

CURRICULUM VITAE

Austin M. Garner

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EDUCATION

In progress **Ph.D. in Integrated Bioscience**

The University of Akron, Akron, Ohio
Anticipated graduation date: May 2021

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 Polymer Science and Biology)
 Todd A. Blackledge, Ph.D. (Department of Biology)
 Anthony P. Russell (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; Readings in Biomimicry; Ethics of Science.

May 2016 **B.Sc. in Biology, *magna cum laude***

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.

PROFESSIONAL EXPERIENCE

May 2018 – Present

Mentoring Fellow

[Tiered Mentoring Program](#), Department of Biology, The University of Akron, Akron, Ohio

August 2016 – Present

Teaching Assistant

Department of Biology, The University of Akron, Akron, Ohio

May 2016 – August 2016

Research Assistant

The University of Akron Field Station, Bath, Ohio

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

RESEARCH INTERESTS

There is a vast amount of morphological, behavioral, and functional variation in vertebrate locomotor systems, and I am interested in how various morphologies and behaviors are related to the performance and function of these systems. I am applying this framework to my investigations of lizard subdigital adhesive pads. Gekkonid and *Anolis* lizards have independently evolved fibrillar adhesive structures, but the morphology of these structures are quite different for these taxa. Anoles have single fibers equipped with one triangular-shaped contact point, while geckos have branched, hierarchical fibers terminating in hundreds to thousands of smaller triangular-shaped contacts. There appears to be microscale variation in the morphological properties of these structures both within and between individuals and species of geckos and anoles, but it is unclear how this morphological variation affects performance or particular attributes of lizard adhesive systems (e.g., adhesion to rough substrates, self-cleaning, etc.). Furthermore, it is currently unclear whether variation in performance of these systems is at all related to behavioral choices these lizards make in artificial or natural habitats. I plan to investigate these topics utilizing both micro-scale (e.g., scanning electron microscopy, optical profilometry) and macro-scale measurements (e.g., adhesive and locomotor performance, behavioral assays) 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 that can operate under a variety of environmental conditions.

PEER-REVIEWED PUBLICATIONS

‡ Denotes equal contribution of authors

- 2018** McInerney, S.J., B. Khakipoor, **A.M. Garner**, T. Houette‡, C.K. Unsworth‡, A. Rupp, N. Weiner, J.F.V. Vincent, J.K.S. Nagel, and P.H. Niewiarowski. E2BMO: Facilitating User Interaction with a BioMimetic Ontology via Semantic Translation and Interface Design. *Designs* 2(4): 53. [PDF](#).
- 2017** **Garner, A.M.**, S.M. Lopez, and P.H. Niewiarowski. Brown anole (*Anolis sagrei*) adhesive forces remain unaffected by partial claw clipping. *Acta Herpetologica* 12:133-137. [PDF](#).
- 2017** **Garner, A.M.**, A.Y. Stark, S.A. Thomas, and P.H. Niewiarowski. 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

- In review** **Garner, A.M.**, J.M. Piechowski, C. Buo, S.R. Stefanovic, P.H. Niewiarowski, and A. Dhinojwala. Step away from the water: digital hyperextension's lack of influence on the self-drying 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** **Garner, A.M.**, A.J. Keith, A.N. Schnarrenberger, H.C. Astley, and P.H. Niewiarowski. What Goes Up, Must Come Down: Substrate Orientation Significantly Impacts Locomotor Performance of *Gekko gekko*.
- In preparation** Wilson, M.C., A.N. Schnarrenberger, F. Kabiri, **A.M. Garner**, P.H. Niewiarowski, and A. Dhinojwala. Comparison of gecko adhesive performance on soft substrates.

HONORS AND AWARDS

- Multiple years** **Company of Biologists' Travel Grant**
Society of Experimental Biology
Amount: £250
Years awarded: 2017, 2018
- Multiple years** **Professional Enrichment Grant**
The University of Akron Graduate Student Government
Amount: \$200
Years awarded: 2017, 2018
- November 2017** **Charlotte Magnum Student Support Award**
The Society for Integrative and Comparative Biology
2018 Annual Meeting, San Francisco, California
Amount: \$109
- November 2016** **Charlotte Magnum Student Support Award**
The Society for Integrative and Comparative Biology
2017 Annual Meeting, New Orleans, Louisiana
Amount: \$109
- November 2015** **Charlotte Magnum Student Support Award**
The Society for Integrative and Comparative Biology
2016 Annual Meeting, Portland, Oregon
Amount: \$109
- May 2016** **Best Overall Poster**
Department of Biology, The University of Akron, Akron, Ohio
Biology Undergraduate Research Symposium
Amount: \$200
- 2012-2016** **Presidential Scholarship**
The University of Akron, Akron, Ohio
- Multiple semesters** **President's List**
The University of Akron, Akron, Ohio
Semesters awarded: Fall 2015 and Spring 2016
- Multiple semesters** **Dean's List**
The University of Akron, Akron, Ohio
Semesters awarded: Fall 2012, 2014, 2015 and Spring 2014, 2015

CONFERENCE PRESENTATIONS

† Denotes presenting author ‡ Denotes equal contribution of authors *Denotes undergraduate author

ORAL PRESENTATIONS

- 2019** Niewiarowski, P.H.[†], A. Dhinojwala[†], and **A.M. Garner**. Developing prototypes for testing gecko adhesion on rough surfaces. SICB 2019 Annual Meeting, Tampa Bay, Florida. Part of symposium titled, “The Path Less Traveled: Reciprocal Illumination of Gecko Adhesion by Unifying Material Science, Biomechanics, Ecology, and Evolution”.
- 2019** **Garner, A.M.**[†], M.R. Klittich, D. Maksuta, P.H. Niewiarowski, and A. Dhinojwala. The Role of Surface Lipids on the Self-Cleaning Ability of Gecko Subdigital Adhesive Pads. SICB 2019 Annual Meeting, Tampa Bay, Florida.
- 2019** Gamel, K.M.[†], **A.M. Garner**, and B.E. Flammang. Modeling evolutionary selection for performance, in the case of the remora adhesive disc. SICB 2019 Annual Meeting, Tampa Bay, Florida.
- 2018** Unsworth, C.K.[†], **A.M. Garner**, S.J. McInerney, B. Khakipoor, T. Houette, A. Rupp, and N. Weiner. E2BMO: Facilitating User Interaction with a BioMimetic Ontology through Semantic Translation and Interface Design. AAAI, Arlington, Virginia.
- 2018** **Garner, A.M.**[†], M.R. Klittich, J.M. Piechowski, D. Maksuta, C. Buo, S.R. Stefanovic, P.H. Niewiarowski, and A. Dhinojwala. Recovery Ability of Gecko Adhesive Toe Pads After Fouling with Water or Dirt. SICB 2018 Annual Meeting, San Francisco, California.
- 2018** M.R. Klittich[†], **A.M. Garner**[‡], D. Maksuta[‡], P.H. Niewiarowski, and A. Dhinojwala. Impact of Surface Chemistry on Gecko Self-Cleaning. SICB 2018 Annual Meeting, San Francisco, California.
- 2017** **Garner, A.M.**[†], J.M. 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. SICB 2017 Midwest Regional Meeting, The University of Akron, Akron, Ohio.
- 2017** **Garner, A.M.**[†], K.E. Siman, A. Wright, T. Davis, and P.H. Niewiarowski. 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

- 2019** **Garner, A.M.**[†], M.C. Wilson, A.P. Russell, P.H. Niewiarowski, and A. Dhinojwala. Morphometrics and Patterning of the Adhesive Setal Fields of an Anolis Lizard in Comparison to those of its Gekkotan Counterparts. SICB 2019 Annual Meeting, Tampa Bay, Florida.
- 2019** **Garner, A.M.**, A.M. Pamfilie^{†*}, A. Dhinojwala, and P.H. Niewiarowski. Relationships between Adhesive Performance and Substrate Preference Behavior in Tokay Geckos (*Gekko gekko*). SICB 2019 Annual Meeting, Tampa Bay, Florida.
- 2018** **Garner, A.M.**, A.J. Keith^{†*}, A. Schnarrenberger*, H.C. Astley, and P.H. Niewiarowski. The Effect of Running Orientation on Gecko Locomotor Performance. SICB 2018 Annual Meeting, San Francisco, California.

- 2016** **Garner, A.M.[†]**, A.Y. Stark, S.A. Thomas, and P.H. Niewiarowski. Geckos Go the Distance: Water's Effect on Gecko Locomotor Performance. Biology Undergraduate Research Symposium, The University of Akron, Akron, Ohio.
- 2016** **Garner, A.M.[†]**, A.Y. Stark, S.A. Thomas, and P.H. Niewiarowski. Geckos Go the Distance: Water's Effect on Gecko Locomotor Performance. SICB 2016 Annual Meeting, Portland, Oregon.

RESEARCH EXPERIENCE

- 2016 – Present** **Doctoral Research**
 Program in Integrated Bioscience, Department of Biology, The University of Akron
 Co-advisors: Peter H. Niewiarowski, Ph.D. and Ali Dhinojwala, Ph.D.
- 2013 – 2016** **Undergraduate Research**
 Department of Biology, The University of Akron
 Principal investigator: Peter H. Niewiarowski, Ph.D.

TEACHING AND MENTORING EXPERIENCE

COURSES TAUGHT

- Multiple semesters** **Foundations of Physiology Lab I**
 Teaching Assistant, Department of Biology, The University of Akron
 Semesters taught: Fall 2017, 2018
- Summer 2018** **Herpetology**
 Teaching Assistant, Department of Biology, The University of Akron
- Spring 2018** **Digital Skills for Biologists (graduate course)**
 Teaching Assistant, Department of Biology, The University of Akron
- Summer 2017** **Human Anatomy and Physiology Lab I**
 Teaching Assistant, Department of Biology, The University of Akron
- Spring 2017** **Principles of Biology Lab II**
 Teaching Assistant, Department of Biology, The University of Akron
- Fall 2016** **General Ecology**
 Teaching Assistant, Department of Biology, The University of Akron
- Fall 2016** **Biomimetic Design (combined undergraduate and graduate course)**
 Teaching Assistant, Department of Biology, The University of Akron

GUEST LECTURES

- Fall 2017** **Gecko Biology and Adhesion: Beyond Saving You Money on Car Insurance**
 Biomimetic Design, The University of Akron

Fall 2016 **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

MENTORING

Undergraduate Students

Austin Keith, Biology Undergraduate (1 manuscript in preparation)

Alexis Schnarrenberger, Biology Undergraduate (2 manuscripts in preparation)

Alexandra Tomasko, Biology Undergraduate

Alexandra Pamfilie, Biology/Psychology Undergraduate ([Tiered Mentoring](#)) (1 experiment in progress)

High School Students

Benjamin Sprenger

Nyle Garg

PROFESSIONAL SERVICE

REVIEWER

Biological Journal of the Linnean Society

OTHER SERVICE

January 2018 **The Society for Integrative and Comparative Biology**
2018 Annual Meeting, San Francisco, California
Session co-chair, Adhesion: Sticky When Dry

ACADEMIC SERVICE

COMMUNITY OUTREACH

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

August 2018 **Camp Bioscience**
Guest Speaker

April 2018 **Norbert Thompson Biology Undergraduate Research Symposium**
Judge

March 2018 **Western Reserve District 5 Science Day**
Super Judge, Animal/Plant Sciences

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- February 2018** **University of Akron/Goodyear STEM Career Day**
Gecko adhesion research demonstration
- April 2017** **Norbert Thompson Biology Undergraduate Research Symposium**
Judge
- April 2017** **University of Akron/Goodyear STEM Career Day**
Gecko adhesion research demonstration
- January 2017** **University of Akron Scholar's Day**
Gecko adhesion research demonstration, Department of Biology tour, answered questions about undergraduate programs in biology
- November 2016** **Departmental Tours for Prospective Undergraduate Students**

MEDIA ATTENTION

- January 2019** **Anole Annals**
[“SICB 2019: Anole Setal Morphological Diversity”](#)
- January 2018** **Anole Annals**
[“Clipped Claws and Consequences for *Anolis* Adhesive Performance”](#)
- January 2016** **Anole Annals**
[“SICB 2016: Can Geckos Run Fast When It's Wet Outside?”](#)

CERTIFICATIONS

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

PROFESSIONAL AFFILIATIONS

- 2017 – Present** **Society of Experimental Biology**
Student Member
- 2017 – Present** **The Herpetologists' League**
Student Member
- 2017 – Present** **The Society for the Study of Amphibians and Reptiles**
Student Member
- 2015 – Present** **The Society for Integrative and Comparative Biology**
Student Member