Rebeca Cardim Falcao

Contact Information

British Columbia Centre for Disease Control
School of Population and Public Health-UBC

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Research Interests

Mathematical Biology, Epidemiology, non-parametric Bayesian, MLE, machine learning.

Education

University of British Columbia, Vancouver, Canada
Ph.D. in Applied Mathematics, 2014 - 2021
Advisor: Daniel Coombs
Thesis: Multi-states inference for analysing noisy single-particle trajectories

Universidade Federal de Pernambuco, Recife, Brazil
M.Sc. in Physics, 2012 - 2014
Advisors: Fernando Parisio
Thesis: Fragmentacao de objetos planares por impacto de projeteis
B.Sc. in Physics, 2008 - 2011

Experience

BCCDC, Vancouver, Canada
Postdoctoral Fellow (Jul, 2021 - current): Working on modelling potential applications of antimicrobial peptides in the poultry chain and how these applications may impact the burden of Salmonella in poultry and people (including AMR impacts).

Unity, MNP and UBC, Vancouver, Canada
Researcher (Sept, 2020 - Dec, 2020): Developing a model to perform a personalized risk assessment of Covid-19 exposure for businesses.

BCCDC, Vancouver, Canada
Math Modeller student (Mar, 2020 - Aug, 2020): Modelling the Covid-19 epidemic in BC, focusing on the impact of non-pharmaceuticals interventions such as contact tracing, and physical distancing.

Visier, Vancouver, Canada
MITACS-Intern (Jul, 2019 - Nov, 2019): Design an algorithm to make Visier's data consistent.

University of British Columbia, Vancouver, Canada
Co-organizer of Frontiers in Biophysics conference, held at UBC, June 2017. Teaching Assistant: Designing and developing a procedure for online exams to replace written exams in MATH 103 course (2018-2019), tutor in Math Learning Center (2014-2017) as well as grader for Applied Analysis (math 301), Differential Equations (math 255), Calculus IV (math 317), and various calculus courses for first year students. Holding and managing computer labs for MATH 215/255.

Universidade Federal de Pernambuco, Recife, Brazil

Sessional Lecturer for Linear Algebra, Mathematics Department, Summer 2013.

Teaching Assistant: Structure of Matter II, Physics Department, 2011 and Linear Algebra, Mathematics Department, 2009.

Undergraduate Research (January-December 2010): Wave attenuation due to porous media, supervisor: Hector Raul Montagne, Center for Studies and Essays in Risk and Environmental Modelling (CEERMA).

Undergraduate Research (February-June 2009): Strongly Correlated Systems in Condensed Matter, supervisor: Mauricio Coutinho Filho, Physics Department.

Preprints, publications, packages

1) Mathematical modeling of COVID-19 in British Columbia: an age-structured model with time-dependent contact rates
with Sarafa A. Iyaniwura et al.
Epidemics Volume 39, June 2022
2) Impact of routine asymptomatic screening on COVID-19 incidence in a highly vaccinated university population
Rebeca C Falcao et al.
Preprint-medRxiv
3) Importance of COVID-19 vaccine efficacy in older age groups
with Manish Sadarangani et al.
Vaccine
4) Epidemiological Branching Process Simulations
Henry Ngo, Rebeca C Falcao and others
R package
5) Quantifying the impact of COVID-19 control measures using a Bayesian model of physical distancing
with Sean C Anderson et al.
PLOS Computational Biology, 2020
6) Diffusion analysis of single particle trajectories in a Bayesian nonparametrics framework Rebeca C Falcao and Daniel Coombs
Physical Biology,v.17,2020
7) Limitations of Qdot labelling compared to directly-conjugated probes for single particle tracking of B cell receptor mobility
with Abraham et al.
Scientific Reports, v.7,2017
8) Fragmentation of brittle plates by localized impact
Rebeca C Falcao and Fernando Parisio
Applied Physics Letters, v.105, number 12, 2014

Honours, Awards and Fellowships

- UBC Mathematics Graduate Research Award 2019
- Travel Award for the Summer School Mathematics of Machine Learning held in UW-Seattle.
- Travel Award for the Workshop Reverse mathematical methods for reconstructing molecular dynamics in single cell held in the CRM-Pisa.

250 US dollars given by the Biophysical Society

- Tuition Fee Award
  Department of Math and Faculty of Graduate Studies, UBC, 2014-2019.
- Faculty of Science Graduate Award
  University of British Columbia, Vancouver, Canada, 2014 - 2019.
- Ranked 2nd student for entering Master's Program in Physics
  Universidade Federal de Pernambuco, 2012.

Computer Skills Python, R, MATLAB, Mathematica, C, and some familiarity with PERL.

Talks and Posters

- SIAM Conference on Applications of Dynamical Systems (DS23)
  Portland, USA, May 2023
  Title:Modeling Salmonella Transmission Dynamics in the Poultry Industry to Inform Application of New Treatments
- Mathematical Biology Seminar-UBC
  Vancouver, Canada, February 2017.
  Title: Multi-state Diffusion Analysis with Measurement Errors.
- Reverse mathematical methods for reconstructing molecular dynamics in single cell.
  Pisa, Italy, October 2018.
  Title: Multi-state Diffusion Analysis with Measurement Errors.
- ImmunoBC
  Vancouver-BC, Canada, June 2018.
  Title: Finding clues to T cell activation in dynamic analysis of peptide-MHC mobility.
- 4th Annual Biophysical Society of Canada meeting
  Vancouver-BC, Canada, May 2018.
  Title: Two-state Diffusion Analysis with Measurement Errors.
- Graduate Summit in Mathematical Biology and Applied PDE
  Jasper-Alberta, Canada, May 2017.
  Title: Mobility of peptide-MHCs in the Immune Synapse.
- Mathematical Biology Seminar-UBC
  Vancouver, Canada, February 2017.
  Title: Some analysis on Single Particle Tracking Data.
- Frontiers in Biophysics
  Vancouver, Canada, June 2016.

Workshops, summer schools and other conferences attended

- Mathematics of Machine Learning
  Mathematical Sciences Research Institute (MSRI),University of Washington, July 2019.
- Immuno-BC
  SFU, Vancouver, Canada, June 2017.
- Mathematical Topics in System Biology
  Mathematical Sciences Research Institute (MSRI), Berkeley-CS, USA, July 2015.