

# JASON BERTRAM

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## Education

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- 2015      **PhD** School of Biology, Australian National University  
Advisors: Roderick Dewar, Graham Farquhar, Michael Roderick
- 2011      **MPhil** School of Physics, Australian National University
- 2008      **BSc (Hons)** Pure & Applied Mathematics, Statistics.  
University of Cape Town (South Africa)

## Professional Experience

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- 2018-present    **Theoretical Biology Fellow**, Environmental Resilience Institute  
Adjunct Research Scientist, Department of Biology  
Indiana University
- 2015-2018      **Postdoctoral Researcher**  
Masel Lab, Department of Ecology and Evolutionary Biology  
University of Arizona

## Publications

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\*advised graduate student

### 2020

- [14] **J Bertram**, J Masel. Evolution rapidly optimizes stability and aggregation in lattice proteins despite pervasive landscape valleys and mazes. *Genetics (Highlighted Investigation)*.  
<https://doi.org/10.1534/genetics.120.302815>.

### 2019

- [13] **J Bertram**, J Masel. Different mechanisms drive the maintenance of polymorphism at loci subject to strong versus weak fluctuating selection. *Evolution* **73** 883-896  
doi:10.1111/evo.13719
- [12] **J Bertram**, J Masel. Density-dependent selection and the limits of relative fitness.  
*Theoretical Population Biology* **129** 81-92 doi: 10.1016/j.tpb.2018.11.006
- [11] S Foy, B Wilson, **J Bertram**, M Cordes, J Masel. A shift in aggregation avoidance strategy

marks a long-term direction to protein evolution. *Genetics* **211**(4) 1345-1355  
doi:10.1534/genetics.118.301719

- [10] K Gomez\*, **J Bertram**, J Masel. In rapidly adapting asexuals, the orientation of G can reflect selection rather than functional constraints. *Genetics* **211**(2) 715-729  
doi:10.1534/genetics.118.301685

- [9] **J Bertram**, E Newman, R Dewar. Maximum entropy models elucidate the contribution of metabolic traits to patterns of community assembly. *Ecological Modelling* **407** 108720  
doi:10.1016/j.ecolmodel.2019.108720

## 2016

- [8] **J Bertram**, K Gomez\*, J Masel. Predicting patterns of long-term adaptation and extinction with population genetics. *Evolution* **71** 204-214 doi:10.1111/evo.13116

## 2015

- [7] **J Bertram** and R C Dewar. Combining mechanism and drift in community ecology: a novel statistical mechanics approach *Theoretical Ecology* **8**(4) 419-435 doi:10.1007/s12080-015-0259-7
- [6] **J Bertram**. Maximum kinetic energy dissipation and the stability of turbulent Poiseuille flow. *Journal of Fluid Mechanics* **767** 342-363 doi:10.1017/jfm.2015.65
- [5] S Haskey, B D Blackwell, C Nuehrenberg, A Koenies, **J Bertram**, C Michael, M Hole, J Howard. Experiment-theory comparison for low frequency BAE modes in the strongly shaped H-1NF stellarator. *Plasma Phys. Control. Fusion* doi:10.1088/0741-3335/57/9/095011

## 2014

- [4] **J Bertram**. Maximum entropy models of ecosystem functioning. *AIP Proceedings MaxEnt 2013* **1636** 131 doi:10.1063/1.4903722

## 2013

- [3] **J Bertram** and R C Dewar. Statistical patterns in tropical tree cover explained by the different water demand of individual trees and grasses. *Ecology* **94** 2138-2144 doi:10.1890/13-0379.1

## Pre-2013

- [2] **J Bertram**, B D Blackwell and M J Hole (2012) Ideal-magnetohydrodynamic theory of low-frequency Alfvén waves in the H-1 Helic. *Plasma Phys. Control. Fusion*  
doi:10.1088/0741-3335/54/5/055009
- [1] **J Bertram**, M J Hole, D G Pretty, B D Blackwell and R L Dewar (2011) A reduced global Alfvén eigenmodes model for Mirnov array data on the H-1 NF Helic. *Plasma Phys. Control. Fusion* doi:10.1088/0741-3335/53/8/085023

## Manuscripts in review

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- [1] **K Gomez\***, J Bertram, J Masel. Mutation bias can shape adaptation in large asexual populations experiencing clonal interference. *In review at Proc. Roy. Soc. B.* Preprint: <https://doi.org/10.1101/2020.02.17.953265>.

## Awards

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ASN Travel Award (\$1500). Evolution 2019, Providence, RI.

SSE Travel Award (\$500). Evolution 2018, Montpellier, France.

Cambridge Philosophical Society Bursary to visit the Newton Institute (\$1000). Cambridge University, UK, 2013.

Australian National University Graduate Scholarship (\$25k/year). 2009-2014.

Crompton Travel Scholarship Award (\$2500). Australian National University, 2010.

## Invited Presentations

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### 2020

**J Bertram** Adaptive Evolution in the Sequencing Era: The Population Genetics of Rapid Adaptation, Extinction and Evolutionary Mazes. *Departmental Seminar, Department of Biology, Texas A&M University.*

### 2019

**J Bertram**, J Masel. Can fluctuating selection stabilize polymorphism concurrently at many loci? *Special Symposium: Causes & consequences of temporally fluctuating selection in the wild. Evolution 2019, Providence.*

**J Bertram.** Evolution in a Changing World: Rapid Adaptation, Extinction and the Importance of Incorporating Ecology into Evolutionary Models. *Departmental Seminar, Department of Biological Sciences, Florida State University, Tallahassee.*

### 2018

**J Bertram**, J Masel. Density-dependent selection and limits of relative fitness. *Arizona Population Genetics Group Workshop, Tucson.*

### 2017

**J Bertram.** Feedbacks can drive large fluctuations in adaptation rates when sex is optional. *Mathematical Modeling and Analysis of Populations in Biological Systems 2017, Tucson.*

### 2013

**J Bertram**, R Dewar. Maximum entropy models of ecosystem functioning. *Frontiers in Macroecology Workshop, Berkeley, 2013.*

**J Bertram**. Statistical stability arguments for maximum kinetic energy dissipation. *Mathematics of the Fluid Earth, Newton Institute Cambridge UK, 2013.*

## **Selected Presentations**

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### **2018**

**J Bertram**, J Masel. Density-dependent selection and limits of relative fitness. *Evolution 2018, Montpellier, France.*

**J Bertram**, J Masel. Reversal of dominance is a powerful stabilizer of polymorphism in fluctuating environments, but boom-bust cycles and storage are more likely to stabilize many loci of large effect. *Population, Evolutionary and Quantitative Genetics 2018.*

### **2016**

**J Bertram**, J Masel. Contrast between selection on fecundity versus interference. *Evolution 2016, Austin, TX.*

### **2015**

**J Bertram**, J Masel. Modelling long-term adaptation and extinction. *Microbial Population Biology Gordon Conference 2015, Andover, NH.*

**J Bertram**, J Masel. A population-genetic model of long-term adaptation and extinction. *Mathematical Models in Ecology and Evolution 2015, Paris, France.*

### **2013**

**J Bertram**, R Dewar. Maximum Entropy Models of Ecosystem Functioning. *MaxEnt 2013, Canberra, Australia.*

## **Mentoring**

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### **Graduate students:**

Kevin Gomez (Co-advisor and thesis committee member, Fall 2015 – present)

### **Undergraduate research students:**

Madison Delmoe (Primary advisor, Fall 2017 – Spring 2018)

Jasmin Templin (Primary advisor, Spring 2015 – Spring 2017)

Austin Fritzke (Primary advisor, Spring 2015)

## **Teaching**

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Co-developer and co-instructor of departmental ecology/evolution modelling course, University of Arizona (2016)

Teaching assistant, Introductory Physics. Australian National University (2012)

Teaching assistant, Introductory Mathematics. Australian National University (2010)

## **Service**

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Lead organizer, Environmental Resilience Institute Fall Symposium 2019.

Environmental Resilience Institute Seminar Series Committee Member (Spring 2019-present).

Judge for W. D. Hamilton Graduate Student Award at Evolution 2018.

Regular editor of scientific Wikipedia pages to add content and improve scientific accuracy  
<https://en.wikipedia.org/wiki/Special:Contributions/Jasonbertram>.

Organizer of annual Wikipedia Edit-a-thons in the Department of Ecology and Evolution at the University of Arizona (2015, 2016, 2017).

Contributing author to University of Arizona Postdoctoral Guide.

Reviewer for *Evolution*, *Genetics*, *BioScience*, *Phil. Trans. B*.