2014 Ph.D. student in Applied Mathematics, supervised by Pierre Ailliot and Valérie Monbet, Université de Rennes 1, France

2011 Master 2 intern, supervised by Valérie Monbet, Université de Rennes 1, France

2009 Master 1 intern, supervised by François Coquet and Magali Fromont, National School of Statistics and Analysis of Information (ENSAI), Bruz, France

2 Participation in Proposals

2.1 Awarded Proposals

Federal Sponsors

FY2023 DOE-ASCR-NP SciDAC: Femtoscale Imaging of Nuclei using Exascale Platforms - I. Cloet (PI) et al. (15 Co-PIs) - role: Co-PI Period of performance: 2023–2027 - $3.7M (ANL)

FY2023 DOE-ASCR: Actionable Intelligent Visual Analytics of Ensembles, K. Potter (PI) et al. (3 Co-PI) - role: Senior personal - Period of performance: 2023–2025 - $900K (ANL)

FY2022 DOE-ASCR: Machine-Learning Accelerated Simulations for Forecasting, Data Assimilation, and Extreme Events - R. Willett (PI), M. Anitescu (Co-PI), J. Bessac (Co-PI), Y. Khoo (Co-PI), D. Mendelson (Co-PI), D. Sanz-Alonso (Co-PI) - Period of performance: 2022–2025 - $2M (ANL)

FY2021 DOE - SciDAC-5 Frameworks, Algorithms, and Scalable Technologies for Mathematics (FASTMath) Institute - Institute Director: E. G. Ng - Period of performance: 2020–2025 - $4.05M (ANL) - role: Co-PI

Argonne Fundings

FY2022 Argonne LDRD Seed: Developing an Artificial Intelligence Based Risk Analysis Tool with Future Extreme Weather Prediction to Analyze its Impact on Buildings and Occupants - Interdivisional PIs: J. Kim (PI), J. Bessac (PI) - Period of performance: 2022 - $50K ($25K per division) - role: co-lead PI

FY2022 Argonne LDRD Swift: Deep-Learning Inference for Nuclear Femtography on Exascale Platforms - I. Cloet (PI), J. Bessac (Co-PI), T. Childers (Co-PI), E. Constantinescu (Co-PI), N. Ramachandra (Co-PI), J. Rudi (Co-PI) - Period of performance: 2022 - $50K

FY2022 Argonne LDRD Prime: Impacts of Climate Change on Intensity, Duration, and Frequency of Drought Events at Different Geographic Scales - V. Rao (PI), B. Gamelin (Co-PI), J. Bessac (Co-PI), M. Altinakar (Co-PI) - Period of performance: 2022–2023 - $250K/yr

FY2021 Argonne EVS-MCS Program development: A Novel Data-based Product for Multi-layer and Multi-scale Analysis - A. Renchon (PI), J. Bessac (Co-PI), B. Drewniak (Co-PI), P. Weisenhorn (Co-PI), J. Franke (Co-PI), E. Constantinescu (Co-PI), R. Matamala (Co-PI) - Period of performance: 2021 - $50K

FY2021 Argonne EVS-MCS Program development: Machine Learning-Informed Functional Data Analysis for ELM Biomass Partitioning - B. Drewniak (PI), J. Bessac (Co-PI), E. Constantinescu (Co-PI) - Period of performance: 2021 - $50K

FY2021 Argonne LDRD Computing Expedition: Deep Neural Networks for Parameter Estimation in Deterministic and Statistical Models - J. Rudi (PI), J. Bessac (Co-PI), E. Constantinescu (Co-PI) - Period of performance: 2021 - $25K

FY2019 Argonne LDRD Innovate Seed: Statistical Multiscale Methods for Parameterization of Complex Physics-based Models - J. Bessac (PI), A. Attia (Co-PI), J. Wang (Co-PI), E. Constantinescu (Co-PI) - Period of performance: 2018–2019 - $25K

FY2019 Argonne LDRD Innovate: Deep Learning for Posterior Density Emulation and Sampling - C. Graziani (PI), J. Bessac (Co-PI) - Period of performance: 2018–2020 - $192K/yr

Non-federal Sponsors

FY2019 Office of Science and Technology of the Embassy of France in the United States - Make Our Planet Great Again - Statistical Data Fusion for Large Heterogeneous Datasets, J. Bessac (PI), P. Naveau (Co-PI), V. Monbet (Co-PI), P. Ailliot (Co-PI), E. Constantinescu (Co-PI) - Period of performance: 2018–2020 - $20K (ANL)

FY2019 Strategic partnership with non-federal sponsors - AT&T Services, Inc. - Climate Risk Analysis and Resilience - R. Kotamarthi (PI), E. Yan (Co-PI), J. Wang (Co-PI), C. Wang (Co-PI), E. Constantinescu (Co-PI), J. Bessac (Co-PI), R. Sullivan (Co-PI) - Period of performance: 2018–2019 - $325K (ANL)

3 Supervisory Activities

3.1 Year-round Supervision

Fall 2022 – present Main supervision of Mitchell Krock (postdoctoral appointee) (funding: DOE-ASCR Machine-Learning Accelerated Simulations for Forecasting, Data Assimilation, and Extreme Events).
Machine learning and neural networks for environmental multivariate extremes

Summer 2022 – present Main supervision of Arkaprabha Ganguli (graduate student, Michigan State University) with F. Cappello (funding: NSF-MSGI program and DOE-Exascale Computing Project)
Statistical assessment of lossy compressibility of scientific data

Fall 2021 – present Main supervision of Daniel Getter (post-Bachelor student, University of California - Berkeley) with Y. Feng (funding: DOE-ASCR Machine-Learning Accelerated Simulations for Forecasting, Data Assimilation, and Extreme Events)
Statistical treatment of convolutional neural networks for super-resolution of surface wind fields over complex terrain

Summer 2021 – Winter 2022 Main supervision of David Krasowska (previously undergraduate student, Clemson University; currently graduate student, Northwestern University) with R. Underwood and F. Cappello
Statistical assessment of lossy compressibility of scientific data

Summer 2018 – Spring 2019 Main supervision of Mark Picel (consultant EVS) (funding: Strategic partnership with non-federal sponsors - AT&T Services, Inc.)
Extreme value analysis for surface wind speed under changing climates

3.2 Seasonal Supervision

Summer 2022 Main supervision of Tiffany E. Christian (graduate student, Northwestern University) with V. Rao at Argonne National Laboratory (NSF-MSGI program)

Summer 2022 Main supervision of Amit Subrahmanya (graduate student, Virginia Tech) with V. Rao at Argonne National Laboratory (Givens Associate program)

Summer 2021 Main supervision of Claire Jordan (undergraduate student, Colorado School of Mines) with Y. Feng at Argonne National Laboratory (SULI program)

Summer 2020 Main supervision of Xuetao Lu (graduate student, Arizona State University) with U. Mishra at Argonne National Laboratory (NSF-MSGI program)

Summer 2020 Co-supervision of Qiyui Wu (graduate student, Rochester Institute of Technology) with J. Wang at Argonne National Laboratory

Summer 2019 Co-supervision of Andrew Pensoneault (graduate student, Iowa State University) with C. Graziani at Argonne National Laboratory

Summer 2019 Main supervision of Qiyui Wu (undergraduate student, Rochester Institute of Technology) with J. Wang at Argonne National Laboratory

Spring 2019 Main supervision of Juliette Legrand (undergraduate student, École Normale Supérieure de Rennes) at Argonne National Laboratory

Summer 2018 Co-supervision of Chitrak Barnejee (graduate student, Michigan State University) with S. H. K. Narayanan at Argonne National Laboratory (NSF-MSGI program)

Fall 2017 Co-supervision of Tom Cornebize (graduate student, ENSIMAG, Grenoble) with S. Perarnau at Argonne National Laboratory

Summer 2017 Main supervision of Rohit Tripathy (graduate student, Purdue University) with E. Constantinescu at Argonne National Laboratory (Givens Associates program)

Summer 2016 Main supervision of Joey Hart (graduate student, North Carolina State University) with E. Constantinescu at Argonne National Laboratory (Givens Associates program)

Summer 2015 Main supervision of Mark Picel (undergraduate, University of Wisconsin-Madison) with E. Constantinescu at Argonne National Laboratory

4 Professional Activities

4.1 Teaching Activities

Upcoming Invited lecturer at summer school "Mathematical Modeling and Forecasting for Renewables" by Pacific Institute of Mathematical Sciences, University of Calgary, Canada, June 2023

Sep. 2018 NSF - NRT funded bootcamp "Introduction to the Statistics of Spatial Data," the University of Chicago, IL, USA

2012–2014 Tutorials on hypothesis tests, National School of Statistics and Analysis of Information (ENSAI), Bruz, France

2012–2014 Tutorials on Markov chains, ENSAI, Bruz, France

2012–2014 Tutorials on measure theory and probability, ENSAI, Bruz, France

2012 Tutorials on mathematical statistics for Master 1 students, Université de Rennes 1, France

2012 Labs on data analysis in Master 1, Université de Rennes 1, France

2012 Labs on Microsoft Office softwares, Université de Rennes 1, France

2010–2011 Oral examinator in mathematics in Classes Préparatoires, Lycée Chateaubriant, Rennes, France

4.2 Position held within professional societies

2023 Peer-nomination and election as *Program director* of SIAM-Mathematics for the Planet Earth (2-year term 2023-2024)

2023 Selection as SIAM Science Policy Fellow (2-year term 2023-2024)

4.3 Organization of Conferences, Workshops, Symposia

2023 *Symposium organizer,* "Advances in Mathematics and Statistics for the Environmental and Earth Sciences," SIAM-Southeastern Atlantic Section Annual Meeting 2023

2022 *Organizing committee member* of SIAM-Mathematics for the Planet Earth 2022

2022 *Symposium organizer,* "Characterization and prediction of rare and extreme events in complex systems," SIAM-Uncertainty Quantification 2022

2021 *Workshop organizer,* "Workshop on statistics topics in multiscale, forecast verification, and data assimilation, 2021 Virtual, " `https://www.mcs.anl.gov/~emconsta/MiniWorkshop2021.html`

2020 *Symposium organizer,* "Advances and challenges in wind modeling and its applications," SIAM-Mathematics for the Planet Earth 2020 Virtual

2020 *Symposium organizer,* "Statistical evaluation and scoring of complex simulations and predictions," SIAM-Uncertainty Quantification 2020 (canceled due to Covid19 pandemic)

2020 *Symposium organizer,* "Subgrid-scale variability modeling and stochastic parameterization for multiscale uncertainty quantification," SIAM-Uncertainty Quantification 2020 (canceled due to Covid19 pandemic)

4.4 Awards

2022 Impact Argonne Award for contribution to Argonne initiative against sexual and gender harassment within the National Academies of Science, Engineering, and Medicine (NASEM)

2021 Impact Argonne Award for strategic partnership with non-federal sponsors, AT&T Services, Inc

2020 Argonne Director's Award, for strategic partnership with non-federal sponsors, AT&T Services, Inc, on "Climate risk analysis and resilience" to J. Wang, E. Yan, R. Kotamarthi, T. Wall, J. Bessac, A. Mitchell, J. Breaux, R. Sadleir, A. Jared

2019 HPC Innovation Excellence Award from Hyperion Research on "Risk and resiliency of infrastructure, Southeastern USA, for AT&T" to R. Kotamarthi, J. Wang, K. Roberts, E. Yan, J. Bessac, T. Wall, A. Jared, M. Picel

2019 2019 R&D 100 Finalist for the Climate Risk and Resilience Analysis technology with R. Kotamarthi, J. Wang, K. Roberts, E. Yan, J. Bessac, T. Wall, A. Jared, M. Picel

2019 Argonne Pacesetter Award, Strategic partnership with non-federal sponsors, AT&T Services, Inc, on "Climate risk analysis and resilience"

4.5 Service to Professional Community

4.5.1 Reviewing for Journals

Advances in Meteorology; Advances in Statistical Climatology, Meteorology and Oceanography; Annals of Applied Statistics; Climate Informatics; Energies; Environmental Modeling and Software; Geoscientific Model Development; IEEE Power & Energy; Journal of Agricultural, Biological, and Environmental Statistics; Journal of Climate; MACH; SIAM Journal on Uncertainty Quantification; Ocean Engineering; Quarterly Journal of the Royal Meteorological Society; STAT; Stochastic Environmental Research and Risk Assessment; Theoretical and Applied Climatology; Wind Energy

4.5.2 Reviewing Funding Proposals

· 2022: German Federal Ministry of Education and Research, funding initiative "ClimXtreme - Climate Change and Extreme Events"

4.5.3 Outreach Activities

Nov. 2022 Invited speaker at "SOS," graduate students in Statistics, at Virginia Tech

Oct. 2022 Invited speaker at "GreenHacks," sustainability-focused hackathon for graduate students at Johns Hopkins University

June 2021 Lecture "Statistics and machine learning modeling for multidimensional data," Argonne Student Lecture Series, Argonne National Laboratory

Feb. 2021 Invited panelist at "Introduce a girl to engineering day," Argonne National Laboratory

Nov. 2020 Invited panelist at "Argonne postdoctoral annual symposium," Argonne National Laboratory

Mar. 2016 Invited panelist at "Elmhurst College career forum," Elmhurst, IL, USA

4.6 Service to Institution

4.6.1 Collective Responsibilities and Engagement

2020–2023 Directorate (Computing, Environment and Life Sciences) representative at Argonne action collaborative steering committee as part of the initiative against sexual and gender harassment in the National Academies of Science, Engineering, and Medicine (NASEM), Argonne National Laboratory. Development of recommendations to the Argonne leadership for prevention and management of sexual and gender harassment.

2021–2022 Implementation team on "Cultural Metrics" within the Argonne action collaborative initiative as part of the initiative against sexual and gender harassment in the NASEM, Argonne National Laboratory. Development of recommendations for metrics to assess sexual and gender harassment and development of questionnaire surveying prevention policies of 17 US national laboratories and their management of sexual and gender harassment.

2012–2014 Graduate student representative at administrative board of IRMAR (Institut de recherche mathématique de Rennes), Université de Rennes 1

2012–2014 Graduate student representative at scientific board of LABEX Lebesgue (Excellence laboratory of the national program "investissement d'avenir"), Université de Rennes 1

4.6.2 Argonne Postdoctoral Career Mentoring Program

2022–2023 mentor of Zhaoyun Zeng (Energy Systems division, ANL)

2022–2023 mentor of Katherine Asztalos (Energy Systems division, ANL)

2021–2023 mentor of Nathan Nichols (Argonne Leadership Computing Facility, ANL)

2019–2022 mentor of Arindam Fadikar (Mathematics and Computer Science division, ANL)

4.6.3 Hiring Service

Argonne Wilkinson postdoctoral fellow committee (2018, 2020); postdoc hiring committees (2017, 2018, 2019, 2020, 2021, 2023)

4.7 Professional Development

2020 CyberTraining on Big Data + High-Performance Computing + Atmospheric Sciences (NSF Initiative on Workforce Development for Cyberinfrastructure) organized by the University of Maryland in Baltimore

County with selective participation. Introduction to MPI, Python, Spark, Deep Learning and Radiative Transfers in the Atmosphere, 12hr/week for 15 weeks

5 Publications and Presentations

Underlined authors were students at the time of main work. Interdisciplinary publications indicate the primary field in parenthesis.

5.1 Submissions and Revisions

Revisions (Climate science) Getter, D., J. Bessac, J. Rudi, and Y. Feng. Statistical treatment of convolutional neural network super-resolution of inland surface wind for subgrid-scale variability quantification - `https://arxiv.org/abs/2211.16708` - Revisions, Artificial Intelligence for the Earth Systems. 2022

Revisions (Computer science) R. Underwood, J. Bessac, Krasowska, D., J. Calhoun, S. Di, and F. Cappello. Black-box statistical prediction of lossy compression ratios for scientific data. Revisions, International Journal of High Performance Computing Applications

Revisions A. Lenzi, J. Bessac, J. Rudi, and M. Stein. Neural networks for parameter estimation of intractable likelihoods - `https://arxiv.org/abs/2107.14346` - Revisions, Computational Statistics and Data Analysis. 2023

Revisions (Climate science) K. Endo, A. H. Monahan, J. Bessac, H. M. Christensen, and N. Weitzel. Robustness of the stochastic parameterization of sub-grid scale wind variability in sea-surface fluxes - Revisions, Monthly Weather Review. 2023

5.2 Peer-Reviewed Journal Publications

2022 Wu, Q., J. Bessac, W. Huang, and J. Wang. Station-wise statistical joint assessment of wind speed and direction under future climates across the United States. *Advances in Statistical Climatology, Meteorology and Oceanography - In press*, 2022

2022 (Climate science) B. Gamelin, J. Feinstein, J. Wang, J. Bessac, E. Yan, and V. R. Kotamarthi. Projected U.S. drought extremes through the 21st century with vapor pressure deficit. *Scientific Reports*, 12(1):1–15, 2022

2022 (Climate science) M. Krock, J. Bessac, M. L. Stein, and A. Monahan. Seasonal bulk-and-tails model with long-term trends for temperature - `https://arxiv.org/pdf/2110.10046.pdf`. *Weather and Climate Extremes*, 36:100438, 2022

2022 (Energy systems) A. Lenzi, J. Bessac, and M. Anitescu. Predicting disturbances in power grid systems with spatio-temporal modeling and Bayesian decision theory. *IEEE Open Access Journal of Power and Energy*, 9:66–75, 2022

2021 J. Bessac and P. Naveau. Forecast score distributions with imperfect observations. *Advances in Statistical Climatology, Meteorology and Oceanography*, 7:53–71, 2021

2021 A. Lenzi, J. Bessac, and M. Anitescu. Power grid frequency prediction using spatio-temporal modeling. *Journal of Statistical Analysis and Data Mining: The ASA Data Science Journal*, pages 1–14, 2021

2021 (Computer science) I. Foster, M. Ainsworth, J. Bessac, F. Cappello, J. Choi, S. Di, Z. Di, A. Murat Gok, H. Guo, K. A. Huck, C. Kelly, S. Klasky, K. Kleese van Dam, X. Liang, K. Mehta, M. Parashar, T. Peterka, L. Pouchard, T. Shu, H. Van Dam, M. Wolf, J. M. Wozniak, W. Xu, I. Yakushin, S. Yoo, and T. Munson. Online data analysis and reduction: An important co-design motif for extreme-scale computers. *The International Journal of High Performance Computing Applications*, 2021

2021 (Climate science) J. Bessac, H. M. Christensen, K. Endo, A. H. Monahan, and N. Weitzel. Scale-aware space-time stochastic parameterization of subgrid-scale velocity enhancement of sea surface fluxes. *Journal of Advances in Modeling Earth Systems*, 13(4):e2020MS002367, 2021

2020 E. M. Constantinescu, N. Petra, J. Bessac, and C. G. Petra. Statistical treatment of inverse problems constrained by differential equations-based models with stochastic terms. *SIAM/ASA Journal on Uncertainty Quantification*, 8(1):170–197, 2020

2019 (Climate science) J. Bessac, A. H. Monahan, H. M. Christensen, and N. Weitzel. Stochastic parameterization of subgrid-scale velocity enhancement of sea surface fluxes. *Monthly Weather Review*, 147(5):1447–1469, 2019

2019 Hart, J. L., J. Bessac, and E. M. Constantinescu. Global sensitivity analysis for statistical model parameters. *SIAM/ASA Journal on Uncertainty Quantification*, 7(1):67–92, 2019

2018 (Computer science) K. Kulshreshtha, S. H. K. Narayanan, J. Bessac, and K. MacIntyre. Efficient computation of derivatives for solving optimization problems in R and Python using SWIG-generated interfaces to ADOL-C. *Optimization Methods and Software*, pages 1–19, 2018

2018 J. Bessac, E. M. Constantinescu, and M. Anitescu. Stochastic simulation of predictive space-time scenarios of wind speed using observations and physical model outputs. *Annals of Applied Statistics*, 12(1):432–458, 2018

2018 (Climate science) J. Wang, R. Kotamarthi, J. Bessac, E. M. Constantinescu, and B. Drewniak. Internal variability of a dynamically downscaled climate over North America. *Climate Dynamics*, pages 1–21, 2018

2016 J. Bessac, P. Ailliot, J. Cattiaux, and V. Monbet. Comparison of hidden and observed regime-switching autoregressive models for (u,v)-components of wind fields in the Northeast Atlantic. *Advances in Statistical Climatology, Meteorology and Oceanography*, 2(1):1–16, 2016

2015 P. Ailliot, J. Bessac, V. Monbet, and F. Pene. Non-homogeneous hidden Markov-switching models for wind time series. *Journal of Statistical Planning and Inference*, 160:75–88, 2015

2015 J. Bessac, P. Ailliot, and V. Monbet. Gaussian linear state-space model for wind fields in the North-East Atlantic. *Environmetrics*, 26(1):29–38, 2015

5.3 Peer-Reviewed Conference Proceedings

2022 (Computer science) R. Underwood, J. Bessac, S. Di, and F. Cappello. Understanding the effects of modern compressors on the community earth science model. In *8th International Workshop on Data Analysis and Reduction for Big Scientific Data in conjunction with SC '22: The International Conference for High Performance Computing, Networking, Storage and Analysis* - ***Winner of the best workshop paper award***

2021 (Computer science) Krasowska, D., J. Bessac, J. Calhoun, R. Underwood, S. Di, and F. Cappello. Exploring lossy compressibility through statistical correlations of scientific datasets. In *7th International Workshop on Data Analysis and Reduction for Big Scientific Data in conjunction with SC '21: The International Conference for High Performance Computing, Networking, Storage and Analysis* - *https://arxiv.org/pdf/2111.13789.pdf*, pages 47–53, 2021

2021 J. Rudi, J. Bessac, and A. Lenzi. Parameter estimation with dense and convolutional neural networks applied to the FitzHugh–Nagumo ODE. In *Proceedings of Machine Learning Research: Mathematical and Scientific Machine Learning* - *https://arxiv.org/abs/2012.06691*, 2021

2020 (Computer science)K. Zhao, S. Di, X. Liang, S. Li, D. Tao, J. Bessac, Z. Chen, and F. Cappello. SDRBench: Scientific data reduction benchmark for lossy compressors. In *The International Workshop on Big Data Reduction in conjunction with the 2020 IEEE International Conference on Big Data*, 2020

2020 (Atmospheric science) M. Yu, J. Bessac, L. Xu, A. Gangopadhyay, Y. Shi, and J. Wang. Image segmentation for dust detection using semi-supervised machine learning. In *IEEE International Conference on Big Data*, 2020

2017 (Computer science) I. Foster, M. Ainsworth, B. Allen, J. Bessac, F. Cappello, J. Y. Choi, E. Constantinescu, P. E. Davis, S. Di, W. Di, H. H. Guo, S. Klasky, K. Kleese Van Dam, T. Kurc, Q. Liu, A. Malik, K. Mehta, K. Mueller, T. Munson, G. Ostouchov, M. Parashar, T. Peterka, L. Pouchard, D. Tao, O. Tugluk, S. Wild, M. Wolf, J. M. Wozniak, W. Xu, and S. Yoo. Computing just what you need: online data analysis and reduction at extreme scales. In *European Conference on Parallel Processing*, pages 3–19. Springer, 2017

2012 J. Bessac, F. Coquet, J. M. Floch, and M. Fromont. Non-parametric tests for Poisson processes: studies on spatial representativeness of services. In *Actes des Xèmes Journées de Méthodologie Statistique de l'INSEE*, 2012

5.4 Peer-Reviewed Posters

2022 (Computer science) Krasowska, D., R. Underwood, J. Bessac, J. Calhoun, S. Di, and F. Cappello. Statistical prediction of lossy compression ratios for 3D-scientific datasets. In *ACM Student Research Competition in conjunction with SC '22: The International Conference for High Performance Computing, Networking, Storage and Analysis* - ***Winner of best poster award***

5.5 Media Coverage of Research

2018 *Phys.org* - Forecasting with imperfect data and imperfect model
`https://phys.org/news/2018-08-imperfect.html`

5.6 White Papers

2021 BER AI4ESP initiative: AI-Automated Detection of Subgrid-scale Processes for Adaptivity Guidance - J. Bessac (Lead), W. Pringle, S. Brus, Y Feng, B. Drewniak, V. Ghate, R. Maulik, J. Rudi, https://ai4esp.org/files/AI4ESP1013_Bessac_Julie.pdf

2021 BER AI4ESP initiative: Characterization of Extremes and Compound Impacts: Applications of Machine Learning and Interpretable Neural Networks - Y. Feng (Lead), R. Maulik, J. Wang, P. Balaprakash, W. Huang, V. Rao, P. Xue, W. Pringle, J. Bessac, R. Sullivan, https://www.ai4esp.org/files/AI4ESP1044_Feng_Yan.pdf

2021 BER AI4ESP initiative: Using AI to Build a Hydrobiogeochemical Soil Model - B. Drewniak (Lead), J. Jastrow, R. Tran Mills, R. Matamala, K. Kemner, A. Renchon, M. Gonzalez-Meler, P. Weisenhorn, Z. Liu, J. Bessac, K. Guan, B. Peng, H. Tong, A. Margenot, K. Todd-Brown, https://www.ai4esp.org/files/AI4ESP1035_Drewniak_Beth.pdf

2021 BER AI4ESP initiative: A Hybrid Climate Modeling System Using AI-assisted Process Emulators - J. Wang (Lead), R. Kotamarthi, V. Ghate, B. Lusch, P. Balaprakash, J. M. Wozniak, X. Yuan, W. Pringle, P. Xue, J. Bessac, W. Chang, https://www.ai4esp.org/files/AI4ESP1142_Wang_Jiali.pdf

2021 BER AI4ESP initiative: Surrogate Multi-fidelity Data and Model Fusion for Scientific Discovery and Uncertainty Quantification in Earth System Models - R. Maulik (Lead), V. P. Ghate, W. Pringle, Y. Feng, V. Rao, J. Bessac, B. Lusch, https://www.ai4esp.org/files/AI4ESP1090_Maulik_Romit.pdf

2018 System Software, Reproducibility, and Performance Variability - Building The Low-level Tools to Measure, Characterize, Predict, and Mitigate Performance Variability on Extreme-Scale Scientific Computing Systems - P. Beckman (Lead), S. Perarnau, J. Bessac, K. Iskra, R. Gupta, K. Yoshii

2017 ASCR: Proper Statistical Analysis and Scoring for Complex Space-Time Phenomena - M. Anitescu (Lead), J. Bessac, E. Constantinescu, https://doi.org/10.6084/m9.figshare.c.3868894

5.7 Seminars and Invited Talks at Conferences and Workshops

Upcoming Department of Statistics, Michigan State University, MI, USA

Sep. 2022 SIAM - Computational Science and Engineering, 2023, Amsterdam, The Netherlands

Oct. 2022 Department of Mathematical Sciences, Appalachian State University, NC, USA

Sep. 2022 SIAM - Mathematics of Data Science, 2022, Virtual

Sep. 2022 Workshop on Forecast Verification and Data Assimilation in models of geophysical fluid dynamics, with applications to medium range and seasonal forecasting, University of Reading, UK

Mar. 2022 Department of Statistics seminar, Virginia Tech, VA, USA

Dec. 2021 American Geophysical Union Fall Meeting 2021, Virtual

Aug. 2021 Joint Statistical Meeting 2021, Virtual

Mar. 2021 Department of Mathematical Sciences seminar, Stevens Institute of Technology, Virtual

Dec. 2020 American Geophysical Union Fall Meeting 2020, Virtual

Nov. 2020 Environmental Data Science Lunch seminar, The University of Chicago, Virtual

Oct. 2020 Statistics Department seminar, University of Wisconsin, Madison, Virtual

Sep. 2020 Computing in Engineering Forum, University of Wisconsin, Madison, Virtual

Aug. 2020 Joint Statistical Meeting 2020, Virtual

Mar. 2019 Workshop on Assessment of ensemble forecasts, Aussois, France

Nov. 2018 Statistics and Data Science Workshop, KAUST, Saudi-Arabia

Oct. 2018 Department of Applied and Computational Mathematics and Statistics seminar, University of Notre Dame, South-Bend, IN, USA

Oct. 2018 Physical Sciences Division seminar, NOAA, Boulder, CO, USA

Oct. 2018 Conference on Stochastic Weather Generators, Boulder, CO, USA

Jul. 2018 School of Earth and Ocean Sciences seminar, University of Victoria, Victoria, BC, Canada

Apr. 2017 LANS seminar, Argonne National Laboratory, Lemont, IL, USA

Feb. 2017 Statistics Department seminar, Penn State University, College State, PA, USA

Jan. 2017 Statistics Department seminar, Baylor University, Waco, TX, USA

Nov. 2016 Purdue Spatial Statistics seminar, Purdue University, West-Lafayette, IN, USA

Nov. 2016 Seminar at Laboratoire des Sciences du Climat et de l'Environnement, Gif-sur-Yvette, France

Jul. 2016 National Wind Technology Center seminar, NREL, Boulder, CO, USA

Jul. 2016 IMAGe-group seminar, NCAR, Boulder, CO, USA

June 2016 LANS seminar, Argonne National Laboratory, Lemont, IL, USA

May 2016 Workshop on Stochastic Weather Generators, Vannes, France

Oct. 2014 National Center of Meteorological Research-Météo-France seminar, Toulouse, France

Sep. 2014 Mathematical Institute of Bordeaux seminar, Bordeaux, France

Sep. 2014 Workshop on Stochastic Weather Generators, Avignon, France

Dec. 2013 Workshop on extreme value theory and risk assessment in climate sciences, Aussois, France

Nov. 2013 Spatio-temporal analysis of met-ocean data II, Landéda, France

Jul. 2013 Spatio-temporal analysis of met-ocean data I, Berder, France

Nov. 2012 Department of Statistics seminar, Victoria University of Wellington, Wellington, New Zealand

Sep. 2012 Workshop on Time-series analysis in marine science and applications for industry, Brest, France

May 2012 International Workshop on Stochastic Weather Generators, Roscoff, France

5.8 Invited Panel Discussion

Aug. 2022 "Future directions of climate statistics,"Joint Statistical Meeting 2022, Washington, DC

Apr. 2019 "Machine Learning for Science Applications," DOE Applied Math Vision workshop, Berkeley, CA

5.9 Contributed Talks

May 2022 European Geophysical Union Spring Meeting 2022, Virtual

May 2022 DOE-Exascale Computing Project Annual Meeting 2022, Virtual

Aug. 2020 SIAM-Mathematics of the Planet Earth 2020, Virtual

Jul. 2019 Joint Statistical Meeting 2019, Denver, CO, USA

Aug. 2018 Joint Statistical Meeting 2018, Vancouver, BC, Canada

Jun. 2018 International Symposium on Forecasting, Boulder, CO, USA

Aug. 2017 Joint Statistical Meeting 2017, Baltimore, MD, USA

Aug. 2016 Joint Statistical Meeting 2016, Chicago, IL, USA

Jan. 2016 Annual Meeting of the American Meteorological Society
23rd Conference on Probability and Statistics in the Atmospheric Sciences, New-Orleans, LA, USA

June 2014 Annual Meeting of the French Statistical Society, Rennes, France

June 2013 Annual Meeting of the French Statistical Society, Toulouse, France

Nov. 2012 New-Zealand Statistical Association Annual Conference, Dunedin, New Zealand

Nov. 2012 Annual Meeting of the Meteorological Society of New Zealand, Wellington, New Zealand

5.10 Invited Visits and Attendances

Sep. 2022 Invitation to residential program at Isaac Newton Institute, University of Reading, UK on "Geophysical fluid dynamics; from mathematical theory to operational prediction"

Dec.&Jan. 2021 DOE-ASCR "Randomized Algorithms for Scientific Computing" workshop, Virtual

Jan. 2021 DOE-ASCR "Data Reduction for Science" workshop, Virtual

Apr. 2019 DOE Applied Math Visioning workshop, Berkeley, CA (Panel discussion participant)

Jan. 2019 DOE-ASCR Applied Math PI meeting, Rockville, MD, USA

Jul. 2018 Visit at School of Ocean and Earth Sciences, University of Victoria, BC, Canada

May 2018 Climate Transition workshop - SAMSI, Research Triangle Park, NC, USA

Jan. 2018 DOE-ASCR Scientific Machine Learning workshop, Rockville, DC, USA

Aug. 2017 Climate Opening workshop - SAMSI, Research Triangle Park, NC, USA

Aug. 2016 Summer Institute on Sustainability and Energy, UIC, Chicago, IL, USA

Jul. 2016 Visit at NWTC-NREL, Boulder, CO, USA

Jul. 2016 Visit at IMAGe-group, NCAR, Boulder, CO, USA

May 2015 STATMOS summer school on data assimilation, Boulder, CO, USA

Oct.-Dec. 2012 Visit at Victoria University of Wellington and National Institute of Water and Atmospheric Research Ltd (NIWA), New-Zealand