

CURRICULUM VITAE

Austin M. Garner

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EDUCATION

Doctor of Philosophy in Integrated Bioscience

Anticipated graduation: May 2021

The University of Akron, Akron, Ohio

Co-advisors: Peter H. Niewiarowski, Ph.D. (Department of Biology)
Ali Dhinojwala, Ph.D. (Department of Polymer Science)

Committee: Henry C. Astley, Ph.D. (Departments of Biology and Polymer Science)
Todd A. Blackledge, Ph.D. (Department of Biology)
Anthony P. Russell, Ph.D. (Department of Biological Sciences, University of Calgary)

Relevant coursework: Research Techniques in Integrated Bioscience (IB); Communicating in IB; Problem Solving in IB; Digital Skills for Biologists; Field Herpetology; Comparative Biomechanics; Biometry (in progress); Readings in Biomimery (in progress).

Bachelor of Science in Biology, Magna Cum Laude

May 2016

The University of Akron, Akron, Ohio

Relevant coursework: Biological Problems (Independent Research); Vertebrate Zoology; Advanced Ecology; Population Biology; Principles of Systematics; Biology of Behavior; Animal Physiology; Evolutionary Biology.

RESEARCH INTERESTS

Among animal taxa, there is a vast amount of morphological variation in vertebrate locomotor systems, and I am interested in how various morphological phenotypes (from micro- to macroscale) can have differential effects on the performance of these systems. For example, the gecko adhesive system is composed of microscopic, beta-keratin fibrils that terminate into nanoscopic, triangular-shaped tips. There appears to be microscale variation in the morphological properties of these structures both within and between individuals and species, but it is unclear how this morphological variation affects performance or particular attributes of the gecko adhesive system (e.g. self-cleaning, adhesion to rough substrates, etc.). Additionally, of the thousands of pad-bearing lizard species, there is immense variation in adhesive toe pad morphology, but it is unknown whether this variation results in differential performance or specialization for a particular habitat. I plan to investigate these topics utilizing both micro-scale (e.g. scanning electron microscopy, atomic force microscopy) and macro-scale measurements (e.g. adhesive and locomotor performance) in both laboratory and ecologically relevant conditions. Beyond researching these themes in a biological context, I am interested in applying this information to the design and fabrication of gecko-inspired synthetic adhesives.

RESEARCH EXPERIENCE

Doctoral Research

May 2016 - Present

Program in Integrated Bioscience, Department of Biology, The University of Akron

Co-advisors: Peter H. Niewiarowski, Ph.D. and Ali Dhinojwala, Ph.D.

- Actively researching lizard adhesion and adhesive locomotion under conditions relevant to the ecology of adhesive pad-bearing lizards (e.g. variable humidity, temperature, substrates, etc.). More specifically, investigating how morphological variation at both micro- and macro-scales can lead to differential adhesive and/or locomotor performance under a variety of environmental conditions.

- Regularly presenting project updates in gecko adhesion research meetings between laboratories in the Department of Biology (Niewiarowski Lab) and the Department of Polymer Science (Dhinojwala Lab); discussions prompted collaboration at the intersection of biology and materials science.
- Regularly attend the Society for Integrative and Comparative Biology Annual Meeting to present research findings to broad scientific audience.

Undergraduate Research

January 2014 - May 2016

Department of Biology, The University of Akron

Principal investigator: Peter H. Niewiarowski, Ph.D.

- Fully researched, designed, and executed an investigation on the effects of water on gecko locomotor performance at the University of Akron.
 - Analyzed and interpreted experimental data.
 - Prepared manuscript for publication and submitted manuscript to a peer-reviewed journal. Manuscript published in the *Journal of Herpetology* (April 2017; see below).
 - Presented project findings via scientific poster at the 2016 Society for Integrative and Comparative Biology Annual Meeting in Portland, OR.
- Regularly presented project updates in gecko adhesion research meetings between laboratories in the Department of Biology and the Department of Polymer Science; discussions prompted collaboration at the intersection of biology and materials science.
- Collected whole animal adhesion data for a study investigating gecko adhesion on wet and dry fluoropolymer substrates as an undergraduate researcher.
 - Acknowledged in peer-reviewed publication for assisting with experimental trials. [Link to article.](#)

PEER-REVIEWED PUBLICATIONS

‡Denotes equal contribution of authors

Garner, A.M., S.M. Lopez, and P.H. Niewiarowski. 2017. Brown anole (*Anolis sagrei*) adhesive forces remain unaffected by partial claw clipping. *Acta Herpetologica* 12(2): 133-137. [PDF](#).

Garner, A.M., A.Y. Stark, S.A. Thomas and P.H. Niewiarowski. 2017. Geckos go the Distance: Water's Effect on the Speed of Adhesive Locomotion in Geckos. *Journal of Herpetology* 51:240-244. [Link to article.](#)

MANUSCRIPTS IN REVIEW OR IN PREPARATION

Garner, A.M., J.P. Piechowski, C. Buo, S.R. Stefanovic, P.H. Niewiarowski, and A. Dhinojwala. The Role of Digital Hyperextension in the Self-drying Mechanism of Gecko Adhesive Toe Pads. *In Preparation.*

Klittich, M.R., **A.M. Garner**‡, D.M. Maksuta‡, P.H. Niewiarowski, and A. Dhinojwala. Impact of Surface Chemistry on Gecko Self-Cleaning. *In Preparation.*

PROFESSIONAL EXPERIENCE

Teaching Assistant

Department of Biology, The University of Akron, Akron, OH

August 2016 - Present

Research Assistant

The University of Akron Field Station, Bath, Ohio

Supervisors: Randall J. Mitchell, Ph.D. and Lara D. Roketenetz, Ph.D.

May 2016 - August 2016

TEACHING EXPERIENCE

COURSES TAUGHT

Foundations of Physiology Lab I Teaching Assistant, Department of Biology, The University of Akron	Fall 2017
Human Anatomy and Physiology Lab I Teaching Assistant, Department of Biology, The University of Akron	Summer 2017
Principles of Biology II Lab Teaching Assistant, Department of Biology, The University of Akron	Spring 2017
General Ecology Teaching Assistant, Department of Biology, The University of Akron	Fall 2016
Biomimetic Design Teaching Assistant, Department of Biology, The University of Akron	Fall 2016

GUEST LECTURES

Gecko Biology and Adhesion: Beyond Saving You Money on Car Insurance Biomimetic Design, The University of Akron	Fall 2017
The Gecko Adhesive System: An Adaptation for an Arboreal Lifestyle General Ecology, The University of Akron	Fall 2016
The Gecko Adhesive System: A Sticky Solution for All Sorts of Problems Biomimetic Design, The University of Akron	Fall 2016

MENTORING

To date, I am mentoring three undergraduate students on two different projects during my doctoral degree. When these studies are complete, these students will later become co-authors on future manuscripts.

Undergraduate Students

Austin Keith (1 manuscript in preparation)
Alexis Schnarrenberger (1 manuscript in preparation, 1 experiment in progress)
Alexandra Tomasko (1 experiment in progress)

HONORS AND AWARDS

Company of Biologists' Travel Grant <i>Society of Experimental Biology</i> <u>Amount:</u> £250	November 2017
Charlotte Magnum Student Support Award <i>The Society for Integrative and Comparative Biology</i> 2018 Annual Meeting, San Francisco, California <u>Amount:</u> \$109	November 2017
Professional Enrichment Grant <i>The University of Akron Graduate Student Government</i> <u>Amount:</u> \$200	October 2017
Charlotte Magnum Student Support Award	November 2016

The Society for Integrative and Comparative Biology
2017 Annual Meeting, New Orleans, Louisiana
Amount: \$109

Charlotte Magnum Student Support Award

November 2015

The Society for Integrative and Comparative Biology
2016 Annual Meeting, Portland, Oregon
Amount: \$109

Best Overall Poster

May 2016

Department of Biology, The University of Akron, Akron, Ohio
Biology Undergraduate Research Symposium
Amount: \$200

Presidential Scholarship

Fall 2012 - May 2016

The University of Akron, Akron, Ohio

President's List

Fall 2015 and Spring 2016

The University of Akron, Akron, Ohio

Dean's List

Fall 2012, 2014, 2015 and Spring 2014, 2015

The University of Akron, Akron, Ohio

PROFESSIONAL SERVICE

RESEARCH AND DEPARTMENTAL OUTREACH

In addition to the below, I give regular outreach presentations using live geckos to educate diverse audiences about gecko biology, gecko adhesion, and Niewiarowski/Dhinojwala lab research. Audiences range from students (K-12, undergraduate, and graduate) to business professionals interested in biomimicry to scientists in various stages of their careers.

UA Scholar's Day

January 2017

Department of Biology, The University of Akron, Akron, OH

- Answered questions and discussed Department of Biology's Bachelor of Science program with prospective undergraduate students.
- Provided informative tours of the Department of Biology's classroom, research, and administrative facilities.
- Discussed gecko adhesion research with prospective Biology undergraduate students with a live gecko demonstration.

Departmental Tours for Prospective Undergraduate Students

November 2016

Department of Biology, The University of Akron, Akron, OH

- Discussed previous undergraduate experiences with 75 prospective undergraduate students.
- Provided informative tour of the Department of Biology's classroom, research, and administrative facilities.

ORAL PRESENTATIONS

‡Denotes equal contribution of authors.

Garner, A.M., M.R. Klittich, J.M. Piechowski, D. Maksuta, C. Buo, S.R. Stefanovic, P.H. Niewiarowski, and A. Dhinojwala. January 2018. Recovery Ability of Gecko Adhesive Toe Pads After Fouling with Water or Dirt. SICB 2018 Annual Meeting, San Francisco, California.

M.R. Klittich, **A.M. Garner**‡, D. Maksuta‡, P.H. Niewiarowski, and A. Dhinojwala. January 2018. Impact of Surface Chemistry on Gecko Self-Cleaning. SICB 2018 Annual Meeting, San Francisco, California.

Garner, A.M., J.M. Piechowski, C. Buo, S.R. Stefanovic, P.H. Niewiarowski, and A. Dhinojwala. October 2017. The Role of Digital Hyperextension in the Self-drying Mechanism of Gecko Adhesive Toe Pads. SICB 2017 Midwest Regional Meeting, The University of Akron, Akron, Ohio.

Garner, A.M., K.E. Siman, A. Wright, T. Davis, and P.H. Niewiarowski. January 2017. What Goes Up, Must Come Down: The Effect of Running Orientation on the Speed of Adhesive Locomotion in Geckos. SICB 2017 Annual Meeting, New Orleans, Louisiana.

POSTER PRESENTATIONS

†Denotes presenting author, if different from lead author. *Denotes undergraduate co-author.

Garner, A.M., A.J. Keith^{†*}, A. Schnarrenberger^{*}, H.C. Astley, and P.H. Niewiarowski. January 2018. The Effect of Running Orientation on Gecko Locomotor Performance. SICB 2018 Annual Meeting, San Francisco, California.

Garner, A.M., A.Y. Stark, S.A. Thomas, and P.H. Niewiarowski. May 2016. Geckos Go the Distance: Water's Effect on Gecko Locomotor Performance. Biology Undergraduate Research Symposium, The University of Akron, Akron, Ohio. Best overall poster award.

Garner, A.M., A.Y. Stark, S.A. Thomas, and P.H. Niewiarowski. January 2016. Geckos Go the Distance: Water's Effect on Gecko Locomotor Performance. SICB 2016 Annual Meeting, Portland, Oregon.

MEDIA ATTENTION

Anole Annals **January 2018**
["Clipped Claws and Consequences for *Anolis* Adhesive Performance"](#)

Anole Annals **January 2016**
["SICB 2016: Can Geckos Run Fast When It's Wet Outside?"](#)

CERTIFICATIONS

Collaborative Institutional Training Initiative (CITI) **January 2013 - Present**
 Animal Care and Use

PROFESSIONAL AFFILIATIONS

The Herpetologists' League **April 2017 - Present**
 Student Member

The Society for the Study of Amphibians and Reptiles **January 2017 - Present**
 Student Member

The Society for Integrative and Comparative Biology **October 2015 - Present**
 Student Member