

# César A. Parra Rojas

POST-DOCTORAL FELLOW

Frankfurt Institute for Advanced Studies

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## Employment

### Frankfurt Institute for Advanced Studies

POST-DOCTORAL FELLOW

Group of Systems Medicine and 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

## Honors & 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

### Submitted:

- 1 THE TRICHOTOMY OF PNEUMOCOCCAL INFECTION OUTCOMES  
A. E. S. Almocera, G. Hernández-Mejía, **C. Parra-Rojas**, and E. A. Hernandez-Vargas  
[|bioRxiv preprint|](#)

### Journal articles:

- 1 ADJUVANTED INFLUENZA VACCINE DYNAMICS  
**C. Parra-Rojas**, V. von Messling, and E. A. Hernandez-Vargas  
[|GitHub repository|](#)  
*in press*  
Scientific Reports
- 2 NEURAMINIDASE INHIBITORS IN INFLUENZA TREATMENT AND PREVENTION—IS IT TIME TO CALL IT A DAY?  
**C. Parra-Rojas**, V. K. Nguyen, G. Hernández-Mejía, and E. A. Hernandez-Vargas  
[|PDF|GitHub repository|](#)  
2018  
Viruses **10(9)**, 454

- 3 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|](#)
- 4 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](#)
- 5 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](#)
- 6 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](#)
- 7 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](#)
- 8 CASIMIR EFFECT IN SWIMMER SUSPENSIONS 2014  
**C. Parra-Rojas**, and R. Soto *Phys. Rev. E* **90**(1), 013024  
[|PDF|](#)[arXiv preprint](#)
- 9 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](#)
- 10  $\text{Pd}^{2+}/\text{Pd}^0$  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

### Upcoming

- KOLLOQUIUM FÜR BIOINFORMATIK UND SYSTEMBIOLOGIE MITTELHESSEN (KoBIS) Dec 2018  
*Chemical diversity in Xenorhabdus and Photorhabdus: interpretable machine learning for natural product research* Gießen, Germany

### Talks

- 28<sup>TH</sup> 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<sup>TH</sup> 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

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### 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. Familiar with Keras, PyTorch.

### Other

Git,  $\text{\LaTeX}$ .

## Projects

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### sdeparams

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

 [github.com/cparrarojas/sde-parameter-estimation](https://github.com/cparrarojas/sde-parameter-estimation)

## Research Internships

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### 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:  $\text{Pd}^{2+}/\text{Pd}^0$  redox cycling in hexagonal  $\text{YMn}_{0.5}\text{Fe}_{0.5}\text{O}_3$

## Leadership

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### 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

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### 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)