

# SWATI PATEL

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CONTACT INFORMATION	Stanley Thomas 407 Tulane University New Orleans, LA 70118	spatel20@tulane.edu www.math.tulane.edu/~spatel20
RESEARCH INTERESTS	Mathematical population genetics, the genotype to phenotype map, evolvability, persistence theory in dynamical systems, feedbacks between ecology and evolution, coexistence theory	
ACADEMIC APPOINTMENTS	<b>Postdoctoral Researcher</b> , Tulane University <i>Mentor</i> : Scott McKinley	Sept 2017-Present
	<b>Postdoctoral Researcher</b> , University of Vienna <i>Mentor</i> : Reinhard Bürger	Sept 2016-August 2017
EDUCATION	<b>University of California</b> , Davis, CA Ph.D., Applied Mathematics	September 2016
	<ul style="list-style-type: none"><li>• Thesis: <i>The effect of ecological and evolutionary feedbacks on community dynamics</i></li><li>• <i>Advisor</i>: Sebastian J. Schreiber</li><li>• <i>Committee</i>: Timothy Lewis, Thomas Schoener</li><li>• Affiliated with Center for Population Biology</li></ul>	
	<b>Northwestern University</b> , Evanston, IL B.A., Integrated Science, Biology, International Studies	May 2009
	<ul style="list-style-type: none"><li>• Senior Honors Thesis: <i>Understanding Neotropical diversification based on phylogeny and biogeography of the Pteroglossus aracarís (Aves: Ramphastidae)</i></li><li>• <i>Advisor</i>: Jason D. Weckstein</li></ul>	
AWARDS AND HONORS	<ul style="list-style-type: none"><li>• Tulane University Postdoctoral Travel Award</li><li>• American Association of University Women Fellowship</li><li>• UC Davis and Humanities Graduate Research Award</li><li>• NSF Vigre Summer Research Fellowship</li><li>• NSF Graduate Research Fellowship</li><li>• Grinter Graduate Research Fellowship</li><li>• Fulbright US Student Fellowship</li><li>• Emanuel Margoliash Basic Research Prize</li><li>• Undergraduate Research Grant</li><li>• NSF Research Experience for Undergraduates</li></ul>	2018, 2019 2015-2016 2014 2013 2010-2015 2010-2011 2009-2010 2009 2008 2007
SUBMITTED MANUSCRIPTS	<ol style="list-style-type: none"><li>1. Yamamichi M, Lyberger K, and <b>Patel S</b>. Antagonistic coevolution between multiple quantitative traits: matching interactions can be subsets of difference interactions. <i>accepted in Population Ecology</i>.</li><li>2. Cortez MH, <b>Patel S</b>, and Schreiber SJ. Destabilizing evolutionary and eco-evolutionary feedbacks drive eco-evo cycles in empirical systems. <i>submitted to Proceedings of Royal Society B</i>.</li></ol>	

## PUBLICATIONS

1. **Patel S** and Bürger R. 2019. Eco-evolutionary feedbacks between prey densities and linkage disequilibrium in the predator maintain diversity. *Evolution*.
2. Azuaje Rodriguez, R, Weckstein, J, Dispoto J, **Patel S**, Bates J, Silva S, and Aleixo A. 2018. Molecular systematics of the Amazonian endemic genus *Hylexetastes* (Aves: Dendrocolaptidae): taxonomic and conservation implications. *Ibis*.
3. **Patel S**, Cortez MH and Schreiber SJ. 2018. Partitioning the effects of eco-evolutionary feedbacks on community stability. *The American Naturalist*, 191: 381-394.
4. **Patel S** and Schreiber SJ. 2018. Robust permanence for ecological equations with internal and external feedbacks. *Journal of Mathematical Biology*, 77: 79-105.
5. terHorst CJ, Zee P, Heath K, Miller T, Pastore A, **Patel S**, Schreiber SJ, Wade M and Walsh M. 2018. Evolution in a community context: trait responses to multiple species interactions. *The American Naturalist*, 191: 368-380.
6. Schreiber SJ, **Patel S**, and terHorst CJ. 2018. Evolution as a coexistence mechanism: Does genetic architecture matter? *The American Naturalist*, 191: 407-420.
7. Cortez MH and **Patel S**. 2017. The effects of predator evolution and genetic variation on predator-prey population-level dynamics. *Bulletin of Mathematical Biology*, 79: 1510-1538.
8. Schreiber SJ and **Patel S**. 2015. Evolutionarily induced alternative states and coexistence in systems with apparent competition. *Natural Resource Modeling*, 28: 475-496.
9. **Patel S** and Schreiber SJ. 2015. Evolutionary-driven shifts in communities with intraguild predation. *The American Naturalist* 186: E98-E110.
10. **Patel S**, Kimball RT, and Braun EL. 2013. Error in phylogenetic estimation for bushes in the Tree of Life. *Journal of Phylogenetics and Evolutionary Biology* 1: 1-10.
11. **Patel S**, Weckstein J, Patane J, Bates J, Aleixo A. 2011. Temporal and spatial diversification of *Pteroglossus aracaris* (AVES: Ramphastidae) in the neotropics: Consant rate of diversification does not support an increase in radiation during the Pleistocene. *Molecular Phylogenetics and Evolution* 58: 105-115.

## INVITED TALKS

1. University of Louisiana at Lafayette. (*scheduled for 11/2019*). Colloquium talk. *The genetic basis of traits and its influence on species evolution and interactions*.

2. Society of Industrial and Applied Mathematics Central States, Iowa State University. (10/2019). Mini-symposium talk. *The structure of genetics influences a population's ability to evolve.*
3. International Conference of Industrial and Applied Mathematics, Valencia, Spain. (7/2019). Mini-symposium talk. *The evolution of a buffering protein from random interactions.*
4. Computational and Mathematical Population Dynamics, Florida Atlantic University. (5/2019). Mini-symposium talk. *Invasive species, novel traits, and the build up of genetic variation.*
5. Society of Industrial and Applied Mathematics TX-LA Section. (10/2018). Mini-symposium talk. *Feedbacks between ecology and evolution affect coexistence of different species.*
6. ETH Zurich, Switzerland (11/2016). Seminar talk. *Eco-evolutionary feedback effects on community dynamics: stability.*
7. Ecological Society of America Conference (8/2016). Mini-symposium talk. *The stabilizing and destabilizing effects of eco-evolutionary feedbacks.*
8. University of Vienna Mathematical Biology Seminar Talk(11/2015). *Dynamics of communities coupled to population quantitative trait evolution.*
9. University of California Davis Mathematical Biology Seminar (05/2015). *Community dynamics with eco-evolutionary feedbacks.*

CONTRIBUTED  
TALKS

1. Society for Industrial and Applied Mathematics Life Sciences, Minneapolis, MN (8/2018). *Genetic processes effects on predator-prey communities.*
2. International Center for Mathematical Sciences, Edinburgh, Scotland (7/2018). Stochastic models of evolving populations: from bacteria to cancer.
3. Mathematical Modeling in Ecology and Evolution, London, UK (7/2017). *Recombination rates effect eco-evolutionary feedbacks.*
4. UC Davis Math Conference, Davis, CA (10/2014). *Coexistence of interacting species under eco-evolutionary dynamics.*
5. Society for Industrial and Applied Mathematics Life Sciences, Charlotte, NC (8/2014). *Species coexistence under eco-evolutionary dynamics.*
6. American Naturalists Conference, Asilomar, CA (1/2014). *The effects of the tempo of evolution on population dynamics of intraguild predation.*
7. Society for Industrial and Applied Mathematics Student Conference, Davis, CA (5/2012). *Integrating ecological and evolutionary timescales.*
8. Chicago Area Undergraduate Research Symposium, Chicago, IL (4/2009). *Genetic structure of Aracaris (Toucans) Across the Rio Japura.*

POSTERS

1. Southeast Center for Mathematical Biology, Georgia Tech, Atlanta, Georgia (1/2019).
2. Mathematical and Computational Evolutionary Biology, Porquerolles, France (6/2017). *Eco-evolutionary feedback effects on genetic polymorphisms and linkage disequilibrium.*
3. Mathematical Modeling in Ecology and Evolution Conference, Paris, France (07/2015). *Eco-evolutionary dynamics of an intraguild predation system*
4. NetSci Conference, Berkeley, CA (6/2014). *Ecological and evolutionary dynamics in food webs*
5. Mathematical Biosciences Institute Workshop, Rapid Evolution and Sustainability, Ohio State University, Columbus, OH. (10/2013). *Eco-evolutionary dynamics of an intraguild predation system*
6. Dynamics Days Conference, Denver, CO (1/2013). *Integrating timescales of ecological and evolutionary processes in an intraguild predation system*
7. International Ornithological Congress, Campos do Jordao, Brazil (8/2010). *Genetic analysis of Pteroglossus azara species (Ramphastidae) complex*
8. Chicago Area Undergraduate Research Symposium, Chicago, IL (4/2008). *Understanding biodiversity: a biogeographic study of Pteroglossus aracarís*

TEACHING  
EXPERIENCE

**Tulane University**, New Orleans, LA

*As Associate Instructor*

- Stochastic Processes (Graduate Level) Fall 2018, 2019
- Independent Research: Engineering Probability Fall 2019
- Introduction to Applied Math Spring 2019, 2018
- Independent Research: Mathematical Ecology Fall 2018, Spring 2019
- Introduction to Probability Fall 2017

**University of California Davis**, Davis, CA

*As Teaching Assistant*

- Ordinary Differential Equations Winter, Spring 2014
- Introduction to Abstract Math Spring 2014
- Calculus for Biologists Winter, Spring 2013
- Advanced Calculus Fall 2012

**COSMOS High School Summer Program**, Davis, CA

- Teaching Assistant for Mathematical Biology Summer 2012, 2014

## SERVICE

### Outreach Service

- Co-founder and co-organizer of Math For All in New Orleans conference (to be held 3/2020)
- Gave a research talk to undergraduate students at Xavier University, New Orleans. (4/2019). *Using mathematics to understand our natural world.*
- Gave a presentation on simulating stochastic population dynamics at Tulane Users R Group. (4/2018).
- Co-led a session on mathematical games at Girls in STEM at Tulane. (10/2017).
- Gave a talk on personal experience of being a woman in STEM at two American Association of University Women California chapter meetings (5/2017, 1/2016)
- Volunteered to judge for Technovation challenge for middle school girls (2015)
- Volunteered at STEM for Girls, UC Davis (2013, 2015)
- Volunteered to review for Association for Women in Mathematics essay contest (2014).
- Led a session on using mathematics to understand genetics and evolution at Math Circle for middle school students (10/2014)
- Regularly volunteered at Women's Center Math Cafe tutoring, UC Davis (2011- 2014)
- Mentored group of undergraduates in STEM as part of initiative at Women's Center, UC Davis (2012-2013)

### Departmental Service

- Organizer of Tulane University Probability and Statistics Seminar, 2018-2019
- Organizer of reading seminar on Biofluids and Evolution, Fall 2019
- Organizer of reading seminar on Large Deviation Theory, Spring 2018
- Co-organizer of UC Davis Student-Run Math Seminar, 2014-2015
- Undergraduate Program Committee Representative, Math Department, UC Davis, 2012-2014

### Peer Review Service

- *Journal of Mathematical Biology*
- *Nature Scientific Reports*
- *Journal of Theoretical Biology*
- *Theoretical Population Biology*
- *Ecology Letters*
- *The American Naturalists*
- *Journal of Ecology*
- *Internet Mathematics*