

George A. Brusch IV, Ph.D.

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Education

- Ph.D. Arizona State University, Tempe, AZ - Biological Sciences (2019)
Dissertation: Water as a physiological currency: Hydration state impacts immune function, metabolic substrates, and reproductive investment
Advisor: Dr. Dale DeNardo
- B.S. California Polytechnic State University, San Luis Obispo, CA – Biological Sciences (2014)

Teaching Experience

- 2018 BIO 181: Molecular and Cellular Biology – Instructor: Mesa Community College
- 2018 MIC 425: Advanced Immunology – Teaching Assistant: Arizona State University
- 2017 BIO 461: Comparative Physiology – Instructor (4 lectures): Arizona State University
- 2017 FSE 100: Introduction to Engineering – Instructor (1 lecture): Arizona State University
- 2017 MIC 425: Advanced Immunology – Teaching Assistant: Arizona State University
- 2017 BIO 202: Human Physiology – Teaching Assistant: Arizona State University
- 2016 BIO 201: Human Anatomy – Teaching Assistant: Arizona State University
- 2016 MIC 425: Advanced Immunology – Teaching Assistant: Arizona State University
- 2014 BIO 426: Immunology – Teaching Assistant: California Polytechnic State University, San Luis Obispo
- 2013 ZOO 341: Herpetology – Teaching Assistant: California Polytechnic State University, San Luis Obispo
- 2013 ZOO 323: Ornithology – Teaching Assistant: California Polytechnic State University, San Luis Obispo

Peer-Reviewed Publications

- Brusch IV GA**, Christian K, Brown GP, Shine R, DeNardo DF. *In Press*. Cane toads (*Rhinella marina*) rely on water access, not drought tolerance, to invade xeric Australian environments. *Oecologia*
- Brusch IV GA**, Heulin B, DeNardo DF. 2019. Dehydration during egg production alters egg composition and yolk immune function. *Comparative Biochemistry and Physiology A* 227: 68-74
- Brusch IV GA**, DeNardo DF. 2019. Egg desiccation leads to dehydration and enhances innate immunity in python embryos. *Developmental and Comparative Immunology* 90: 147-151
- Brusch IV GA**, Lourdais O, Kaminsky B, DeNardo DF. 2018. Muscles provide an internal water reserve for reproduction. *Proceedings of the Royal Society (London) B* 285: 20180752
Media coverage from NSF Science 360, Outside JEB, The Wildlife Society, EurekAlert!, Phys.Org, National Public Radio, Sciences et Avenir, Deccan Chronicle, New Kerala, Big

News Network, ANI News, ABP, Business Standard, Science Daily, Long Room, Global Times, Xinhua, ASU Now.

Nowakowski AJ, Watling JI, Thompson ME, **Brusch IV GA**, Catenazzi A, Whitfield SM, Kurz DJ, Suarez-Mayorga A, Gutierrez AFA, Donnelly MA, Todd BD. 2018. Thermal biology mediates responses of amphibians and reptiles to habitat modification. *Ecology Letters* 21: 345-355

Brusch IV GA, Billy G, Blattman JN, DeNardo DF. 2017. Reproduction alters hydration state but does not impact the positive effects of dehydration on innate immune function in Children's pythons (*Antaresia childreni*). *Physiological and Biochemical Zoology* 90: 646-654 (**featured cover story**)

Brusch IV GA, DeNardo DF. 2017. When less means more: dehydration improves innate immunity in rattlesnakes. *Journal of Experimental Biology* 220: 2287-2295

Dupoué A, Rutschmann A, Le Galliard JF, Miles DB, Clobert J, DeNardo DF, **Brusch IV GA**, Meylan S. 2017. Water availability and environmental temperature correlate with geographic variation in water balance in common lizards. *Oecologia* 185: 561-571

Brusch IV GA, Taylor EN, Whitfield SM. 2016. Turn up the heat: thermal tolerances of lizards at La Selva, Costa Rica. *Oecologia* 180: 325-334 (**featured cover story**)

Hopkins GR, Brodie Jr ED, Mohammadi S, **Brusch IV GA**, Neuman-Lee LA, Hopkins ZM, French SS. 2016. Physiological responses to salinity vary with proximity to the ocean in a coastal amphibian. *Physiological and Biochemical Zoology* 89: 322-330

Heiken KH, **Brusch IV GA**, Gartland S, Escallón C, Moore IT, Taylor EN. 2016. Effects of long distance translocation on corticosterone and testosterone levels in male rattlesnakes. *General and Comparative Endocrinology* 237: 27-33

In review or in prep manuscripts (available upon request)

Brusch IV GA, Christian K, Brown GP, Shine R, DeNardo DF. *In Review*. Dehydration enhances innate immunity in a semi-aquatic snake from the wet-dry tropics. *Physiological and Biochemical Zoology*

Brusch IV GA, Trussell D, Billy G, Quiquempois V, Heulin B, DeNardo DF. *In Prep*. The relationship between maternal hydration and immune function: trans-generational impacts on egg and offspring quality. Target journal: *Journal of Experimental Biology*

Brusch IV GA, Price D, DeNardo DF. *In Prep*. Reassessing the 'cost' of reproduction: hydration state during reproduction in Gila monsters (*Heloderma suspectum*). Target journal: *Physiological and Biochemical Zoology*

Awards and Grants

Total = \$256,053

External

2018	National Science Foundation – Travel Award (\$513)
2018	Society for Integrative & Comparative Biology – Mentoring Award (\$100)
2018	Charlotte Magnum Student Support Award (\$1,500)

2017 Peabody Family Memorial Fellowship (\$1,277)
 2016 NSF East Asia and Pacific Summer Institute (EAPSI) Fellowship (\$15,000)
 2015 Organization for Tropical Studies Outstanding Student Paper Award – *Finalist*
 2015 *Oecologia* Highlighted Student Paper
 2014 NSF Graduate Research Fellowship (\$138,000)
 2014 NSF/LSAMP PROUD scholar: Outstanding Research in STEM
 2014 NSF/LSAMP PROUD scholar: Overall Academic Success
 2013 NSF/Organization for Tropical Studies Research Fellowship (\$10,000)
 2013 Louis Stokes Alliance for Minority Participation (LSAMP) Scholarship (\$4,000)
 2013 Unocal Environmental Education Scholarship (\$1,500)

Internal

2019 ASU Graduate College Completion Fellowship (\$20,186)
 2019 ASU Sun Devil Child Care Subsidy (\$1,000)
 2019 ASU GPSA Travel Grant (\$950)
 2018 ASU GPSA Leadership Scholarship (\$5,000)
 2018 ASU School of Life Sciences – RTI Grant (\$2,000)
 2018 ASU Sun Devil Child Care Subsidy (\$500)
 2018 School of Life Sciences Graduate Ambassador Leadership Award (\$2,000)
 2018 Faculty Women’s Association Distinguished Graduate Student Award
 2018 Arijit Guha Graduate Student Advocacy Award (\$500)
 2018 ASU GPSA Travel Grant (\$203)
 2018 ASU College of Liberal Arts and Sciences Graduate Excellence Award (\$100)
 2018 ASU Graduate College Fellowship (\$5,000)
 2018 ASU GPSA Graduate Research and Support Program (\$2,000)
 2018 ASU GPSA Travel Grant (\$634)
 2018 ASU Immunology Graduate Student Association GSO funding (\$1,005)
 2017 College of Liberal Arts and Sciences Student Leader Award
 2017 ASU GPSA Leadership Scholarship (\$5,000)
 2017 ASU School of Life Sciences – Travel Award (\$400)
 2017 ASU School of Life Sciences – RTI Grant (\$1,202)
 2017 School of Life Sciences Graduate Ambassador Fellowship (\$6,000)
 2017 ASU Immunology Graduate Student Association GSO funding (\$743)
 2017 ASU Sun Devil Child Care Subsidy (\$1,000)
 2017 ASU Graduate College Knowledge Mobilization Impact Award - *Finalist*
 2017 ASU College of Liberal Arts and Sciences Graduate Excellence Award (\$200)
 2017 ASU GPSA JumpStart Research Grant (\$500)
 2017 ASU GPSA Travel Grant (\$713)
 2016 ASU Sun Devil Child Care Subsidy (\$1,000)
 2016 ASU GPSA Assembly President Scholarship (\$7,500)
 2016 ASU GPSA Assembly Service Award (\$500)
 2016 ASU College of Liberal Arts and Sciences Graduate Excellence Fellowship for
 First Generation Students (\$5,000)
 2016 ASU College of Liberal Arts and Sciences Graduate Excellence Award (\$200)
 2016 ASU School of Life Sciences – Assistance with facilities (\$540)
 2015 ASU GPSA Graduate Research Grant (\$750)

- 2015 ASU College of Liberal Arts and Sciences Graduate Excellence Award (\$250)
 2014 ASU School of Life Sciences – Assistance with Field Work (\$1,087)
 2014 ASU School of Life Sciences – Doctoral Recruitment Fellowship (\$6,000)
 2014 Cal Poly Senior Recognition Award for Exceptional Achievement: Outstanding
 Biological Sciences Major
 2012 California Polytechnic State University – President’s List
 2011-14 California Polytechnic State University - Dean’s List (\$4,000)

Research Experience

- 2014-present Field & Lab Research (Hydration Ecoimmunology) – Arizona State University
 2016 Field & Lab Research (Ecoimmunology) – East Asia & Pacific Summer Institute,
 Australia (2-month duration)
 2013 Field & Lab Research (Thermal Physiology) – Organization for Tropical Studies,
 La Selva, Costa Rica (2-month duration)
 2012-2014 Field Research (Spatial Ecology) - Vandenberg Air Force Base, CA (6-month
 duration)
 2012-2014 Field Research (Herpetofaunal Surveys) - Chorro Creek Ecological Preserve, San
 Luis Obispo, CA (4-month duration)
 2012 GIS Consultant (Spatial Ecology) – Cal Poly, San Luis Obispo, CA (6-month
 duration)
 2012 Independent Research Project (Bullfrog Parasitology) - Cal Poly, San Luis
 Obispo, CA (2-month duration)

Service Activities

Advocacy

- 2018-2019 Graduate and Professional Student Association (GPSA) – *Director of Federal
 Relations
 Member, External Affairs Committee
 Lobbyist, Legislative Action Days, Sept 2018, Washington D.C.*
 2017-2018 Graduate and Professional Student Association (GPSA) – *Director of Legislative
 Affairs
 Member, External Affairs Committee
 Member, College of Liberal Arts and Sciences Committee
 Lobbyist, Legislative Action Days, Sept 2017, March 2018, Washington D.C.*
 2017-2018 ASU Graduate Student Bill of Rights Committee – *Chair*
 2016-2017 Graduate and Professional Student Association (GPSA) – *Assembly President /
 Representative, School of Life Sciences, ASU
 Member, College of Liberal Arts and Sciences Committee
 Lobbyist, Legislative Action Days, Sept 2016, Washington D.C.*
 2015-2016 Graduate and Professional Student Association (GPSA) – *Representative, School
 of Life Sciences, ASU
 Member, External Affairs Committee
 Member, College of Liberal Arts and Sciences Committee
 Lobbyist, Legislative Action Days, Sept 2015, March 2016, Washington D.C.*

Mentorship

- 2018 Society for Integrative and Comparative Biology, Broadening Participation Program - *Mentor*
- 2015-present First Generation Pathways to Success (1GPS), *Mentor* – ASU
- 2014-present Shades Multicultural Peer Mentoring Program, *Mentor* – ASU
- 2014-present Arizona Women in Science, *Mentor* – ASU
- 2011-2014 Louis Stokes Alliance for Minority Participation (NSF-LSAMP), *Member/Mentor* – California Polytechnic State University, San Luis Obispo

Community outreach

- 2018 ASU hosts the ‘Chief Science Officers’ - reptile presentation
- 2018 ASU Sun Devil Giving Day: School of Life Sciences - reptile booth
- 2016-2018 ASU Day at the Capitol: School of Life Sciences booth
- 2014-present Department of Animal Care & Technologies: reptile tent at Homecoming– ASU
- 2014-2017 Employment Engagement Committee’s Bring Your Child to Work Day: Herpetology presentation – ASU
- 2014 SoLS Takes a Hike: reptile booth – ASU
- 2014-present Night of the Open Door: reptile booth – ASU
- 2014-present Ask A Biologist: contributor to Physiology section

Academic service

- 2017 ASU School of Life Sciences – Graduate Programs Committee
Co-Chair, Mentoring Agreement Sub-Committee
- 2017 ASU College of Liberal Arts and Sciences – Graduate Student Success Committee – *Member*
- 2016-present Immunology Graduate Student Association (Ig-SA), *President/Co-founder* – ASU
- 2016-present Microbiology Graduate Student Association, *Member* – ASU

Reviewer

- 2018-present Journal of Animal Ecology (*Ad-hoc reviewer*)
- 2018-present Physiological and Biochemical Zoology (*Ad-hoc reviewer*)
- 2018-present Journal of Thermal Biology (*Ad-hoc reviewer*)
- 2018-present Journal of Experimental Zoology – Part A (*Ad-hoc reviewer*)
- 2018-present International Journal of Sports and Exercise Medicine (*Ad-hoc reviewer*)
- 2018 School of Life Sciences NSF-GRFP Writing Course – *Reviewer*
- 2018 School of Life Sciences Graduate Retreat – ‘Preparing for Comps’ – *Panelist*
- 2016 ASU School of Life Sciences – Summer Research Experience Program (*reviewer*)
- 2016-present Ecology (*Ad-hoc reviewer*)
- 2015-present Frontiers in Zoology (*Ad-hoc reviewer*)

Presentations

Invited seminars

- 2018 **Brusch IV GA.** To unpathed waters: the relationship between hydric state and immune function. Ayres Lab Research Seminar, Salk Institute for Biological Studies. La Jolla, CA. July 30, 2018
- 2018 **Brusch IV GA.** To unpathed waters: the relationship between hydric state and immune function. Stenglein Lab Research Seminar, Colorado State University. Ft. Collins, CO. June 1, 2018
- 2018 **Brusch IV GA.** To unpathed waters: the relationship between hydric state and immune function. Biology Department Research Seminar, Cal Poly. San Luis Obispo, CA. May 25, 2018
- 2018 **Brusch IV GA.** To unpathed waters: the relationship between hydric state and immune function. ASU School of Life Sciences ‘Brown Bag’ Symposium. Tempe, AZ. May 4, 2018
- 2018 **Brusch IV GA.** To unpathed waters: the relationship between hydric state and immune function. Immunology Graduate Students Association (Ig-SA) Seminar. Tempe, AZ. April 25, 2018
- 2017 **Brusch IV GA, Lourdais O, Kaminsky B, DeNardo DF.** Muscles provide water reserves for reproduction in a capital breeder facing water deprivation. ASU School of Life Sciences ‘Brown Bag’ Symposium. Tempe, AZ. December 1, 2017
- 2016 **Brusch IV GA.** Diversity of Costa Rican Flora and Fauna. Desert Garden Montessori. Phoenix, AZ. May 4, 2016
- 2016 **Brusch IV GA.** Diversity and importance of reptiles & amphibians. ASU Annual Science Day. Tempe, AZ. April 25, 2016
- 2015 **Brusch IV GA, DeNardo DF.** Important predators of the Sonoran Desert. Introduction to Biology Special Seminar, ASU. Tempe, AZ. November 17, 2015
- 2015 **Brusch IV GA, Taylor EN, Whitfield SM.** Turn up the heat: thermal tolerances of lizards at La Selva, Costa Rica. ASU School of Life Sciences ‘Brown Bag’ Symposium. Tempe, AZ. October 9, 2015
- 2014 **Brusch IV GA, Taylor EN, Whitfield SM.** Turn up the heat: thermal tolerances of lizards at La Selva, Costa Rica. Biology Department Research Seminar, Cal Poly. San Luis Obispo, CA. May 16, 2014

Conference presentations

- 2019 **Brusch IV GA, Webster T, Wilson Sayres M, Blattman J, Baldwin A, DeNardo DF.** A mechanistic approach to understanding the relationship between dehydration and enhanced immune function. Society for Integrative and Comparative Biology Annual Meeting. Tampa, FL. January 5, 2019
- 2018 **Brusch IV GA, Webster T, Wilson Sayres M, Blattman J, Baldwin A, DeNardo DF.** A mechanistic approach to understanding the relationship between dehydration and enhanced immune function. Society for Integrative and Comparative Biology – Southwestern Regional Meeting. San Marcos, CA. November 10, 2018
- 2018 **Brusch IV GA, Webster T, Wilson Sayres M, Blattman J, Baldwin A, DeNardo DF.** A mechanistic approach to understanding the relationship between

- dehydration and enhanced immune function. Arizona Physiological Society Annual Meeting. Tempe, AZ. October 5, 2018
- 2018 **Brusch IV GA**, Webster T, Wilson Sayres M, Blattman J, Baldwin A, DeNardo DF. A mechanistic approach to understanding the relationship between dehydration and enhanced immune function. International Society of Developmental and Comparative Immunology 14th Congress. Santa Fe, NM. June 21, 2018
- 2018 **Brusch IV GA**, Lourdais O, Kaminsky B, DeNardo DF. Muscles provide water reserves for reproduction when resources are limited. Society for Integrative and Comparative Biology Annual Meeting. San Francisco, CA. January 7, 2018
- 2017 **Brusch IV GA**, Kaminsky B, Lourdais O, DeNardo DF. Muscle as an internal water depot for reproduction: dehydration increases protein catabolism in a capital breeder. Society for Integrative and Comparative Biology – Southwestern Regional Meeting. Claremont, CA. October 21, 2017
- 2017 **Brusch IV GA**. Snakes have tails too: diversity of snakes in Arizona. ASU Annual Science Day. Tempe, AZ. April 21, 2017
- 2017 **Brusch IV GA**, DeNardo DF. Exploring the relationship between hydric state and innate immunity. Society for Integrative and Comparative Biology Annual Meeting. New Orleans, LA. January 8, 2017

Poster presentations

- 2019 **Brusch IV GA**, Heulin B, DeNardo DF. Dehydration during egg production alters egg composition and yolk immune function. Society for Integrative and Comparative Biology Annual Meeting. Tampa, FL. January 6, 2019
- 2018 **Brusch IV GA**, Heulin B, DeNardo DF. Dehydration during egg production alters egg composition and yolk immune function. Society for Integrative and Comparative Biology – Southwestern Regional Meeting. San Marcos, CA. November 10, 2018
- 2018 **Brusch IV GA**, Christian K, Brown G, Shine R, DeNardo DF. Invasive cane toad (*Rhinella marina*) expansion across Australia: physiological adaptation or phenotypic plasticity? International Society of Developmental and Comparative Immunology 14th Congress. Santa Fe, NM. June 17, 2018
- 2018 Trussell D, **Brusch IV GA**, DeNardo DF. Effects of High Glucose Intake on Energy Consumption in Rhinoceros Iguanas (*Cyclura cornuta*). School of Life Sciences Undergraduate Research Symposium. Phoenix, AZ. April 20, 2018
- 2018 **Brusch IV GA**, DeNardo DF. Egg desiccation leads to dehydration and enhanced innate immunity in python embryos. Society for Integrative and Comparative Biology Annual Meeting. San Francisco, CA. January 5, 2018
- 2017 Trussell D, **Brusch IV GA**, DeNardo DF. Effects of Water Availability During Gravidity on Performance and Growth of Neonate Children’s Pythons (*Antaresia childreni*). School of Life Sciences Undergraduate Research Symposium. Phoenix, AZ. March 17, 2017

Professional Societies

International Society of Developmental and Comparative Immunology

Society for Integrative and Comparative Biology
American Association of Immunologists
Federation of American Societies for Experimental Biology
International Union of Immunological Societies
American Association for the Advancement of Science
American Society for Microbiology
National Association of Graduate Students

Professional Development

2018 NSF Workshop - Women in STEM
2015-2016 ASU Preparing Future Faculty Program
2015-2018 National Association of Graduate & Professional Students - Leadership & Advocacy Training

Media Coverage

Featured Blogs

“To A Place Unknown – Research experiences in Thailand, Costa Rica, Australia, and beyond,”
by George Brusch, <http://directionseast.blogspot.com>. May 2009 – August 2016

Articles

“Wanted for the murder of lizards: climate change,” by Jay Gonza, St. Edward’s University Press. Austin, TX. June 9, 2017
“After 11 years and 100 rattlesnakes, SLO man to graduate from Cal Poly,” by Nick Wilson, The Tribune. San Luis Obispo, CA. June 13, 2014
“Spring Outstanding Graduates,” by Savannah Sperry, UWire. Carlsbad, CA. June 9, 2014
“Cal Poly Biology Student Wins National Science Foundation Graduate Fellowship,” by Rachel Henry, College of Science and Mathematics Magazine. San Luis Obispo, CA. May 30, 2014

References

Dr. Dale DeNardo

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Director, Department of Animal Care and Technologies
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