

STÉPHANE GUERRIER



CONTACT INFORMATION

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EDUCATION

PhD in Statistics, University of Geneva, Switzerland, 2008 - 2013

- Thesis: “*Two Essays in Statistics: A Prediction Divergence Criterion for Model Selection & Wavelet Variance based Estimation of Latent Time Series Models*”
Advisor: Prof. Maria-Pia Victoria-Feser

MSc & BSc in Environmental Engineering, École Polytechnique Fédérale de Lausanne, Switzerland, 2003 - 2008

- MSc Thesis: “*Integration of Skew-Redundant MEMS-IMU with GPS for Improved Navigation Performance*” · Advisor: Dr. Jan Skaloud
- Major in Geomatics Engineering and Navigation
- Minor in Management of Technology and Entrepreneurship

ACADEMIC POSITIONS

SNSF professorship in Statistics and Data Science, Geneva School of Economics and Management & Faculty of Science (School of Pharmaceutical Sciences), University of Geneva, Switzerland, January 2019 - Present.

Assistant Professor in Statistics and Data Science (tenure track), Pennsylvania State University, Department of Statistics & Institute for Computational and Data Sciences, PA, USA, July 2017 - December 2018.

Assistant Professor in Statistics (tenure track), University of Illinois at Urbana-Champaign, Department of Statistics, IL, USA, July 2014 - June 2017.

Visiting Professor, École Polytechnique Fédérale de Lausanne, Geodetic Engineering Laboratory, Switzerland, May 2016 - July 2016.

Visiting Assistant Professor in Statistics, University of California, Santa Barbara, Department of Statistics & Applied Probability, CA, USA, September 2013 - June 2014.

ARTICLES UNDER REVIEW

45. Bakalli, G., **Guerrier, S.** & Scaillet, O., “*Estimation of Large Dimensional Conditional Factor Models through Two-Pass Penalised Regression*”, Journal of Econometrics, major revision invited.
Full text: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3777215.
44. **Guerrier, S.**, Kuzmics, C. & Victoria-Feser, M.-P., “*Prevalence Estimation from Random Samples and Census Data with Participation Bias*”, Annals of Applied Statistics, major revision invited. Full text: <https://arxiv.org/abs/2012.10745>.

43. Bakalli, G., Cucci, D., Radi, A., El-Sheimy, N., Molinari, R., Scaillet, O. & **Guerrier, S.**, “*Multi-Signal Approaches for Repeated Sampling Schemes in Inertial Sensor Calibration*”, IEEE Transactions on Signal Processing, major revision submitted. Full text: <https://arxiv.org/abs/2105.06217>.
42. Pfarrwaller, E., Voirol, L., Piumatti, G., Karemera, M., Sommer, J., Gerbase, M., **Guerrier, S.** & Baroffio A., “*Students’ Motives to Become Doctors are Associated with their Intention to Practice Primary Care: a Longitudinal Study*”, BMC Medical Education, major revision submitted.

ARTICLES
ACCEPTED

41. **Guerrier, S.**, Molinari, R., Victoria-Feser, M.-P. & Xu, H., “*Robust Two-Step Wavelet-Based Inference for Time Series Models*”, Journal of the American Statistical Association (Theory & Methods), 2021, in press.

PUBLICATIONS

40. Heerah, S., Molinari, R., **Guerrier, S.** & Marshall-Colon, A., “*Granger-Causal Testing for Irregularly Sampled Time Series with Application to Nitrogen Signaling in Arabidopsis*”, Bioinformatics, 7(16), p.2450-2460, 2021.
39. Quartier, J., Lapteva, M., Boulaguiem, Y., **Guerrier, S.** & Kalia, Y., “*Polymeric Micelle Formulations for the Cutaneous Delivery of Sirolimus: A New Approach for the Treatment of Facial Angiofibromas in Tuberous Sclerosis Complex*”, International Journal of Pharmaceutics, 604, p. 1-13, 2021.
38. Jammalamadaka, S. R., **Guerrier, S.** & Mangalam, V., “*Exact Distributions and Performance of some Two-sample Nonparametric Tests for Circular Data*”, Sankhya B, 83, p.140-166, 2021.
37. Wang, Y., Gardoni, P., Murphy, C. & **Guerrier, S.**, “*Empirical Predictive Modeling Approach to Quantifying Social Vulnerability to Natural Hazards*”, Annals of the American Association of Geographers, 111(5), p.1559-1583, 2021.
36. Parisi, N., Janier-Dubry, A., Ponzetto, E., Pavlopoulos, C., Bakalli, G., Molinari, R., **Guerrier, S.** & Mili, N., “*Non Applicability of Validated Predictive Models for Intensive Care Admission and Death of COVID-19 Patients in a Secondary Care Hospital in Belgium*”, Journal of Emergency and Critical Care Medicine, 5(22), p.1-13, 2021.
35. **Guerrier, S.**, Jurado, J., Khaghani, M., Bakalli, G., Karemera, M., Molinari, R., Orso, S., Raquet, J., Schubert Kabban, C., Skaloud, J., Xu, H. & Zhang, Y., “*Wavelet-Based Moment-Matching Techniques for Inertial Sensor Calibration*”, IEEE Transactions on Instrumentation & Measurement, 69(10), p.7542 - 7551, 2020.
34. Khamma, T., Zhang, Y., **Guerrier, S.** & Boubekri, M., “*Generalized Additive Models: An Efficient Method for Short-Term Energy Prediction in Office Buildings*”, Energy, 213, p.118834, 2020.
33. Wang, Y., Gardoni, P., Murphy, C. & **Guerrier, S.**, “*Worldwide Predictions of Earthquake Casualty Rates with Seismic Intensity Measure and Socioeconomic Data: A Fragility-Based Formulation*”, Natural Hazards Review, 21(2), p.1-40, 2020.
32. LaChance, J., Radhakrishnan, S., Madiwale, G., **Guerrier, S.** & Vanamala, J., “*Targeting Hallmarks of Cancer with a Food System-based Approach*”, Nutrition, 69 (110563), p.1-23, 2020.
31. **Guerrier, S.**, Dupuis, E., Ma, Y. & Victoria-Feser, M.-P., “*Simulation based Bias Correction Methods for Complex Models*”, Journal of the American Statistical Association (Theory & Methods), 114(525), p.146-157, 2019.

30. Xu, H., **Guerrier, S.**, Molinari, R. & Karemera, M., “*Multivariate Signal Modelling with Applications to Inertial Sensor Calibration*”, IEEE Transactions on Signal Processing, 67(19), p.5143-5152, 2019.
29. Radi, A., Bakalli, G., **Guerrier, S.**, El-Sheimy, N., Sesay, A. & Molinari, R. “*A Multi-Signal Wavelet Variance-based Framework for Inertial Sensor Stochastic Error Modeling*”, IEEE Transactions on Instrumentation & Measurement, 68(12), p.4924-4936, 2019.
28. Wang, Y., Gardoni, P., Murphy, C. & **Guerrier, S.**, “*Predicting Fatality Rates Due to Earthquakes Accounting for Community Vulnerability*”, Earthquake spectra, 35(2), p.513-536, 2019.
27. **Guerrier, S.**, Orso, S. & Victoria-Feser, M.-P., “*Parametric Inference for Index Functionals*”, Econometrics, invited paper for the special issue *Econometrics and Income Inequality*, 6(2), 22, 2018.
26. Clausen, P., Skaloud, J., Molinari, R., Lee, J. & **Guerrier, S.**, “*Use of a New Online Calibration Platform with Applications to Inertial Sensors*”, IEEE Aerospace and Electronic Systems Magazine, 33(8), p.30-36, 2018.
25. Branca, M., Orso, S., Molinari, R., Xu, H., **Guerrier, S.**, Zhang, Y. & Mili, N., “*Is Non-Metastatic Cutaneous Melanoma Predictable through Genomic Biomarkers?*”, Melanoma Research, 28(1), p.21-29, 2018.
24. Balamuta, J., **Guerrier, S.**, Molinari, R. & Yang, W., “*A Computationally Efficient Framework for Automatic Inertial Sensor Calibration*”, IEEE Sensors Journal, 18(4), p.1636-1646, 2018.
23. Xu, H., **Guerrier, S.**, Molinari, R., & Zhang, Y., “*A Study of the Allan Variance for Constant-Mean Non-Stationary Processes*”, IEEE Signal Processing Letters, 24(8), p.1257 - 1260, 2017.
22. **Guerrier, S.**, Mili, N., Molinari, R., Orso, S., Avella-Medina, M. & Ma, Y., “*A Paradigmatic Regression Algorithm for Gene Selection Problems*”. *Frontiers in Genetics, Statistical Genetics and Methodology*, 7(97), p.1-11, 2016.
21. **Guerrier, S.**, Molinari, R. & Stebler, Y., “*Theoretical Limitations of Allan Variance-based Regression for Time Series Model Estimation*”, IEEE Signal Processing Letters, 23(5), p.597-601, 2016.
20. **Guerrier, S.**, Molinari, R. & Stebler, Y., “*Wavelet-based Improvements for Inertial Sensor Error Modelling*”, IEEE Transactions on Instrumentation and Measurement, 65(12), p.2693-2700, 2016.
19. **Guerrier, S.**, Molinari, R. & Balamuta, J., “*Discussion on Maximum Likelihood-based Methods for Inertial Sensor Calibration*”, IEEE Sensors Journal, 16(14), p.5522-5523, 2016.
18. Duncan, I. & **Guerrier, S.**, “*Member Plan Choice and Migration in Response to Changes in Member Premiums after Massachusetts Health Insurance Reform*”, North American Actuarial Journal, p.1-16, 2016.
17. Kerr, D., Yadollahi, M., Mendoza, H., Chen, X., Dong, S., **Guerrier, S.**, Laan, R. & Duncan, I., “*Use of a publically available database to determine the impact of diabetes on length of hospital stay for elective orthopedic procedures in California*”, Population Health Management, p.1-17, 2016.

16. **Guerrier, S.**, Molinari, R. & Skaloud, J., “*Automatic Identification and Calibration of Stochastic Parameters in Inertial Sensors*”, Journal of the Institute of Navigation, 62(4), p.265-272, 2015.
15. Stebler, Y., **Guerrier, S.** & Skaloud, J., “*An Approach for Observing and Modeling Errors in MEMS-based Inertial Sensors under Vehicle Dynamic*”. IEEE Transactions on Instrumentation and Measurement, 64(11), p.2926-2936, 2015.
14. Stebler, Y., **Guerrier, S.**, Skaloud, J. & Victoria-Feser, M.-P., “*The Generalized Method of Wavelet Moments for Inertial Navigation Filter Design*”, IEEE Transactions on Aerospace and Electronic Systems, 50(3), p.2269-2283, 2014.
13. **Guerrier, S.**, Molinari, R. & Victoria-Feser, M.-P., “*Estimation of Time Series Models via Robust Wavelet Variance*”, Austrian Journal of Statistics, 43(3-4), p.267-277, 2014.
12. **Guerrier, S.**, Stebler, Y., Skaloud, J. & Victoria-Feser, M.-P., “*Wavelet-Variance-Based Estimation for Composite Stochastic Processes*”, Journal of the American Statistical Association (Theory & Methods), 108(503), p.1021-1030, 2013.
11. **Guerrier, S.**, Skaloud, J., Waegli, A. & Victoria-Feser, M.-P., “*Fault Detection and Isolation in Multiple MEMS-IMUs Configurations*”, IEEE Transactions on Aerospace and Electronic Systems, 48(3), p.2015-2031, 2012.
10. Stebler, Y., **Guerrier, S.**, Skaloud, J. & Victoria-Feser, M.-P., “*Constrained EM Algorithm for Stochastic Inertial Error Modelling: Study of Feasibility*”, Measurement Science and Technology, 22(8), p.121-135, 2011.
9. Waegli, A., Skaloud, J., **Guerrier, S.**, Parés, M. & Colomina, I., “*Noise Reduction and Estimation in Multiple Micro-Electro-Mechanical Inertial Systems*”, Measurement Science and Technology, 21(6), p.231-242, 2010.
8. Xu, H., Ke, Y., **Guerrier, S.** & Li, R., “*Nonasymptotic Theories for Tail-Robust Autocovariance Matrix Estimation Methods*”.
7. Zhang, Y., Cucci, D., Molinari, R. & **Guerrier, S.**, “*Scale-wise Variance Minimization for Optimal Virtual Signals*”, Full text: <https://arxiv.org/abs/2106.15997>.
6. **Guerrier, S.**, Karemera, M., Orso, S., Victoria-Feser, M.-P. & Zhang, Y., “*A General Approach for Simulation-based Bias Correction in High Dimensional Settings*”. Full text: <https://arxiv.org/abs/2010.13687>.
5. **Guerrier, S.**, Karemera, M., Orso, S. & Victoria-Feser, M.-P., “*A Simple Recipe for Making Accurate Parametric Inference in Finite Sample*”. Full text: <https://arxiv.org/abs/1901.06750>.
4. Miglioli, C., Bakalli, G., **Guerrier, S.**, Orso, S., Molinari, R., Karemera, M. & Mili, N., “*Non-Coding Chameleon micro-RNAs in Breast Cancer: the Elusive Function of Genomic Variables with High Predictive Power*”. Full text: <https://doi.org/10.1101/2020.12.15.422846>.
3. Molinari, R., Bakalli, G., **Guerrier, S.**, Miglioli, C., Orso, S. & Scaillet, O., “*SWAG: A Wrapper Method for Sparse Learning*”. Full text: <https://arxiv.org/abs/2006.12837>.
2. Cucci, D. A., Khaghani, M. & **Guerrier, S.** “*Rigorous Stochastic Calibration of Inertial and Positioning Sensors*”.

ARTICLES
SUBMITTED

WORKING
PAPERS
(SELECTED)

1. Pfarrwaller, E., Voirol, L., Karemera, M., Piumatti, G., **Guerrier, S.**, Gerbase, M. & Baroffio, A., “*Trajectories and Predictive Factors of Medical Students Career Intentions*”.
2. Karemera, M., Voirol, L., Chu, W., Molinari, R., Cucci, D. A., & **Guerrier, S.**, “*Modeling and Estimation of Rotation-Induced Sinusoidal Disturbances in Inertial Sensors*”.
3. Boulaguiem, Y., Couturier, D., Quartier, J., Lapteva, M., Kalia, Y. & **Guerrier, S.**, “*Efficient Statistical Approach to Test Bioequivalence with Multivariate Data*”.
4. Couturier, D., Karemera, M., **Guerrier, S.** & Victoria-Feser, M.-P., “*A Simulation-Based Inferential Framework for Generalized Linear Mixed Models with Non-Ignorable Missing Data*”.
5. Awan, J., **Guerrier, S.**, Karemera, M. & Molinari, R., “*A General Statistical Inference Framework for Differentially Private Mechanisms*”.
6. **Guerrier, S.**, Ma, Y. & Zhang, Y., “*Simulation-Based Bias Correction Method for Semiparametric Models*”.
7. **Guerrier, S.**, Héritier, S. & Victoria-Feser, M.-P., “*Exact Inference for Studies with a Small Number of Clusters*”.
8. **Guerrier, S.**, Victoria-Feser, M.-P. & Avella, M., “*A Prediction Divergence Criterion for Model Selection*”. Full text: <http://arxiv.org/abs/1511.04485>.
1. Karemera, M., Pfarrwaller, E., Voirol, L., Piumatti, G., **Guerrier, S.**, Gerbase, M. & Baroffio, A., “*Determinants of Empathy in Medical Students: A Cross-sectional and Cross-cultural Study*”.

CONFERENCE
PROCEEDINGS

14. Radi, A., Nassar, S., Molinari, R., **Guerrier, S.** & El-Sheimy, N., “*Improved Stochastic Modelling of Low-Cost GNSS Receivers Positioning Errors*”, in Proceedings of IEEE/ ION PLANS 2018, Monterey, CA, USA, 2018.
15. Bakalli, G., Radi, A., Molinari, R., Zhang, Y., **Guerrier, S.** & Nassar, S., “*A Two-Step Computationally Efficient Procedure for IMU Classification and Calibration*”, in Proceedings of IEEE/ION PLANS 2018, Monterey, CA, USA, 2018.
16. Zhang, Y., Xu, H., Radi, A., Molinari, R., **Guerrier, S.**, Karemera, M. & El-Sheimy, N., “*An Optimal Virtual Inertial Sensor Framework using Wavelet Cross Covariance*”, in Proceedings of IEEE/ION PLANS 2018, Monterey, CA, USA, 2018.
17. Claussen, P., Orso, S., Skaloud, J. & **Guerrier, S.**, “*Construction of Dynamically-Dependent Stochastic Error Models*”, in Proceedings of IEEE/ION PLANS 2018, Monterey, CA, USA, 2018.
18. Contento, A., Xu, H., Gardoni, P. & **Guerrier, S.**, “*Modeling the climate change effects on storm surge with metamodels*”, 6th International Symposium on Life-Cycle Civil Engineering, IALCCE, 2018.
19. Khaghani, M., **Guerrier, S.**, Skaloud, J. & Zhang, Y., “*Optimal Stochastic Sensor Error Modeling based on Actual Impact on Quality of GNSS-INS Integrated Navigation*”, in Proceedings of the ION GNSS 2019, Miami, FL, USA, 2019.
20. Voirol, L., **Guerrier, S.**, Zhang, Y., Karemera, M. & Radi, A., “*Optimally Weighted Wavelet Variance-based Estimation for Inertial Sensor Stochastic Calibration*”, in 12th International Conference on Electrical Engineering, Cairo, Egypt, 2020.

13. Claussen, P., Skaloud, J., Molinari, R., Balamuta, J. & **Guerrier, S.**, “*An Overview of a New Sensor Calibration Platform*”, in Proceeding of the 4th IEEE International Workshop on Metrology for Aerospace, Padova, Italy, 2017.
 12. Radi, A., Bakalli, G., **Guerrier, S.**, El-Sheimy, N. & Molinari, R., “*An Automatic Calibration Approach for the Stochastic Parameters of Inertial Sensors*”, in Proceedings of the ION GNSS 2017, Portland, OR, USA, 2017.
 11. Bakalli, G., Radi, A., Molinari, R., El-Sheimy, N. & **Guerrier, S.**, “*A Computational Multivariate-based Technique for Inertial Sensor Calibration*”, in Proceedings of the ION GNSS 2017, Portland, OR, USA, 2017.
 10. Molinari, R., Balamuta, J., **Guerrier, S.** & Skaloud, J., “*An Inertial Sensor Calibration Platform to Estimate and Select Error Models*”, in Proceedings of the International Association of Institutes of Navigation, Prague, Czech Republic, 2015.
 9. Balamuta, J., Molinari, R., **Guerrier, S.** & Skaloud, J., “*A Computationally Efficient Platform for Inertial Sensor Calibration*”, in Proceedings of the ION GNSS 2015, Tampa, FL, USA, 2015.
 8. Molinari, R., Balamuta, J., **Guerrier, S.** & Skaloud, J., “*Automatic and Computationally Efficient Method For Model Selection In Inertial Sensor Calibration*”, in Proceedings of the ION GNSS 2015, Tampa, FL, USA, 2015.
 7. Stebler, Y., **Guerrier, S.**, Skaloud, J., Molinari, R. & Victoria-Feser, M.-P., “*Study of MEMS-based Inertial Sensors Operating in Dynamic Conditions*”, in Proceedings of IEEE/ION PLANS 2014, Monterey, CA, USA, 2014.
 6. **Guerrier, S.**, Molinari, R., Skaloud, J. & Victoria-Feser, M.-P., “*An Algorithm for Automatic Inertial Sensors Calibration*”, in Proceedings of the ION GNSS 2013, Nashville, TN, USA, 2013.
 5. Stebler, Y., **Guerrier, S.**, Skaloud, J. & Victoria-Feser, M.-P., “*A Framework for Inertial Sensor Calibration Using Complex Stochastic Error Models*”, in Proceedings of IEEE/ION PLANS 2012, Myrtle Beach, SC, USA, 2012.
 4. Stebler, Y., **Guerrier, S.**, Skaloud, J. & Victoria-Feser, M.-P., “*Improving Modeling of MEMS-IMUs Operating in GNSS-denied Conditions*”, in Proceedings of the ION GNSS 2011, Portland, OR, USA, 2011.
 3. **Guerrier, S.**, Skaloud, J., Waegli, A. & Victoria-Feser, M.-P., “*Robust FDI in Redundant MEMS-IMUs Systems*”, EuroCow, the Calibration and Orientation Work-shop (European Spatial Data Research), Barcelona, Spain, 2010.
 2. **Guerrier, S.**, “*Improving Accuracy with Multiple Sensors: Study of Redundant MEMS-IMU/GPS Configurations*”, in Proceedings of the ION GNSS 2009, Savannah, GA, USA, 2009.
 1. Waegli, A., **Guerrier, S.** & Skaloud, J., “*Redundant MEMS-IMU integrated with GPS for Performance Assessment in Sports*”, in Proceedings of IEEE/ION PLANS 2008, Monterey, CA, USA, 2008.
8. “**simts**” - **R package**: contains various tools for time series analysis. Indeed, this R package provides a series of tools to simulate, plot, estimate, select and forecast different time series models. It is originally conceived as a support to the online textbook “*Applied Time Series Analysis with R*”. Available on CRAN, downloads \approx 6K/year. More information: <http://simts.smac-group.com>.

7. **“wv” - R package:** implements the methods proposed in [41] to perform robust wavelet variance analysis. Available on CRAN, downloads \approx 5K/year. More information: <https://smac-group.github.io/wv/>.
6. **“avar” - R package:** implements the Allan variance and Allan variance linear regression estimator for time series models (see [21] and [23]). Available on CRAN, downloads \approx 6K/year. More information: <https://smac-group.github.io/avar/>.
5. **“gmwm” - R package:** provides a computationally efficient implementation of the estimators introduced in [12] and [13]. Downloads \approx 6K/year. More information: <https://github.com/SMAC-Group/gmwm>.
4. **“irg” - R package:** implements the methods proposed in [40] to perform Granger-causal analysis of irregularly sampled signals. More information: <https://github.com/SMAC-Group/irg>.
3. **“cape” - R package:** implements the conditional prevalence estimation approach proposed in [44]. More information: <https://stephaneguerrier.github.io/cape/>.
2. **“swag” - R package:** implements the algorithm presented in [3] and [22]. More information: <https://github.com/SMAC-Group/SWAG-R-Package>.
1. **“ib” - R package:** implements the bias correction strategies studied in [6] and [31]. More information: <https://github.com/SMAC-Group/ib>.

HONORS AND AWARDS

- Recipient of the SNSF Professorial Fellowship, sub-division of Mathematics, 2018. More information: <http://p3.snf.ch/project-176843>.
- IEEE International Workshop on Metrology for Aerospace (2017), *Best Demonstration Award*.
- The Institute of Navigation (ION GNSS 2013), *Best Presentation Award*.
- The Institute of Navigation (ION GNSS 2009), *Award for Best Student Paper*.
- IGSO Prize 2008, *Award for Best Master Project on a new Aspect of Geomatics or related Fields*.

GRANTS

- Swiss National Science Foundation Award for the grant entitled: “*New Challenges for Statistical Methods in Large and Complex Data Settings*”, SNSF professorship (sub-division Mathematics), amount: CHF 1,633,470.00, period: 2019 - 2022. More information: <https://p3.snf.ch/project-176843>.
- InnoSuisse award for the grant entitled: “*Stochastic Modelling of Inertial Sensors for Precise GNSS-based Positioning*”, Engineering division, with Dr. Jan Skaloud (EPFL, principal grantee) & Dr. Markus Wenk (Hexagon Technology Center GmbH), amount: total CHF 917,280.00 & CHF 246,355.20 (\approx 27%) for the University of Geneva, period: 2020 - 2022.
- Project partner of the Swiss National Science Foundation Award entitled: “*DRONING - Towards the next generation of self-localization and orientation of micro drones*”, of Dr. Jan Skaloud (EPFL), amount: CHF 310,039.00, period: 2019 - 2022. More information: <https://p3.snf.ch/Project-182072>.

| | Google Scholar | Research Gate |
|--------------------------------------|----------------|---------------|
| Citations: | 769 | 617 |
| Number of articles [§] : | 33 | - |
| Number of proceedings [§] : | 20 | - |
| <i>h</i> -index: | 15 | 13 |
| <i>i</i> 10-index: | 17 | - |

Note: [§]published and peer-reviewed.

Additional information:

- SJR Ranking of published articles: Q1:26 ,Q2:5, Q3:1, Q4:1;
- Number of papers where major/minor revisions are invited: 4;
- Number of papers submitted (excluding revisions): 9.

RESEARCH GROUP

| Name | Position | Background | Financed by |
|---------------------------|----------|--------------------|-----------------|
| Mucyo Karemera | Postdoc | PhD in Mathematics | SNSF (SG) |
| Samuel Orso | Postdoc | PhD in Statistics | SNSF (SG) |
| Davide Cucci | SRA | PhD in Robotics | InnoSuisse (SG) |
| Wenfei Chu [§] | PhD Stu. | MSc in Statistics | SNSF (SG) |
| Yuming Zhang [§] | PhD Stu. | MSc in Statistics | GSEM (SG) |
| Jun Wu [§] | PhD Stu. | MSc in Mathematics | CSC (SG) |
| Lionel Voirol* | PhD Stu. | MSc in Analytics | SNSF (MPVF) |
| Younes Boulaguiem* | PhD Stu. | MSc in Statistics | SNSF (MPVF) |

Notes: Postdoctoral Researcher (Postdoc); Senior Research Associate (SRA); PhD Student (PhD Stu.); Swiss National Science Foundation (SNSF); Geneva School of Economics and Management (GSEM); China Scholarship Council (CSC); [§]Thesis Advisor; *Co-advisor with Prof. Maria-Pia Victoria-Feser; Stéphane Guerrier (SG); Maria-Pia Victoria-Feser (MPVF).

FIELDS OF RESEARCH

Statistics & Signal Processing

Along with the ever-increasing data size and model complexity, statistical methods become increasingly limited by their computational and numerical aspects. In fact, one of the major challenges in modern Statistics consists in balancing statistical rigor with applicability, in particular in large data settings, where the former is often sacrificed in favor of the latter. The main focus of my research lies in the development of statistical and algorithmic methods that allow to respond to modern computational challenges while achieving desirable statistical properties and performance. For example, my current research includes the development of a new estimation framework for time series and spatial models (see e.g. [12] and [41]) called the Generalized Method of Wavelet Moments. This framework allows, among other things, to estimate a wide range of models, including some where standard methods typically fail due to the complexity of the models and/or the unrealistic computational burden they would entail. The methodology has been so far applied and extended to engineering domains where massive amounts of data (typically tens of millions of observations) are used to estimate complex state-space

models (see e.g. [14] or [30]). Moreover, I have studied the (algorithmic and asymptotic) properties of various simulation-based methods in [5], [6] and [31]. These findings were then used to build a framework defining simulation-based estimators that is of particular interest for complex models and/or large-scale data settings. The benefit of this general approach is, for example, of particular relevance for Generalized Linear Mixed Models and Generalized Linear Latent Variables Models, which are very popular in various areas of research such as social and economic sciences. Another important benefit concerns models for missing not at random data and/or with measurement errors.

Selected Publications: [5], [6], [12], [30], [31], [41].

Selected Statistical Software: [ib](#), [wv](#), [avar](#) and [gmwm](#) R packages.

Machine Learning & Life Sciences Analytics

The ever-growing amount of available data, as issued from biological and/or genetic measurements or as features from medical images, allows life sciences researchers to breach the frontiers of knowledge in many directions, outside the controlled experimental settings. Data analytics, in this context, consists in using and developing statistical methods that can control population (or out-of-sample) validity (e.g. under sampling bias, measurement error, etc.), by controlling the decisional risk associated to hypothesis testing and/or prediction. I contribute to the application and development of new data analytics methods, in high dimensions, for estimation, prediction and/or model selection. For example, in [22] I propose a new classification algorithm specifically designed for gene selection problems. This approach considers the problem of selecting a set of models (or several sets of variables) with statistically equivalent predictive power, as opposed to a unique and “best” model (or set of variables). I believe that such methods are of particular importance in research fields where optimal solutions should not only rely on classification (or prediction) error minimization, but also on the “explanatory” power of the chosen models. Indeed, methods providing a set of interconnected models (rather than a single model) can help experts to further understand the observed links and interactions among the available variables (in huge quantities), when several “optimal” models (having statistically equivalent classification performance) do in fact exist. In the field of medicine, the benefits of this approach were already illustrated in [25]. This method was recently extended in [3] as a general-purpose machine learning (wrapper) technique.

Selected Publications: [3], [4], [22], [25], [40], [44].

Selected Statistical Software: [irg](#) and [swag](#) R packages.

Applied Analytics

Data analytics can be used within a wide range of settings but often researchers and practitioners are faced with very specific problems for which no suitable statistical method is adapted to a particular data setting. In this context, the development of new statistical methods faces the two-fold challenge of extending existing statistical methodologies to a particular research environment and developing new, more global (fundamental) statistical methods. My experience as a researcher in Statistics has shown me that this is not only the path I would like to pursue, but also that it is the path with higher potential impact given that interdisciplinary research allows to combine knowledge and deliver more quality research than if this were done independently in respective domains. I collaborate with scholars in other disciplines on the adaptation and/or creation of new methodologies tailored to the problem at

hand for providing decisional frameworks with controlled decisional risk. Examples include medicine, nutrition, business analytics, civil engineering.

Selected Publications: [18], [28], [32], [37].

Selected Statistical Software: [simts](#) R package.

TEACHING

SUMMARY BY YEAR

2021 - 2022: “*Comprendre le Numérique*” (Fall, undergraduate class, University of Geneva), “*Modelling and Data Analysis for Pharmaceutical Sciences*” (Spring, graduate class, University of Geneva), “*Introduction to Data Science*” (Spring, undergraduate class, University of Geneva).

2020 - 2021: “*Comprendre le Numérique*” (Fall, undergraduate class, University of Geneva), “*Introduction to Statistics*” (Winter, graduate class, Shanghai International Studies University), “*Data Visualization*” (Spring, graduate class, short course, University of Geneva), “*Introduction to Programming*” (Spring, graduate class, short course, University of Geneva), “*Modelling and Data Analysis for Pharmaceutical Sciences*” (Spring, graduate class, University of Geneva), “*Introduction to Data Science*” (Spring, undergraduate class, University of Geneva).

2019 - 2020: “*Inference for Large-Scale Time Series with Application to Sensor Fusion*” (Winter, graduate class, École Polytechnique Fédérale de Lausanne). “*Introduction to Data Science*” (Spring, undergraduate class, University of Geneva).

2018 - 2019: “*Applied Time Series Analysis - STAT 463*” (Fall, undergraduate class, Pennsylvania State University). “*Introduction to Data Science*” (Spring, undergraduate class, University of Geneva). “*Introduction to Data Science*” (Summer, Geneva Summer School, University of Geneva).

2017 - 2018: “*Statistical Programming Methods - STAT 297*” (Fall, undergraduate class, Pennsylvania State University).

2016 - 2017: “*Time Series Analysis - STAT 429*” (Fall, graduate class). “*Time Series Forecasting - STAT 578*” (Fall, graduate class). “*Statistical Programming Methods - STAT 385*” (Fall, undergraduate class). All courses were given at the University of Illinois at Urbana-Champaign.

2015 - 2016: “*Time Series Analysis - STAT 429*” (Fall, graduate class). “*Statistics - STAT 410*” (Spring, undergraduate class). All courses were given at the University of Illinois at Urbana-Champaign.

2014 - 2015: “*Time Series Analysis - STAT 429*” (Fall, graduate class). “*Statistics - STAT 400*” (Spring, undergraduate class). All courses were given at the University of Illinois at Urbana-Champaign.

2013 - 2014: “*Introduction to Statistics - PSTAT 5A*” (Fall & Winter, undergraduate class). “*Statistics - PSTAT 120C*” (Spring, undergraduate class). All courses were given at the University of California, Santa Barbara.

TEACHING MATERIALS

Ebooks:

Beckman, M., **Guerrier, S.**, Lee, J., Molinari, R., Orso, S. & Rudnytskyi, J., “*An Introduction to Statistical Programming Methods with R*”. Full text: <http://r.smac-group.com>*

Guerrier, S., Molinari, R., Xu, H. & Zhang, Y., “*Applied Time Series Analysis with R*”. Full text: <http://ts.smac-group.com>.

Websites with Instructional Videos:

Karemera, M. & **Guerrier, S.**, “*Introduction to Mathematics for Undergraduates in Economics and Management*”, all material is in French and an English version is under development (available early 2022). Youtube videos: [here](#).

More information: <https://mkaremera-math1.netlify.app>.

Websites with Interactive Materials:

Skaloud, J. & **Guerrier, S.**, “*Inference for Large-Scale Time Series with Application to Sensor Fusion*”. More information: <https://gmwm.netlify.com/>.

Guerrier, S., Voirol, L. & Zhang, Y., “*Introduction to Data Science with R*”. More information: <https://intro-to-ds.netlify.app/>*

*The pedagogical innovations for the course: “*Introduction to Data Science*” of the GSEM which is based on the ebook: <http://r.smac-group.com> and the interactive website: <https://intro-to-ds.netlify.app/> was ranked among the best 3 projects for the Credit Suisse Award for Best Teaching 2020. This pedagogical project will be presented to the “Commission d’innovations pédagogiques” of the Rectorate in December 2021.

COURSE DETAILS

University of Geneva, Switzerland

“*Introduction to Data Science*” Spring 2019, 2020, 2021 & 2022

Undergraduate level course on Statistical Programming Methods (Bachelor in Economics and Management) based on the following ebook: <http://r.smac-group.com>, website with interactive material accessible at <https://intro-to-ds.netlify.app/>, and syllabus accessible [here](#), class size: \approx 70 students.

“*Modelling and Data Analysis for Pharmaceutical Sciences*” Spring 2021 & 2022

Graduate level course (Master in Pharmaceutical Sciences) with Prof. Francesco Gervasio, slides available [here](#), class size: \approx 10 students.

Participation to “*Comprendre le Numérique*” Fall 2020 & 2021

Bachelor level course (open to all bachelor students of the University of Geneva, *cours transversal*), responsible for the module on statistical literacy. Slides available [here](#), class size: \approx 300 students.

Data Visualization

Spring 2021

Short course of 4 hours (open to all PhD students of the University of Geneva) on Data Visualization given within the program “Digital Skills for PhD Students” of the Graduate Campus, material accessible [here](#), class size: ≈ 20 students.

Introduction to Programming

Spring 2021

Short course of 4 hours (open to all PhD students of the University of Geneva) on programming given within the program “Digital Skills for PhD Students” of the Graduate Campus, material accessible [here](#), class size: ≈ 20 students.

“R programming for Data Science”

Summer 2019

Multidisciplinary graduate level course on Statistical Programming Methods (Geneva Summer School). This course is based on an ebook accessible at <http://r.smac-group.com>, class size: ≈ 50 students.

Shanghai International Studies University, China

“Introduction to Statistics”

Winter 2021

PhD-level course (with Yuming Zhang) providing a first introduction to Statistics for students of the Graduate Institute of Interpretation and Translation. More information: [here](#), class size: ≈ 20 students.

École Polytechnique Fédérale de Lausanne, Switzerland

“Inference for Large-Scale Time Series with Application to Sensor Fusion” 2020

PhD-level course (with Dr. Jan Skaloud) on signal processing with application in navigation (for PhD students in Robotics & PhD in Civil Engineering). More information: <https://gmwm.netlify.com/>, syllabus accessible [here](#), class size: ≈ 20 students.

Pennsylvania State University, USA

“Applied Time Series Analysis (STAT 463)”

Fall 2018

Undergraduate level course on Time Series Analysis (Bachelor in Statistics). This course is based on an ebook accessible at <http://ts.smac-group.com>, syllabus accessible [here](#), class size: ≈ 80 students.

“Statistical Programming Methods (STAT 297)”

Fall 2017

Undergraduate level course on Statistical Programming Methods (open to several STEM programs). This course is based on an ebook accessible at <http://r.smac-group.com>, class size: ≈ 50 students.

University of Illinois at Urbana-Champaign, USA

“Statistical Programming Methods (STAT 385)”

Spring 2017

Undergraduate level course on Statistical Programming Methods (open to various STEM programs). This course is based on an ebook accessible at <http://r.smac-group.com>, syllabus accessible [here](#), class size: ≈ 120 students.

“Time Series Analysis (STAT 429)”

Fall 2014, 2015 & 2016

Graduate level course on Time Series Analysis (MSc and PhD in Statistics). This course is based on an ebook accessible at <http://ts.smac-group.com>, syllabus accessible [here](#), class size: ≈ 60 students.

“Time Series Forecasting (STAT 578)”

Fall 2016

Graduate level course on Time Series Forecasting (open to several STEM programs). Syllabus accessible [here](#), class size: ≈ 20 students.

“Statistics and Probability II (STAT 410)”

Spring 2016

Upper undergraduate level course in Probability and Statistics (BSc in Statistics and BSc in Mathematics). Syllabus accessible [here](#), class size: ≈ 100 students.

“Statistics and Probability I (STAT 400)”

Spring 2015

Undergraduate level course in Probability and Statistics (open to several STEM programs). Syllabus accessible [here](#), class size: ≈ 200 students.

University of California, Santa Barbara, USA

“Statistics (PSTAT 5A)”

Fall 2013 & Winter 2014

Undergraduate level course in Probability and Statistics (open to various programs but designed for non-STEM students). Syllabus accessible [here](#), class size: ≈ 450 students.

“Probability and Statistics (PSTAT 120C)”

Spring 2014

Upper division undergraduate level course in Statistics (open to various STEM programs). Syllabus accessible [here](#), class size: ≈ 450 students.

SUPERVISION OF MSC THESIS

- **Giulia Genoni**, *“Simulation-Based Methods for Interval Estimation of Time Series Models”*, MSc in Statistics, September 2020.
- **Ziyi Xuan**, MSc in Pharmacy, December 2021 (expected).
- **Youssef Hellioui**, MSc in Pharmacy, December 2021 (expected).
- **Samy Slamani**, MSc in Pharmacy, December 2021 (expected).
- **Thi Huong Quynh Nguyen**, MSc in Pharmacy, May 2022 (expected).

ADMINISTRATION

- Member of the PhD in Statistics Committee of the Research Center for Statistics of the University of Geneva (2020 - present).
- Member of the scientific committee of the project “Data Science for All” (financed by Swiss Universities) which aims at increasing the numerical literacy within the University of Geneva community (2021 - present).
- Co-organiser of the Data Analytics Modular course of the Geneva Summer School (planned for 2020 but postponed to 2022).
- Co-organiser of the Missing not at Random and Causal Inference Conference (Summer 2020, postponed to 2022)

- Member of the organization committee for the Certificate of Advanced Study (CAS) in Quality in Pharmaceutical Industry (module Operation Quality in Manufacturing) of the School of Pharmaceutical Sciences, University of Geneva.
- Organiser of the Department of Statistics Research Seminar at the University of Illinois at Urbana-Champaign (2014 - 2017) and at the Pennsylvania State University (2017 - 2018).
- Member of the Student Appeals Faculty Committee at the University of Illinois at Urbana-Champaign (2014 - 2017).

PROFESSIONAL SOCIETIES

- Member of the American Statistical Association.
- Member of the Institute of Electrical and Electronics Engineers (IEEE).

TECHNICAL AND SCIENTIFIC ROLES

- Advisor for MindEarth, a Swiss non-profit start-up that combines Earth Observation, Complex Networks and Artificial Intelligence to solve complex spatial problems related to urbanization, human mobility and socio-economic challenges. More information: <https://www.mindearth.org>.
- Reviewer for international scientific journals in Statistics and Engineering.
- Member of the evaluation committee of several MSc and PhD students in Statistics and Engineering.

PH.D. THESIS ADVISOR

- **Haotian Xu:** PhD in Statistics, University of Geneva, graduated in 2021. Thesis: “*Contributions to Time Series Analysis*”, co-advisor with Prof. Maria-Pia Victoria-Feser. Now Postdoctoral Researcher, University of Warwick, Department of Statistics, UK.
- **Gaetan Bakalli:** PhD in Statistics, University of Geneva, graduated in 2021. Thesis: “*Domain-Tailored Approaches to Statistical Learning*”, co-advisor with Prof. Olivier Scaillet. Now Visiting Assistant Professor, Auburn University, Department of Mathematics and Statistics, USA.
- **Samuel Orso:** PhD in Statistics, University of Geneva, graduated in 2019. Thesis: “*Contributions to Simulation-based Estimation Methods*”, co-advisor with Prof. Maria-Pia Victoria-Feser. Now Postdoctoral Researcher at the University of Geneva, Switzerland.
- **Roberto Molinari:** PhD in Statistics, University of Geneva, graduated in 2016. Thesis: “*Robust Inference for Random Fields and Latent Models*”, co-advisor with Prof. Maria-Pia Victoria-Feser. Now Assistant Professor (tenure track), Auburn University, Department of Mathematics and Statistics, USA.
- **Elise Dupuis:** PhD in Statistics, University of Geneva, graduated in 2015. Thesis: “*Simulation Based Bias Correction Methods for Complex Problems*”, co-advisor with Prof. Maria-Pia Victoria-Feser. Now Bio-statistician at Geneva University Hospitals, Switzerland.

FORMER POSTDOCS

- **Dr. Mehran Khaghani** (2019 - 2020), currently Sensor Fusion Algorithm Engineer at Leica Geosystems, Switzerland.

Invited Department Seminar Talks

- *Statistics, Probability or Mathematics*: University of California, Santa Barbara (2013, 2015), University of Illinois at Urbana-Champaign (2014, 2019), George Mason University (2014), Texas A&M University (2014), Bocconi University (2014), City University of New York (2015, 2016), Pennsylvania State University (2016, 2017, 2018, 2019), University of Calgary (2018, 2019), Auburn University (2021).
- *Biostatistics or Epidemiology*: University of Geneva (2016, 2018), University of Illinois at Chicago (2019).
- *Aerospace or Geomatics Engineering*: University of Illinois at Urbana-Champaign (2015), Ecole Polytechnique Fédérale de Lausanne (2016, 2017), University of Calgary (2016, 2018).

Conference Talks

- *Statistics*: Computational Management Science (2011, contributed), International Conference on Computational Statistics (2012, contributed), Joint Statistical Meetings (2012, contributed), International Conference on Robust Statistics (2013, contributed), Conference of the International Society for Non-Parametric (2016, invited), Joint Statistical Meetings (2019, invited), International Chinese Statistical Association Conference on Data Science (2019, invited).
- *Engineering*: Proceedings of the ION GNSS (2009, 2013, 2015, 2019, invited), IEEE/ION PLANS (2012, invited), Calibration and Orientation Workshop - European Spatial Data Research (2009, invited).