

Nicolas (Nikos) Neva Lessios

Assumption College

Department of Biological and Physical Sciences

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<https://www.assumption.edu/people-and-departments/directory/nicolas-lessios>

Education and Training

- Arizona State University- NSF Graduate Research Fellow**, Tempe AZ 2010 - 2016
Biology PhD (2016).
Coadvised by: Drs. Ronald Rutowski and Jonathan Cohen (U. Delaware College of Earth, Ocean, & Environment)
- Marine Biological Laboratory**, Woods Hole MA Summer 2013
Neural Systems and Behavior summer course
- Duke University**, Durham NC 2005 - 2009
BS with distinction in Biology, Minor in Environmental Science
- Duke University Marine Lab, Beaufort NC** 2008
- International School of Panama** Graduated 2005
High School Diploma, International Baccalaureate program

Teaching Experience

- BIO 280 Sensory Systems** Fall 2019-Present
Assumption College, Worcester, MA
- Novel course developed to complement a newly created Neuroscience major. Taught complementary lecture and laboratory experiences emphasizing experimentation using model organisms and featuring ADInstruments physiological hardware (16 students)
- BIO 160L Concepts in Biology** Fall 2019-Present
Assumption College, Worcester, MA
- Inquiry-based laboratory section emphasizing early exposure to experimentation, scientific writing and oral presentations (20 students)
- BIO 156 Introductory Biology for Health Professionals** Spring 2018
University of Arizona: PERT Postdoctoral Fellow and Pima Community College partnership
- Lecture and integrated laboratory component for aspiring health professionals (30 students)
- Active Learning Strategies and Pedagogy Workshop** Spring 2017
University of Arizona: Postdoctoral Fellow
- Practiced implementing active learning strategies that could be used in a variety of class sizes. Workshop took place in a small group setting and involved both strategies for presenting and assessing students' knowledge of content.

BIO 361 Animal Physiology Laboratory Class

Fall 2014 - Spring 2015,

ASU

Fall 2011 - Spring 2012

- Taught one full laboratory and recitation section of upper level biology majors. I was the primary instructor, as there was no attached lecture component (16 students)

Graduate Teaching Assistant: Invertebrate Zoology

Summer 2014,

ASU

Spring 2011

- Taught two inquiry-based laboratory sections to upper level biology majors (40 students). In 2014 I was the primary lab coordinator.

Graduate Teaching Assistant: Bio 100

Fall 2010

ASU

- Taught three non-major laboratory sections of introductory biology (72 students)

Mentoring Undergraduate Research Assistants:

Fall 2010 – Present

Assumption College, University of Arizona, ASU

- Mentored Assumption College students starting Fall 2019
- Mentored and provided oversight for the following U. of Arizona/Pima Community College undergraduate and post baccalaureate students while at the University of Arizona: Marcel Sayre (Currently: graduate student at U. Lund, Sweden), Briana Yolanda Olea-Rowe (target medical school U. of Arizona 2020), Catherine Stypa (target medical school: U. of Arizona 2020), Petra Tineo, and Torin Hodge. Mentored the following ASU undergraduates: Patrick Murphy (Currently: Medical school at A.T. Still University in Mesa, AZ. Honors Thesis at ASU: Regional Genetic Variation of two ephemeral pool crustacean species. SICB 2016 first author poster presentation), Elena Bautista-Hobin (SoLS Undergraduate Research Apprentice award: \$200), Anna Thome (Independent project: Diversity of Anostraca in Arizona. Obtained a Masters at Johns Hopkins Env. Science program), Molly Klein (Currently in Veterinary school in Glendale, AZ), Ti Ericksonn (currently PhD candidate at ASU, NSF GRFP awardee), Agustin Temporini, Mariana Machado Toffolo, Megan Wittenberg, Sophia Madril, Rachel Too.

Full-Time Laboratory Instructor

Fall 2009 – Spring 2010

Duke Biology Department

- Worked full time teaching introductory biology laboratories to biology majors (24 students)

Publications (Google Scholar profile: search for “Nicolas Lessios”. Undergraduate or post baccalaureate authors are indicated by an *)

Lessios, N., Rutowski, R.L., Cohen, J.H., Sayre, M.S*, Strausfeld, N.J. (2018). Multiple spectral channels in branchiopods. I. Vision in dim light and neural correlates. *Journal of Experimental Biology*. 221: jeb.165860.

Lessios, N., Rutowski, R.L., Cohen, J.H. (2018). Multiple spectral channels in branchiopods. II. Role in light-dependent behavior and natural light environments. *Journal of Experimental Biology*. 221: jeb.165878.

Lessios, N. (2017). Using electroretinograms and multi-model inference to identify spectral classes of photoreceptors and relative opsin expression levels. *PeerJ* 5, e3595.

- Bergman, M., **Lessios, N.**, Seymoure, B., & Rutowski, R. (2015). Visual mate detection in a territorial butterfly- the effect of background and luminance contrast. *Behavioral Ecology*, 26:851-860.
- Forward, R.B. Jr., Bourla M.H., **Lessios, N. N.**, Cohen, J.H. (2009). Orientation to shorelines by the supratidal amphipod *Talorchestia longicornis*: wavelength specific behavior during sun compass orientation. *Journal of Experimental Marine Biology and Ecology*. 376: 102-109.
- Cohen, J. H., Cronin, T.W. **Lessios, N.** and Forward, R.B. (2010). Visual physiology underlying orientation and diel behavior in the sand beach amphipod *Talorchestia Longicornis*. *Journal of Experimental Biology* 213: 3843-3851.
- Dickinson, W., Ferreyra, J., Imbesi, K. L., Joshi, S., Kingsolver, C., Klein, E., **Lessios, N. N.**, Ng, A., Stamp, T., White, K., Xu, D., and Vidra, R. L. (2006). The ethical challenges faced by ecological restorationists. *Ecological Restoration* Vol. 24, no. 2, pp. 102-104.

Manuscripts in Preparation (*indicates undergraduate or post baccalaureate authors)

- Rutowski, R. L., **Lessios, N.**, Seymoure, B., Pegram, K., & Raymundo, A*. Male display in a swallowtail butterfly (*Battus philenor*) ensures visibility of an iridescent sexual signal to female during courtship. In prep. for *Animal Behavior*
- Murphy P.M.* , **Lessios, N.**, Rutowski, R.L. Regional Genetic Variation of Two Ephemeral Pool Crustacean Species: Implications for Dispersal or Local Adaptation. In prep. for *Evolutionary Ecology*
- Lessios, N. Cohen J. H. Dorsal Light reflex of *T. longicaudatus*. In prep. For *Limnology and Oceanography*

Research Experience

Visual decision-making of stomatopod (mantis shrimp) crustaceans 2016-2019

- Studied the visual decision-making of shallow water stomatopod crustaceans using integrative behavioral, electrophysiological, and neuroanatomical techniques. Shallow water stomatopod crustaceans live in dynamic visual environments where they must process behaviorally relevant visual stimuli despite chromatic light flicker and other visual noise. Despite this variability, they can track prey-size objects with their eyestalks, often moving them independently. We are taking electrical recordings from the central complex, which is an unpaired midline brain region common to all Pancrustaceans. I found that it is implicated in coordinating both independent and conjoint movements of the eyestalks.

Vision and behavior of large branchiopods 2010 -2016

Arizona State University (ASU)- coadvisors: Drs. Ronald Rutowski and Jonathan Cohen (U. Delaware College of Earth, Ocean, & Environment)

- Studied the vision and behavior of branchiopod crustaceans in natural light environments of turbid ephemeral pools. The genera of interest are found in the same ephemeral pools, but are separated in the water column by depth: *Triops longicaudatus* (Branchiopoda: Notostraca), and *Streptocephalus mackini* (Branchiopoda: Anostraca). Tested how their

visual systems are adapted to match their behavioral ecology. Using behavioral responses, electroretinography, histology, and multimodel inference, identified that branchiopods use four spectral channels in dim, yet spectrally variable habitats. Further addressed how their behavior has driven the maintenance of multiple opsin-based spectral photoreceptor classes through their evolution, but is constrained by their reduced neural circuitry, so that it is unlikely they are using these multiple photoreceptor classes for color vision. This work contributed to two companion papers in the Journal of Experimental Biology.

Photo behavior of a supratidal amphipod (*Talorchestia longicornis*) Spring - Fall 2008
Duke University Marine Lab- Advisor: Dr. Richard Forward

- Studied the phototactic behavior of a supratidal amphipod, *Talorchestia longicornis* (beach hopper). This amphipod has two spectral photoreceptor classes, found to serve separate functions of sun-compass navigation, and phototaxis. The behavioral responses contributed towards a publication in the Journal of Experimental Biology (2010), supporting electroretinography and micro-spectrophotometry.
- Studied the sun compass behavior of the same amphipod with a Rachel Carson Scholar grant. This work contributed to publication in the Journal of Experimental and Marine Biology and Ecology (2009).

Female mate choice in the Tungara frog (*Physalaemus pustulosus*) Summer 2007
Panama- Advisor: Dr. Michael Ryan (University of Texas at Austin)

- Worked as a field technician testing female mate choice and communication in the Tungara frog, *Physalaemus pustulosus*. Carried out nighttime field collection of mated pairs and testing in a sound chamber.

Color differentiation by a brittlestar Summer 2006 - Fall 2007
Duke University main campus- Advisor: Dr. Sönke Johnsen

- Worked full time as a Howard Hughes Research Fellow from July to Aug 2006, studying possible wavelength-specific behavior of the brittle star *Ophioderma brevispinum*.

Professional Presentations/Posters (undergraduate or post baccalaureate authors indicated by asterisk*)

- **Lessios N.**, Strausfeld, NJ. The when and where of stomatopod visual decision-making: advances towards understanding the neuroanatomy and electrophysiology of pancrustacean brains. Thirteenth International Congress of Neuroethology Brisbane, Australia, July, 2018
- **Lessios N.**, Cohen, JH., Rutowski, RL., Sayre, ME*, Strausfeld, NJ. Multiple spectral channels in branchiopods: Vision in dim light and neural correlates. Crustacean Society Summer Meeting. Washington DC, May 2018.
- **Lessios N.**, Modeling spectral sensitivities of visual systems: identification of photoreceptor arrays using electroretinograms and multi-model inference. Society for Integrative and Comparative Biology Annual Meeting, New Orleans, LA, January 2017
- Murphy, P.J.*, **Lessios N.**, and Rutowski, R.L. Regional Genetic Variation of Two Ephemeral Pool Crustacean Species: Implications for Visual System Plasticity or Local Adaptation.

Society for Integrative and Comparative Biology Annual Meeting, Portland, OR, January 2016.

- Rutowski, R.L., **Lessios, N.**, Seymoure, B.M., and Pegram, K. The behavioral ecology of iridescent signals. Animal Behavior Conference. Anchorage, AK, June 2015.
- **Lessios N.**, Cohen J. H. and Rutowski R.L. How do natural light environments maintain multiple pigment Pancrustacean visual systems? An answer from branchiopod crustacean vision and behavior in desert ephemeral pools. Society for Integrative and Comparative Biology Annual Meeting, West Palm Beach, FL January 2015.
- Bergman M., **Lessios N.**, Seymoure B.M., and Rutowski R.L. Visual mate detection in a territorial butterfly – the effect of background and luminance contrast. International Conference for Biology of Butterflies. Turku, Finland, August 2014.
- **Lessios N.**, Cohen J.H., and Rutowski R.L. How do natural light environments maintain multiple-pigment visual systems? An answer from branchiopod crustacean vision and behavior in desert ephemeral pools. Eleventh International Congress of Neuroethology Sapporo, Japan, July, 2014.
- **Lessios N.** Cohen J. H. and Rutowski R.L. Visual ecology of a branchiopod crustacean (*Triops*): phototaxis and light-orientation behavior. Society for Integrative and Comparative Biology Annual Meeting, San Francisco, CA, January 2013.
- Rutowski R.L, Raymundo A*, Seymoure B.M., and **Lessios N.** 2013. Courtship behavior of male butterfly enhances transmission of iridescent signal. Animal Behavior Conference. Boulder, CO, July, 2014.
- Thome A*, Rutowski R. L., **Lessios N** Distribution of Large Branchiopods in Arizona. School of Life Sciences Undergraduate Research Symposium, Tempe, Arizona, May 2013.
- **Lessios N.** and Rutowski R.L. Vision of an ancient crustacean: vertical orientation and wavelength-specific behavior of *Triops*. The Crustacean Society Summer Meeting Athens, Greece, June 2012.
- **Lessios N.** and Rutowski R.L. Visual behavior of an ancient crustacean: *Triops*. Animal Behavior Society, Albuquerque, NM, June 2012.
- **Lessios N.** and Thome A*. Distribution of Large Branchiopods in Arizona. North America Center for Transborder Studies. NACTS Fellowship Meeting, Tempe, Arizona, April 2012.
- Seymoure, B., Borchert, J. **Lessios N.**, Ligon, R. Ganesh, T. and Webber, A. Graduate Partners in Science Education: A graduate student-led program focused on hands-on science education for middle school students. Society for Integrative and Comparative Biology Annual Meeting, San Francisco, CA January 2013.
- **Lessios N.** and Rutowski R.L. Orienting Behavior and Possible Visual Statocyst in a Crustacean from the Sonoran Desert: *Triops* (Branchiopoda: Notostraca). Society for Integrative and Comparative Biology Annual Meeting, Charleston, SC, January 2012. **Runner-up Best Student Presentation** Division of Invertebrate Zoology.
- **Lessios N.** and Rutowski R.L. Wavelength-specific behavior and compound eye spatial resolution of *Triops longicaudatus* (Notostraca) from the Sonoran Desert: adaptive significance and constraints. The Crustacean Society Summer Meeting Honolulu, Hawaii, June 2011. **Best Student Poster Award.**

Fellowships/Scholarships:

- PERT postdoctoral Fellowship \$154,000
- National Science Foundation Graduate Research Fellowship (ASU 2010-2015) \$90,000
- Neural Systems and Behavior Course Endowed Fellowship \$3,155
- William Townsend Porter Scholarship \$1,000
- William Randolph Hearst Foundation \$600
- American Society for Cell Biology \$1,000
- North America Center for Trans-border Studies Student Sustainability Fellowship (ASU 2011-2012) \$1,000
- Graduate Partners in Science Education Student Citizen Awards (ASU 2011-2014) \$2,000
- Summer Tuition scholarship (Duke summer 2008) \$2,352
- Tungara Frog Research internship (Duke summer 2007) \$3,000

Honors:

- Runner-up Best Student Poster Presentation Division of Invertebrate Zoology SICB, Charleston SC, Jan. 2012
- Best Student Presentation/Poster: Crustacean Society Conference, Honolulu Hawaii, June 2011
- James B. Rast Department Award for Comparative Organismal Biology (Duke 2005-2009)

Grant proposals submitted

- Air Force Research Laboratories Phase II Small Business Technology Transfer (STTR) Grant Academic Advisor for Boulder Nonlinear Systems “Amplitude and Polarization High-speed Image Display (APHID) for characterizing invertebrate vision”. Declined. \$225,000
- NSF IOS Preliminary Proposal Neural Systems: “Central control of eye movements by stomatopods”. Declined.

Grants:

- Key Personnel for Air Force Research Laboratories Phase I Small Business Technology Transfer (STTR) Grant. Academic Advisor for Boulder Nonlinear Systems, CO (2017) \$45,000
- SoLS Research and Training Initiative Grant used in SoLS DNA laboratory (2 awards total ASU 2013, 2014) \$3000
- ASU 2014 College Liberal Arts and Sciences Graduate Excellence Award \$250
- Graduate Arthropod Professional Student Organization Arthropod Vision: From Behavior to Brains Workshop (ASU March 2015) \$1483
- International Society for Neuroethology Travel Award to attend International Congress of Neuroethology 2014 in Sapporo, Japan (ASU 2014) \$750
- Graduate Professional Student Association Travel Grant used to attend \$950

International Congress of Neuroethology 2014 in Sapporo, Japan (ASU 2014)	
• SoLS Graduate Initiatives for Training Grant used to attend Woods Hole MBL Neural Systems and Behavior course (ASU 2013)	\$2500
• Graduate Professional Student Association Travel Grant used to travel to Woods Hole MBL Neural Systems and Behavior course (ASU 2013)	\$500
• Denton Belk Large Branchiopod Memorial Fellowship Grant (Crustacean Society 2012)	\$1500
• Sigma Xi Grant-in-Aid of Vision Research (Sigma Xi 2012)	\$1750
• Graduate Arthropod Professional Student Organization Large Branchiopod Identification Workshop (ASU 2011)	\$1405
• Jumpstart Research Grant (ASU 2011-2015, 2015 3 awards total)	\$1452
• Graduate Research Support Program Grant (ASU 2011-2012)	\$750
• Graduate Professional Student Association Travel Grant for Panama Tropical Research Course (ASU 2010)	\$600
• Graduate Professional Student Association Travel Grants for Crustacean Society summer meetings Hawaii, USA; Athens, Greece (ASU 2011, 2012)	\$618
• Graduate Professional Student Association Travel Grant for Animal Behavior Society (ABS) meeting Albuquerque NM (ASU 2012)	\$125,
• SoLS Travel Grant (ASU 2011-2015 4 awards total)	\$1600
• Graduate College Travel Grant (ASU 2011, 2015, 2 awards total)	\$700
• Rachel Carson Scholar grant (Duke 2008)	\$750
• Duke Engage Grant (Duke summer 2008)	\$21,900
• Howard Hughes summer research program (Duke summer 2006)	\$3,300

Service Experience

Review Service

- Hydrobiologia, The Biological Bulletin

Arthropod Professional Student Association

Spring 2011- Spring 2016

- Created this student organization as a venue for graduate students who were interested in hearing of others' research involving arthropods through a series of workshops and invited speakers (15 members)
- Invited workshop speaker (Fall 2011): Large Branchiopod Taxonomy and Identification: D. Christopher Rogers Kansas Biological Survey.

School of Life Sciences Undergraduate Research (SoLUR) application committee

Spring 2014

- Served for applicant review and then in panel decisions for awarding paid undergraduate Fellows (best of three grades, Fellows, Researchers or Apprentices), based on research experience and academic performance.

North America Center for Trans-border Studies Student Sustainability Fellowship

Fall 2011- Spring 2012

- Participated in graduate student program promoting North American research collaboration

(my collaborator: Centro de Investigaciones Biológicas del Noroeste (CIBNOR). Large branchiopod researchers in La Paz, Mexico).

GPSE (Graduate Partners in Science Education) Spring 2011- Spring 2015

- Mentored junior high students in traditionally underprivileged schools, meeting weekly to develop science fair projects in the spring, which we carried out together. Students then presented their projects at a regional Science Fair.
- Developed and implemented weekly lesson plans for middle school children at underprivileged schools under the theme of “Energy Meets Biology” from 2011-2012.

Ask-a-Biologist Service (SoLS service answering student questions) Fall 2010 - Spring 2016

- Answered questions for K-12 students and teachers through the. Ask-a- Biologist website (<http://askbiologist.asu.edu/>). Questions ranged from identification to sensory ecology
- Translated popular science texts from English to Spanish for the Ask-a- Biologist website.

GPISA (Graduate Professional Student Association) Fall 2010 - Spring 2016

- Graduate Research Support Program, and Teaching Excellence Award grant reviewer.

Reforestation/Education Project Summer 2008

Boquerón, Panama (Funded through Duke Engage)

- Obtained funding and organized the community of Boquerón to reforest using native and lucrative species in farmland overgrown by the invasive wild cane, *Saccharum spontaneum*. (Boquerón is a town located in the Panama Canal watershed within Chágres national park).
- Bought 2,000 trees from a womans’ cooperative nursery in a neighboring town and arranged community involvement in both the transportation of the small trees, and the building of a temporary nursery. Both lucrative and native species were chosen by the village community to ensure their care after planting.
- Researched the monoculture cane literature extensively, contacting scientists from the Smithsonian Tropical Research Institute and officials of USAID in Panama for advice on methods for planting, and for housing in the community with a host family.
- Followed up the planting to check on the trees with the farmers and fertilized them.
- Took GPS coordinates of each planting, creating a map and a summary, so that farmers would know the areas we had planted, and so that possible future projects could return and/or expand the areas planted.

Service Research in Indigenous (Waorani) Communities Summer 2009

Amazonian Ecuador

- Facilitated and translated (to Spanish) for a group of 8 Duke Students traveling through 15 communities in Amazonian Ecuador by canoe, trail and airplane. The overarching goal of the project was to interview the Waorani on how they perceived resource scarcity; also to install eight sets of solar panels and built water-catchment systems for the communities.
- Interviewed Waorani hunters from different age groups about what animals they preferred to hunt and which they were encountering, with the aim of creating a map to better understand the current distribution of these game species, so that they can manage them in the future.

Skills/abilities

Native speaker proficiency in English and Spanish, Wilderness First Aid, SCUBA certified (NAUI)