André Victor Ribeiro Amaral

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Research Appointments

1. **Lecturer in Statistical Learning** at the *School of Mathematical Sciences, University of Southampton*. Southampton, England. From 01/2025 to PRESENT.
2. **Postdoctoral Research Associate in Mathematics** at *Imperial College London* (Statistics Section). London, England. From 01/2024 to 12/2024.

   In collaboration with Dr. Oliver Ratmann and Dr. Adam Sykulski, I work on the development of novel, flexible and computationally tractable spatio-temporal statistical inference tools and on their application in the domains of (1) species mapping and forecasting utilizing oceanographic and climatological data, and (2) quantification and hotspot mapping of orphanhood levels worldwide.

Education

1. **PhD in Statistics**, King Abdullah University of Science and Technology (KAUST). Thuwal, Saudi Arabia. From 08/2020 to 12/2023. Advised by Dr. Paula Moraga.
   Dissertation title: *Spatial and Spatio-temporal Statistical Methods for Environment and Public Health Applications*. https://repository.kaust.edu.sa/handle/10754/695717.
2. **MSc in Statistics**, Universidade Federal de Minas Gerais (UFMG). Belo Horizonte, Brazil. From 02/2019 to 06/2020. Advised by Dr. Roger Silva.
   Dissertation title: *Phase Transition Phenomenon in Percolation Models using Boolean Functions* (written in Portuguese). http://hdl.handle.net/1843/51318.

Publications

Peer-reviewed

1. **Amaral, AVR**, Wolffram, D, Moraga, P, and Bracher, J (2024). *Post-processing and weighted combination of infectious disease nowcasts*. PLOS Computational Biology. https://doi.org/10.1371/journal.pcbi.1012836.
2. Zhong, R, **Amaral, AVR**, and Moraga, P (2024). *Spatial data fusion adjusting for preferential sampling using INLA and SPDE*. Journal of the Royal Statistical Society (Series A). https://doi.org/10.1093/jrsssa/qnae058.
3. **Amaral, AVR**, Rubio, FJ, Quaresma, M, Rodríguez-Cortés, FJ, and Moraga, P (2024). *Extended Excess Hazard Models for Spatially Dependent Survival Data*. Statistical Methods in Medical Research (SMMR). https://doi.org/10.1177/09622802241233767.
4. **Amaral, AVR**, Krainski, ET, Zhong, R, and Moraga, P (2023). *Model-based Geostatistics under Spatially Varying Preferential Sampling*. Journal of Agricultural, Biological and Environmental Statistics. https://doi.org/10.1007/s13253-023-00571-0.
5. **Amaral, AVR**, González, JA, and Moraga, P (2022). *Spatio-temporal modeling of infectious diseases by integrating compartment and point process models*. Stochastic Environmental Research and Risk Assessment. https://doi.org/10.1007/s00477-022-02354-4.
6. Mahmood, M, **Amaral, AVR**, Mateu, J, and Moraga, P (2022). *Modeling infectious disease dynamics: Integrating contact tracing-based stochastic compartment and spatio-temporal risk models*. Spatial Statistics. https://doi.org/10.1016/j.spasta.2022.100691.

Preprint

1. Steyn, N, Unwin, HJT, Ponmattam, J, Villaveces, A, Martins, L, Sherr, L, Blenkinsop, A, Semenova, E, Stuart-Brown, A, **Amaral, AVR**, Ratmann, O, Schnekenberg, RP, Cluver, L, Hillis, S, Rawlings, L, Barberia, L, Souza, AS, Castro, MC, and Flaxman, S (2025). *Regional and national estimates of children affected by all-cause and COVID-19-associated orphanhood and caregiver death in Brazil, by age and family circumstance.* medRxiv preprint. `https://doi.org/10.1101/2025.01.31.25321479`.
2. **Amaral, AVR**, Sykulski, AM, Cavan, E, and Fielding, S (2024). *Navigating Challenges in Spatio-temporal Modelling of Antarctic Krill Abundance: Addressing Zero-inflated Data and Misaligned Covariates.* arXiv preprint. `https://doi.org/10.48550/arXiv.2412.01399`.

Teaching

1. **Lecturer** in "Statistical Modelling II" (MATH3091), University of Southampton, 2nd semester (2024/2025). Co-taught with Dr. Helen Ogden. The material is available on `https://avramaral.github.io/MATH3091/`.
2. **Mini-course Instructor** in "Machine Learning & Global Health (MLGH) Workshop at Imperial College London." 04/2024. The material (INLA Tutorial) is available on `https://avramaral.github.io/INLA_tutorial/`.
3. **Guest lecturer** in "Spatial Statistics" (MATH60139/70139), Imperial College London. Spring, 2024. Invited by Dr. Adam Sykulski. The material (Inference on Point Processes) is available on `https://avramaral.github.io/PP_inference/`.
4. **Mini-course Instructor** in the "Spatio-temporal Point Pattern Data Analysis with Applications in Health Surveillance and Environmental Data" course, taught during the "International Conference on Bioinformatics (InCoB2022)." 11/2022. The material is available on `https://avramaral.github.io/PP_tutorial/`.
5. **Graduate Teaching Assistant** in "Applied Statistics with R" (STAT 215), King Abdullah University of Science and Technology. Twice (Fall, 2021 and 2022). Advised by Dr. Joaquin Ortega. The material is available on `https://avramaral.github.io/STAT215/`.
6. **Teaching Assistant** in "Applied Statistics and Data Analysis" (DSA004). This was a four-day course given to ARAMCO employees in collaboration with King Abdullah University of Science and Technology. Summer, 2022. Advised by Dr. Paula Moraga. The material is available on `https://avramaral.github.io/aramco_course/`.
7. **Graduate Teaching Assistant** in "Contemporary Topics in Statistics" (STAT 294), King Abdullah University of Science and Technology. Fall, 2021. Advised by Dr. Paula Moraga. The material is available on `https://avramaral.github.io/STAT294/`.
8. **Graduate Teaching Assistant** in "Statistics and Probability" (EST 031), Universidade Federal de Minas Gerais. From 02/2020 to 06/2020. Advised by Dr. Cristiano Carvalho. The material (written in Portuguese) is available on `avramaral.github.io/AulasEstProb/`.

Supervision

1. **Co-supervisor** (MSc project). 2024. *Attention-based Probabilistic Neural Networks for Nowcasting of Dengue Fever in Brazil.* Imperial College London.
2. **Co-supervisor** (MSc project). 2024. *Modelling the dynamic behavior and interaction of dengue virus lineages in São Paulo, Brazil.* Imperial College London.

Conference Presentations

1. **Talk** at "METMA XI." 07/2024. *Navigating Challenges in Spatio-Temporal Modelling of Antarctic Krill Abundance: Addressing Zero-Inflated Data and Misaligned Covariates.* The slides are available on `https://github.com/avramaral/AC/tree/main/METMA_XI`.

2. **Talk** at "CEN 2023." 09/2023. *Extended Excess Hazard Models for Spatially Dependent Survival Data.* The slides are available on `https://github.com/avramaral/AC/tree/main/CEN_2023`.
3. **Talk** at "JSM 2023." 08/2023. *Model-based Geostatistics under Spatially Varying Preferential Sampling.* The slides are available on `https://github.com/avramaral/AC/tree/main/JSM_2023`.
4. **Poster presentation** at "KAUST 2022 Workshop on Statistics." 11/2022. *Extended Excess Hazard Model for Spatially Dependent Survival Data with Applications to Cancer Research.* The poster is available on `https://github.com/avramaral/AC/tree/main/KAUST_2022_STAT_WORKSHOP`.
5. **Talk** and **poster presentation** at "JSM 2022." 08/2022. *Integrating Compartment and Point Process Models for Spatio-Temporal Modeling of Infectious Diseases.* The slides and poster are available on `https://github.com/avramaral/AC/tree/main/JSM_2022`.
6. **Talk** at "GeoEnv 2022." 06/2022. *Spatio-temporal Point Process Compartment Modeling for Infectious Diseases.* The slides are available on `https://github.com/avramaral/AC/tree/main/GeoEnv_2022`.
7. **Poster presentation** at "METMA X." 06/2022. *Assessing the Effect of Model-based Geostatistics Under Preferential Sampling for Spatial Data Analysis.* The poster is available on `https://github.com/avramaral/AC/tree/main/METMA_X`.
8. **Talk** at "ENAR 2022." 03/2022. *Modeling Infectious Disease Dynamics: Integrating Contact Tracing-based Stochastic Compartment and Spatio-temporal Risk Models.* The slides are available on `https://github.com/avramaral/AC/tree/main/ENAR_2022`.
9. **Poster presentation** at "TWAS 15$^{\text{th}}$ General Conference." 11/2021. *Modeling Infectious Disease Dynamics: Integrating Contact Tracing-based Stochastic Compartment and Spatio-temporal Risk Models.* The poster is available on `https://github.com/avramaral/AC/tree/main/TWAS_15`.

Grants

1. **FoNS Researcher Mobility Grant for Postdocs and Fellows** (Imperial College London): Travel grant for a 3-week research visit to the Inria Centre at Université de Lorraine (in France). 05/2024. £2,000.
2. **KHYS Aspirant Grant** (Karlsruhe Institute of Technology): Travel grant for a 30-day research visit to the Karlsruhe Institute of Technology (in Germany). 09/2023. €1,200.

Honors and Awards

1. **CEMSE Dean's List Award**, by King Abdullah University of Science and Technology (KAUST). Academic years 2021/2022 and 2022/2023.
2. **Graduate Fellowship**, by King Abdullah University of Science and Technology (KAUST). From 08/2020 to 12/2023.
3. **Undergraduate Scholarship**, by Brazil's "Science without Borders" Program. From 07/2016 to 12/2017.

Participation and Attendance

1. Three-week visiting period at the Institut Elie Cartan de Lorraine (in France) under the supervision of Dr. Radu Stoica. 10/2024.

   We worked on preliminary ideas for the development of a statistical framework to model the positions of drifters in the ocean using a point-process approach.
2. International Workshop on Epidemic Preparedness for Infectious Diseases in the Brazilian Amazon. 06/2024.
3. Eight-week visiting period at the Karlsruhe Institute of Technology (in Germany) under the supervision of Dr. Johannes Bracher. 05/2023 and 09/2023.

   We worked in the development of a framework for post-processing and combining *nowcasting* models, and applied it to "COVID-19 7-day hospitalization incidence" in Germany.

4. Summer school: Bayesian methods in health economics (2023). 07/2023.
5. Three-week visiting period at University College London (in the United Kingdom) under the supervision of Dr. Javier Rubio. 10/2022.

   We worked on the development of a statistical class of models for modeling spatially dependent survival data under the assumption of competing risks and unknown cause-of-death.
6. Gaussian Process Modeling, Design, and Optimization. Professional Development Continuing Education Course at "JSM 2022." 08/2022.
7. 13^{th} Summer Institute in Statistics and Modeling in Infectious Diseases (SISMID). 07/2021. I attended the following modules: "Module 7: Simulation-Based Inference for Epidemiological Dynamics", "Module 9: Contact Network Epidemiology", and "Module 12: Statistics and Modeling with Novel Data Streams".
8. València International Bayesian Analysis Summer School, 4^{th} Edition (VIBASS4). 07/2021.
9. Duke Machine Learning Virtual Summer School 2021. 06/2021.