

César A. Parra Rojas

POST-DOCTORAL FELLOW · SYSTEMS MEDICINE OF INFECTIOUS DISEASES

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Employment

Frankfurt Institute for Advanced Studies

POST-DOCTORAL FELLOW

Group of Systems Medicine of Infectious Diseases

Frankfurt am Main, Germany

May 2017 - Present

Education

Udacity

MACHINE LEARNING ENGINEER NANODEGREE

[view certificate](#)

2018

The University of Manchester

DOCTOR OF PHILOSOPHY (PHYSICS)

- Thesis title: Intrinsic Fluctuations in Discrete and Continuous Time Models
- Supervisor: Prof. Alan J. McKANE

Manchester, UK

2016

Universidad de Chile

M.Sc. PHYSICS

- Thesis title: Efectos Macroscópicos de las Fluctuaciones en un Baño Bacteriano Diluido (Macroscopic Effects of Fluctuations in a Dilute Bacterial Bath)
- Supervisor: Rodrigo Soto

Santiago, Chile

2013

Universidad de Chile

B.Sc. ASTRONOMY

Santiago, Chile

2012

Universidad de Chile

B.Sc. PHYSICS

Santiago, Chile

2010

Honours & Awards

- | | | |
|-------------|---|----------------------------|
| 2019 | Science to Data Science (S2DS) fellow | Pivigo, UK |
| 2013 – 2016 | Becas-Chile Study Abroad Scholarship for PhD | CONICYT, Chile |
| 2012 | Fulbright nominee | Fulbright Comission, Chile |
| 2011 – 2012 | Masters Scholarship | CONICYT, Chile |

Publications

Journal articles:

- | | | |
|---|---|--|
| 1 | QUANTITATIVE MODELING OF THE FUNCTION OF KINETICALLY DRIVEN TRANSCRIPTIONAL RIBOSWITCHES
C. Parra-Rojas , B. Fürtig, H. Schwalbe, and E. A. Hernandez-Vargas | submitted |
| 2 | PDEPARAMS: PARAMETER FITTING TOOLBOX FOR PARTIAL DIFFERENTIAL EQUATIONS IN PYTHON
C. Parra-Rojas , and E. A. Hernandez-Vargas
 bioRxiv preprint GitHub repository | submitted |
| 3 | CYCLO(TETRAHYDROXYBUTYRATE) PRODUCTION IS SUFFICIENT TO DISTINGUISH BETWEEN <i>Xenorhabdus</i> AND <i>Photorhabdus</i> ISOLATES IN THAILAND
N. J. Tobias, C. Parra-Rojas , Y.-N. Shi, Y.-M. Shi, S. Simonyi, A. Thanwisai, A. Vitta, N. Chantratita, E. A. Hernandez-Vargas, and H. B. Bode
 PDF bioRxiv preprint GitHub repository | 2019
<i>Environ. Microbiol.</i> 21(8) , 2921 |

- 4 THE TRICHOTOMY OF PNEUMOCOCCAL INFECTION OUTCOMES IN THE HOST 2019
A. E. S. Almocera, G. Hernández-Mejía, C. Parra-Rojas, and E. A. Hernandez-Vargas *Commun. Nonlinear Sci. Numer. Simulat.* **73**, 1
[|PDF|bioRxiv preprint|](#)
- 5 ADJUVANTED INFLUENZA VACCINE DYNAMICS 2019
C. Parra-Rojas, *V. von Messling, and E. A. Hernandez-Vargas* *Scientific Reports* **9**, 73
[|PDF|GitHub repository|](#)
- 6 NEURAMINIDASE INHIBITORS IN INFLUENZA TREATMENT AND PREVENTION—IS IT TIME TO CALL IT A DAY? 2018
C. Parra-Rojas, *V. K. Nguyen, G. Hernández-Mejía, and E. A. Hernandez-Vargas* *Viruses* **10(9)**, 454
[|PDF|GitHub repository|](#)
- 7 THE 2017 PLAGUE OUTBREAK IN MADAGASCAR: DATA DESCRIPTIONS AND EPIDEMIC MODELLING 2018
V. K. Nguyen, C. Parra-Rojas, and E. A. Hernandez-Vargas *Epidemics* **25**, 20
[|PDF|bioRxiv preprint|GitHub repository|](#)
- 8 REDUCTION OF A METAPOPULATION GENETIC MODEL TO AN EFFECTIVE ONE ISLAND MODEL 2018
C. Parra-Rojas, *and A. J. McKane* *Europhys. Lett.* **122**, 18001
[|PDF|arXiv preprint|](#)
- 9 STOCHASTIC EPIDEMIC DYNAMICS ON EXTREMELY HETEROGENEOUS NETWORKS 2016
C. Parra-Rojas, *T. House, and A. J. McKane* *Phys. Rev. E* **94(6)**, 062408
[|PDF|arXiv preprint|](#)
- 10 SUPPRESSING ESCAPE EVENTS IN MAPS OF THE UNIT INTERVAL WITH DEMOGRAPHIC NOISE 2016
C. Parra-Rojas, *J. D. Challenger, D. Fanelli, and A. J. McKane* *Phys. Rev. E* **94(5)**, 052133
[|PDF|arXiv preprint|](#)
- 11 INTRINSIC NOISE AND TWO-DIMENSIONAL MAPS: QUASICYCLES, QUASIPERIODICITY, AND CHAOS 2014
C. Parra-Rojas, *J. D. Challenger, D. Fanelli, and A. J. McKane* *Phys. Rev. E* **90(3)**, 032135
[|PDF|arXiv preprint|](#)
- 12 CASIMIR EFFECT IN SWIMMER SUSPENSIONS 2014
C. Parra-Rojas, *and R. Soto* *Phys. Rev. E* **90(1)**, 013024
[|PDF|arXiv preprint|](#)
- 13 ACTIVE TEMPERATURE AND VELOCITY CORRELATIONS PRODUCED BY A SWIMMER SUSPENSION 2013
C. Parra-Rojas, *and R. Soto* *Phys. Rev. E* **87(5)**, 053022
[|PDF|arXiv preprint|](#)
- 14 $\text{Pd}^{2+}/\text{Pd}^0$ REDOX CYCLING IN HEXAGONAL $\text{YMn}_{0.5}\text{Fe}_{0.5}\text{O}_3$: IMPLICATIONS FOR CATALYSIS BY PGM SUBSTITUTED COMPLEX OXIDES 2011
J. A. Kurzman, J. Li, T. D. Schladt, C. R. Parra, X. Ouyang, R. Davis, J. T. Miller, S. L. Scott, and R. Seshadri *Inorg. Chem.* **50**, 8073
[|PDF|](#)

Conference proceedings:

- 1 FROM MICROSCOPIC CALCIUM SPARKS TO THE ECG: MODEL REDUCTION APPROACHES FOR MULTI-SCALE CARDIAC SIMULATION 2015
M. A. Colman, C. Parra-Rojas, and E. A. Pérez Alday *Computing in Cardiology (CinC)*
[|PDF|](#)

Presentations

Talks

- SUMMER COURSE ON BIOINFORMATICS, MSC-MOLBIO-10: MOLEKULARE ZELLBIOLOGIE UND BIOCHEMIE EUKARYOTISCHER SYSTEME, GOETHE-UNIVERSITÄT FRANKFURT Jun 2019
Protein structure and prediction Frankfurt, Germany
- KOLLOQUIUM FÜR BIOINFORMATIK UND SYSTEMBIOLOGIE MITTELHESSEN (KOBIS) Dec 2018
Chemical diversity in Xenorhabdus and Photorhabdus: interpretable machine learning for natural product research Gießen, Germany
- 28TH ANNUAL MEETING OF THE SOCIETY FOR VIROLOGY Mar 2018
Role of adjuvants in immune response dynamics after influenza vaccination Würzburg, Germany
- XIV LATIN AMERICAN WORKSHOP ON NONLINEAR PHENOMENA Sep 2015
Mesoscopic description of discrete-time stochastic processes Cartagena, Colombia

Posters

28TH ANNUAL MEETING OF THE SOCIETY FOR VIROLOGY

Neuraminidase inhibitors—is it time to call it a day?

Mar 2018

Würzburg, Germany

SOUTHERN WORKSHOP ON GRANULAR MATERIALS

Velocity agitation energy due to an active suspension

Dec 2012

Puerto Varas, Chile

Technical Skills

Programming

Python, Mathematica. Familiar with MATLAB, FORTRAN, C++, Bash.

Data analysis and visualisation

NumPy, pandas, Matplotlib, Seaborn. Familiar with Plotly, Altair.

Databases

Familiar with SQL, REST-like APIs.

Machine Learning

scikit-learn, XGBoost, LightGBM, SHAP, PyTorch. Familiar with spaCy, CatBoost, Keras.

Other

Git, \LaTeX .

Projects

PDEparams

PYTHON MODULE FOR PARAMETER ESTIMATION IN PARTIAL DIFFERENTIAL EQUATIONS USING THE DIFFERENTIAL EVOLUTION ALGORITHM.

github.com/cparrarojas/PDEparams

sdeparams

PYTHON MODULE FOR PARAMETER ESTIMATION IN STOCHASTIC DIFFERENTIAL EQUATIONS WITH DEMOGRAPHIC NOISE.

github.com/cparrarojas/sde-parameter-estimation

find-wally

A DEEP LEARNING SOLVER FOR *Where's Wally?* PUZZLES, USING TRANSFER LEARNING WITH THE KERAS IMPLEMENTATION OF RETINANET.

github.com/cparrarojas/find-wally

Research Internships

Argonne National Laboratory & James Franck Institute

CHICAGO-CHILE MATERIALS COLLABORATION PROGRAM, UNIVERSITY OF CHICAGO

- Supervisor: Prof. Igor Aronson
- Project: Study of noise effects on the nematic transition of bacterial suspensions

Chicago, USA

Jan – Mar 2012

Cerro Calán Observatory

UNIVERSIDAD DE CHILE

- Supervisor: Dr. Francisco Förster
- Project: *Robotic telescope: optimisation of observation plan by means of Ant Colony Optimisation and genetic algorithms*

Santiago, Chile

Jan 2011

Materials Research Laboratory

CISEI PROGRAM, UNIVERSITY OF CALIFORNIA, SANTA BARBARA

- Supervisors: Dr. Joshua Kurzman & Prof. Ram Seshadri
- Project: $\text{Pd}^{2+}/\text{Pd}^0$ redox cycling in hexagonal $\text{YMn}_{0.5}\text{Fe}_{0.5}\text{O}_3$

Santa Barbara, USA

Jan – Mar 2010

Leadership

The University of Manchester Chilean Society

CHAIR

Manchester, UK

2015–2016

XI ChileGlobal Seminars UK: Education and Public Policy

CO-ORGANISER

Manchester, UK

May 2015

The University of Manchester Chilean Society

BOARD MEMBER

Manchester, UK

2014–2015

Other activities

Music

Guitarist, vocalist, songwriter. Tenor of the University of Manchester Chorus (2013–2014) and of the School of Science and Engineering Choir of Universidad de Chile (2007–2009)