

Christophe A. N. Biscio

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Associate Professor

Employment

- Since 2020 **Associate Professor**, Department of Mathematical Sciences - Aalborg University - Denmark.
2016-2020 **Assistant Professor**, Department of Mathematical Sciences - Aalborg University - Denmark.
2015-2016 **Postdoc**, Department of Mathematical Sciences - Aalborg University - Denmark.

Funding

- 2021-2026 **DFR Research project 2**, Role: co-PI, Amount: 6.128.038 DKK.
Deciphering Nanoporosity of Amorphous Materials using Topological Data Analysis
- 2023 **Danish Data Sciences Academy**, Role: co-PI, Amount: 50.000 DKK.
Organization of Earth Day 2023: The Use of Data Science to Combat Global Heating
- 2019 **Carlsberg Foundation**, Role: PI, Amount: 40.200 DKK.
Conference on Data Science organized at Aalborg University

Research Supervision

- 2022-2025 **PhD: Martin Vogt Vejling**, co-supervised with Pr. Petar Povposki.
Preliminaries titles: Contribution to modelling of wireless communication through point processes, with a view to sensing applications.
- 2021-2024 **Postdoc: Matteo Pegoraro**, co-supervised with associate Professor Lisbeth Fajtrup.
Topics: Application of topological data analysis to study the porosity of glass materials.
- 2021-2024 **Postdoc: Yossi Bokor**, co-supervised with associate Professor Lisbeth Fajtrup.
Topics: Application of topological data analysis to study the porosity of glass materials.
- Since 2018 **Supervision of 9 master thesis**, for a total of 20 master students.

Education

- Defended the **PhD**, Laboratoire de Mathématiques Jean Leray (Nantes, France).
24 Sept 2015
- Title: Contribution to the modelling and the parametric estimation of determinantal point processes.
 - President: Bernard Delyon
 - Advisor: Frédéric Lavancier, Maître de conférences, Université de Nantes, France.
 - Reviewers: Patricia Reynaud-Bouret and Rasmus Waagepetersen.
 - Members: Anne Philippe, Jean-Francois Coeurjolly.
- 2012 **Master's Degree in research (2nd year)**, Mathematics: speciality Probability and Statistics, Université de Rennes, France.
- 2011 **Agrégation of Mathematics**, French competitive examination for teaching in higher education.
- 2011 **CAPES of Mathematics**, French competitive examination for teaching.
- 2009 **Master's Degree in research (1st year)**, Mathematics: speciality Probability and Statistics, Université de Nice, France.
- 2008 **Bachelor of sciences**, Mathematics, Université de Nice, France.
- 2005-2007 **CPGE MPSI-MP**, Preparation for national competitive entrance exams to leading French "grandes écoles", specializing in Mathematics and Physics, Dumont d'Urville Highschool, Toulon, France.

Teaching experiences - Short version

- 2023-now Lecturer - Statistics for Linear Models for 5th semester students, Aalborg University
- Since 2018 PhD course - Design and Analysis of Experiments, Aalborg University
- 2017-2023 Lecturer - Probability for 4th semester students, Aalborg University
- 2016-now Supervisions of approximately 6 projects by semester for undergraduate and graduate students. In Aalborg University, each project is between 15 and 30 ECTS depending on the semester and can be on various topics and/or in collaboration with a company. I have supervised projects in the mathematics and mathematical economy program but I have done most of my supervision in the mathematical engineering program (mattek).
- 2012-2015 Teaching assistant for various lectures in Statistics and Probability, University of Nantes.

Talks

Research Stays

- 2023 Chalmers University, Sweden, hosted by Ottmar Cronie.
- 2023 ENSAI, France, hosted by Frédéric Lavancier.

Invited Speaker

- 2023 Seminar of Statistics at the ENSAI - Rennes - France
- 2023 Seminar of Statistics and Probability at Chalmers University - Göteborg - Sweden
- 2023 Meeting of the Danish Statistical Society - Aalborg - Denmark
- 2023 SSIAB 15 - Spatial Statistics and Image Analysis in Biology - Grenoble - France
- 2021 10th International Workshop on Applied Probability, IWAP - Thessaloniki - Greece (cancelled due to covid)
- 2020 Workshop on determinantal point processes - Grenoble - France (cancelled due to covid)
- 2019 12th International Conference on Computational Statistics (ERCIM WG) - London - United Kingdom
- 2019 Seminar of the Department of Probability and Mathematical Statistics - Pragues - Czech Republic
- 2019 Seminar of the Department of Mathematics - Avignon - France
- 2018 40th Stochastic Processes and their Applications International Conference - Göteborg - Sweden
- 2018 9th International Workshop on Applied Probability IWAP - Budapest - Hungary
- 2016 Lecture on determinantal point processes at the Laboratory of Mathematics - Lilles - France
- 2013-2016 7 talks at the seminars of the mathematical department of several French universities: Nantes, Lille, Rouen, Grenoble, Besançon

Contributed Speaker

- 2024 Danish Digitalization, Data Science and AI 1.0 conference Nyborg - Denmark
- 2017 SGSIA 19th Workshop on Stochastic Geometry, Stereology and Image Analysis - Luminy - France
- 2017 Spatial Statistics: One World One Health - Lancaster - United Kingdom
- 2016 Workshop on Geometry and Stochastic of Non-linear Functional and Graph Data - Bornholm - Denmark
- 2016 Workshop on Spatial Statistics and Image Analysis in Biology - Rennes - France
- 2015 11th Workshop of the Center for Stochastic Geometry and Advanced Bioimaging - Aarhus - Denmark
- 2015 6th Meeting of the Young Statistician of the SFdS (French statistical society) - Bordeaux - France
- 2015 4th Stochastic Geometry Days of the GdR GeoSto, Poitiers - France
- 2015 Spatial Statistics: Emerging Patterns - Avignon - France

Conferences Organisation

- 2024 Organisation of Julia User Groups meeting in Aalborg (JUGA).
- 2023 Earth Day 2023: The Use of Data Science to Combat Global Heating. The events included several talks and a hackathon.

- 2018 12th French-Danish Workshop on Spatial Statistics and Image Analysis in Biology, with Ege Rubak.
- 2017 "Points in time and space" - a workshop to celebrate the 60 year birthday of Jesper Møller, with Rasmus Waagepetersen.

Administrative Responsibilities

- 2024 Co-responsible for the development of maritime education in the mathematical engineering program at Aalborg University
- Since 2021 Responsible for the collaboration with the Department of electronic systems regarding the joint teachings program in mathematical engineering (mattek)
- 2017-2019 & 2023- Arbejds miljørepræsentant (working environment representative) at Department of mathematical sciences, Aalborg, Denmark.
- Since 2021 Semester coordinator for 4th and 5th semester students
- 2013-2015 PhD students representative at the council of the Henri Lebesgue Center, an excellence laboratory for Rennes and Nantes in Mathematics.
- 2012-2013 PhD students representative at the council of the Laboratory of Mathematics Jean Leray, Nantes.

Linguistic and technical skills

- Danish Intermediate - Prøve i Dansk 3
- English Upper intermediate
- Italian Moderate
- French Native speaker
- Programming R, Python, Julia, Rmarkdown (quarto), Shiny, Latex, Scilab, SPSS

Reviewer in academic journals

- Journal of Royal Statistical Society C, Electronic Journal of Statistics, Journal of Multivariate Analysis, Applications of Mathematics, Statistical and Probability Letters, Scandinavian Actuarial Journal, Scandinavian Journal of Statistics, Biometrics, Journal of Agricultural Biological and Environmental Statistics, Advances in Statistical Analysis, Applied Stochastic Models in Business and Industry, Biometrical Journal, Computational Statistics and Data Analysis.

List of Publications

In Mathematics and Statistics

- 2023 M.V. Vejling, C.A.N. Biscio, P. Popovski. **Multi-Sensor Multi-Scan Radar Sensing of Multiple Extended Targets**. *To appear in 2024 IEEE International Conference on Acoustics, Speech and Signal Processing - ICASP - arXiv:2310.09011*.
- 2023 A.M. Svane, C.A.N. Biscio, R. Waagepetersen. **A functional central limit theorem for the K-function with an estimated intensity function** . *arXiv:2309.12834*.
- 2023 O. Cronie, M. Moradi, C.A.N Biscio. **A cross-validation-based statistical theory for point processes**. *Biometrika, asad041, <https://doi.org/10.1093/biomet/asad041>*.
- 2022 T. Kallehauge, P. Ramírez-Espinosa, A.E. Kalør, C.A.N. Biscio, P. Popovski. **Predictive rate selection for ultra-reliable communication using statistical radio maps** . *GLOBECOM 2022 - 2022 IEEE Global Communications Conference, 4989-4994*
- 2022 N. Ho, V.L. Ho, T.B. Pedersen, M. Vu, C.A.N. Biscio. **A Unified Approach for Multi-Scale Synchronous Correlation Search in Big Time Series-Full Version** . *arXiv:2204.09131*
- 2022 C.A.N. Biscio, A.M. Svane. **A functional central limit theorem for the empirical Ripley's K-function** . *Electronic Journal of Statistics 16 (1), 3060-3098*
- 2021 C.A.N. Biscio, J. Møller. **Discussion of 'Event history and topological data analysis'** . *Biometrika 108 (4), 779-783*
- 2020 C.A.N. Biscio, N. Chenavier, C. Hirsch and A.M.Svane. **Testing goodness of fit for point processes via topological data analysis**. *Electronic Journal of Statistics, 14*.

- 2019 C.A.N. Biscio and Jesper Møller. **The accumulated persistence function, a new useful functional summary statistic for topological data analysis, with a view to brain artery trees and spatial point process applications.** *Journal of Computational and Graphical Statistics* 28 (3), 671-681.
- 2019 C.A.N. Biscio and Rasmus Waagepetersen. **A general central limit theorem and subsampling variance estimator for α -mixing point processes.** *Scandinavian Journal of Statistics* 46.
- 2019 Celia Chaiban, C.A.N. Biscio, Weerapong Thanapongtharm, Michael Tildesley, Xiangming Xiao, Timothy P Robinson, Sophie O Vanwambeke, and Marius Gilbert. **Point pattern simulation modelling of extensive and intensive chicken farming in Thailand: accounting for clustering and landscape characteristics.** *Agricultural Systems, Volume 173, Pages 335-344.*
- 2019 Nguyen Ho, Torben Bach Pedersen, Mai Vu, Long Van Ho, C.A.N. Biscio. **Efficient Bottom-Up Discovery of Multi-Scale Time Series Correlations Using Mutual Information.** *35th IEEE International Conference on Data Engineering (ICDE 2019)*
- 2018 C.A.N. Biscio, Arnaud Poinas, and Rasmus Waagepetersen. **A note on gaps in proofs of central limit theorems.** *Statistics and Probability Letters, Volume 135, Pages 7-10.*
- 2016 C.A.N. Biscio and Jean-François Coeurjolly. **Standard and robust intensity parameter estimation for stationary determinantal point processes.** *Spatial Statistics, Volume 18.*
- 2016 C.A.N. Biscio and Frédéric Lavancier. **Contrast estimation for parametric stationary determinantal point processes.** *Scandinavian Journal of Statistics, Volume 44.*
- 2016 C.A.N. Biscio and Frédéric Lavancier. **Quantifying repulsiveness of determinantal point processes.** *Bernoulli, Volume 22*
- 2016 C.A.N. Biscio and Frédéric Lavancier. **Brillinger mixing of determinantal point processes and statistical applications.** *Electronic Journal of Statistics, Volume 10.*

In other fields

- 2023 N.A. Weinreich, D.B. van Diepen, F. Chiariotti, C.A.N. Biscio. **Automatic bike sharing system planning from urban environment features.** *Transportmetrica B: Transport Dynamics* 11 (1), 2226347.
- 2023 Yongbao Xiao, Tao Du, Søren S. Sørensen, Zhimin Chen, C.A.N. Biscio, Lisbeth Fajstrup, Mathieu Bauchy, Morten M. Smedskjaer. **Medium-Range Order Structure Controls Thermal Stability of Pores in Zeolitic Imidazolate Frameworks.** *The Journal of Physical Chemistry Letters* 14 (33).
- 2023 Yongbao Xiao, Tao Du, Søren S. Sørensen, Zhimin Chen, C.A.N. Biscio, Lisbeth Fajstrup, Mathieu Bauchy, Morten M. Smedskjaer. **Deciphering the hierarchical structure of phosphate glasses using persistent homology with optimized input radii.** *Physical Review Materials* 7 (6).
- 2022 S. Sørensen, T. Du, C.A.N. Biscio, L. Fajstrup, M. Smedskjaer. **Persistent homology: A tool to understand medium-range order glass structure .** *Journal of Non-Crystalline Solids: X* 16, 100123
- 2022 R. Christensen, C.A.N. Biscio, L. Fajstrup, M. Smedskjær. **Characterizing diffusion channels in lithium thiophosphate glassy electrolytes .** *26th International Congress on Glass*
- 2022 Xiangting Ren, Tao Du, Haibo Peng, Lars R Jensen, C.A.N. Biscio, Lisbeth Fajstrup, Mathieu Bauchy, Morten M. Smedskjaer. **Irradiation-induced toughening of calcium aluminoborosilicate glasses .** *Materials Today Communications* 31, 103649
- 2022 Ang Qiao, Søren S. Sørensen, Malwina Stepniewska, C.A.N. Biscio, Lisbeth Fajstrup, Zhu Wang, Xianghua Zhang, Laurent Calvez, Ivan Hung, Zhehong Gan, Morten M. Smedskjaer, Yuanzheng Yue. **Hypersensitivity of the Glass Transition to Pressure History in a Metal-Organic Framework Glass .** *Chemistry of Materials* 34 (11), 5030-5038
- 2021 Justus Kaufmann, C.A.N. Biscio, Peter Bankhead, Stefanie Zimmer, Heinz Schmidberger, Ege Rubak, Arnulf Mayer. **Using the R package spatstat to assess inhibitory effects of microregional hypoxia on the infiltration of cancers of the head and neck region by cytotoxic T lymphocytes.** *Cancers* 13 (8), 1924
- 2021 S. Sørensen, C.A.N. Biscio, M. Bauchy, L. Fajstrup, M. Smedskjaer. **Revealing hidden medium-range order in amorphous materials using topological data analysis .** *Science Advances* 6 (37), eabc2320