César A. **Parra Rojas**

Post-doctoral fellow · Systems Medicine of Infectious Diseases

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Employment

Frankfurt Institute for Advanced Studies   *Frankfurt am Main, Germany*

Post-doctoral fellow   *May 2017 - Present*

Group of Systems Medicine of Infectious Diseases

Education

Udacity

Machine Learning Engineer Nanodegree   *2018*

view certificate

The University of Manchester   *Manchester, UK*

Doctor of Philosophy (Physics)   *2016*

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

Universidad de Chile   *Santiago, Chile*

M.Sc. Physics   *2013*

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

Universidad de Chile   *Santiago, Chile*

B.Sc. Astronomy   *2012*

Universidad de Chile   *Santiago, Chile*

B.Sc. Physics   *2010*

Honours & Awards

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. Focused natural product elucidation by prioritizing high-throughput metabolomic studies with machine learning   *submitted*

   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

   |bioRxiv preprint|GitHub repository|

2. The trichotomy of pneumococcal infection outcomes in the host   *in press*
                                                                                    Commun. Nonlinear Sci.
   A. E. S. Almocera, G. Hernández-Mejía, **C. Parra-Rojas**, and E. A. Hernandez-Vargas   *Numer. Simulat.*

   |bioRxiv preprint|

3. Adjuvanted influenza vaccine dynamics   *2019*
   C. Parra-Rojas, V. von Messling, and E. A. Hernandez-Vargas   *Scientific Reports* **9**, 73

   |PDF|GitHub repository|

4   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|

5   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|

6   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|

7   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|

8   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|

9   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|

10   CASIMIR EFFECT IN SWIMMER SUSPENSIONS   *2014*

C. Parra-Rojas, *and R. Soto*   *Phys. Rev. E* **90(1)**, 013024

|PDF|arXiv preprint|

11   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|

12   Pd^{2+}/Pd^0 REDOX CYCLING IN HEXAGONAL $YMn_{0.5}Fe_{0.5}O_3$: 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

KOLLOQUIUM FÜR BIOINFORMATIK UND SYSTEMBIOLOGIE MITTELHESSEN (KoBIS)   *Dec 2018*

Chemical diversity in Xenorhabdus *and* Photorhabdus: *interpretable machine learning for natural product research*   *Gießen, Germany*

28$^{\text{TH}}$ 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*

XVIII SIMPOSIO CHILENO DE FÍSICA   *Nov 2012*

Temperatura activa de una suspensión bacteriana (Active temperature of a bacterial suspension)   *La Serena, Chile*

Posters

28$^{\text{TH}}$ ANNUAL MEETING OF THE SOCIETY FOR VIROLOGY   *Mar 2018*

Neuraminidase inhibitors—is it time to call it a day?   *Würzburg, Germany*

SOUTHERN WORKSHOP ON GRANULAR MATERIALS   *Dec 2012*

Velocity agitation energy due to an active suspension   *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.
Machine Learning	scikit-learn, XGBoost, LightGBM, SHAP, PyTorch. Familiar with CatBoost, Keras.
Other	Git, LaTeX.

Projects

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, USA*

CHICAGO-CHILE MATERIALS COLLABORATION PROGRAM, UNIVERSITY OF CHICAGO *Jan – Mar 2012*

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

Cerro Calán Observatory *Santiago, Chile*

UNIVERSIDAD DE CHILE *Jan 2011*

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

Materials Research Laboratory *Santa Barbara, USA*

CISEI PROGRAM, UNIVERSITY OF CALIFORNIA, SANTA BARBARA *Jan – Mar 2010*

- Supervisors: Dr. Joshua Kurzman & Prof. Ram Seshadri
- Project: Pd^{2+}/Pd^{0} *redox cycling in hexagonal* $YMn_{0.5}Fe_{0.5}O_3$

Leadership

The University of Manchester Chilean Society *Manchester, UK*

CHAIR *2015–2016*

XI ChileGlobal Seminars UK: Education and Public Policy *Manchester, UK*

CO-ORGANISER *May 2015*

The University of Manchester Chilean Society *Manchester, UK*

BOARD MEMBER *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)