

**Curriculum Vitae**  
**Timothy Edward Higham**

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**ACADEMIC POSITIONS:**

2021 to present: Full Professor, University of California, Riverside  
2015-2021: Associate Professor, University of California, Riverside  
2017 to 2018: Alexander von Humboldt Fellow, University of Freiburg and the Museum Koenig, Germany  
2011 to 2015: Assistant Professor, University of California, Riverside  
2008 to 2011: Assistant Professor, Clemson University

**POST-DOCTORAL:**

2006 to 2008: Harvard University. Advisor: Andrew Biewener

**EDUCATION:**

2006: Ph.D. University of California, Davis. Advisor: Peter C. Wainwright  
2003: M.S. University of Cincinnati. Advisor: Bruce C. Jayne  
2000: B.S. University of Calgary. Zoology

**PUBLICATIONS:**

- 110) Cobos, A. and **T.E. Higham**. In review. The scaling of gecko adhesion across surfaces of various roughness: The intersection of biomimetics and ecology. *Journal of Nanotechnology*.
- 109) **Higham, T.E.**, Ryan, D., Antos, C., and M. Bradley. In review. Sidewinding, swimming, and slithering: Garter snakes modulate performance and kinematics in response to substrate and medium. *Integrative and Organismal Biology*.
- 108) Sternes, P.C. and **T.E. Higham**. In Revision. Hammer it out: ontogenetic shifts in ecology are associated with allometric changes in fin and body form in the scalloped hammerhead (*Sphyrna lewini*). *Biological Journal of the Linnean Society*.
- 107) Freymiller, G.A., M.D. Whitford, C.P. McGowan, **T.E. Higham**, and R.W. Clark. In Revision. Springing into action: comparing jump kinematics between bipedal and quadrupedal rodents. *Journal of Experimental Biology*.
- 106) Naylor, E.R. and **T.E. Higham**. 2022. High-speed terrestrial substrate transitions: How a fleeing cursorial day gecko copes with compliance changes that are experienced in nature. *Functional Ecology*. 36, 471-484.
- 105) Whitford, M.D., G.A. Freymiller, **T.E. Higham**, and R.W. Clark. 2022. Shaking things up: the unique feeding behaviour of western banded geckos when consuming scorpions. *Biological Journal of the Linnean Society*. 135, 533-540.

- 104) Freymiller, G.A., M.D. Whitford, M.J. Schwaner, C.P. McGowan, **T.E. Higham**, and R.W. Clark. 2022. Comparative analysis of *Dipodomys* species indicates that kangaroo rat hindlimb anatomy is adapted for rapid evasive leaping. *Journal of Anatomy*. 240, 466-474.
- 103) **Higham, T.E.**, M. Zhuang, and A.P. Russell. 2021. Ankle structure of the Tokay gecko (*Gekko gecko*) and its role in the deployment of the subdigital adhesive system. *Journal of Anatomy*. 239, 1503-1515.
- 102) **Higham, T.E.**, L. Ferry, J. Messier, D. Irschick, P. Anderson, P. Bergmann, E. Carrington, S. Farina, K. Feilich, P. Hernandez, H. Jamniczky, M. Johnson, S. Kawano, C. Law, S. Longo, C. Martin, P. Martone, L. Monteiro, D. Navon, A. Rico-Guevara, S. Santana, L. Schmitz, S. Starko, and K. Niklas. 2021. Linking ecomechanical models and functional traits to investigate phenotypic diversity. *Trends in Ecology and Evolution*. 36, 860-873.
- 101) Griffing, A.H., T.J. Sanger, L. Arnaoudoff, A.M. Bauer, A. Cobos, **T.E. Higham**, E. Naylor, and T. Gamble. 2021. And thereby hangs a tail: morphology, developmental patterns, and performance of the adhesive tail tips of crested geckos. *Proceedings of the Royal Society B*. 288: 20210650.
- 100) Vollin, M.F. and **T.E. Higham**. 2021. Tail autotomy alters prey capture performance and kinematics, but not success, in banded geckos. *Integrative and Comparative Biology*. 61, 538-549.
- 99) Clark, J, C. Clark, and **T.E. Higham**. 2021. Tail control enhances gliding in arboreal lizards: an integrative study using a 3D geometric model and numerical simulation. *Integrative and Comparative Biology*. 61, 579-588.
- 98) **Higham, T.E.**, M. Hofmann, M. Modert, M. Thielen, and T. Speck. 2021. Jumping with adhesion: landing surface incline alters impact force and body kinematics in crested geckos. *Scientific Reports*. 11, 23043.
- 97) Wright, A.N., R. Screen, E.R. Naylor, C. Piantoni, S. Kennedy-Gold, and **T.E. Higham**. 2021. Clinging performance on natural substrates predicts habitat use in anoles and geckos. *Functional Ecology*. 35, 2472-2482.
- 96) Whitford, M.D, G.A. Freymiller, **T.E. Higham**, and R.W. Clark. 2020. The effects of temperature on the kinematics of rattlesnake predatory strikes in both captive and field environments. *Integrative Organismal Biology*. 2, obaa025.
- 95) Whitford, M.D., G.A. Freymiller, **T.E. Higham**, and R.W. Clark. In Review. The effects of temperature on the defensive strikes of rattlesnakes. *Journal of Experimental Biology*. 223, 223859.
- 94) Kane, E.A. and **T.E. Higham**. 2020. Dynamic functional integration during prey capture in bluegill sunfish (*Lepomis macrochirus*): The roles of variation and constraint in shaping an emergent phenotype. *Biological Journal of the Linnean Society*. 130, 205-224.
- 93) **Higham, T.E.** and L. Schmitz. 2019. A hierarchical view of gecko locomotion: photic environment, physiological optics, and locomotor performance. 59, 443-455.
- 92) Zhuang, M.V. A.P. Russell, and **T.E. Higham**. 2019. Evolution of digit orientation and morphology in relation to the acquisition of the adhesive system in geckos. *Journal of Morphology*. 280, 1582-1599.
- 91) Russell, A.P., A.Y. Stark, and **T.E. Higham**. 2019. The Integrative Biology of Gecko Adhesion: historical review, current understanding and grand challenges. *Integrative and Comparative Biology*. 59, 101-116.
- 90) Naylor, E.R. and **T.E. Higham**. 2019. Attachment beyond the adhesive system: the contribution of claws in gecko clinging and locomotion. *Integrative and Comparative Biology*. 59, 168-181.

- 89) **Higham, T.E.**, A.P. Russell, P. Niewiarowski, A. Wright, and T. Speck. 2019. The ecomechanics of gecko adhesion: natural surface topography, evolution, and biomimetics. *Integrative and Comparative Biology*. 59, 131-147.
- 88) Freymiller, G.A., M.D. Whitford, **T.E. Higham**, and R.W. Clark. 2019. Escape kinematics of free-ranging desert kangaroo rats evading rattlesnake strikes. *Biological Journal of the Linnean Society*. 127, 164-172.
- 87) Whitford, M.D, G.A Freymiller, **T.E. Higham**, and R.W. Clark. 2019. Determinants of predation success: how to survive an attack from a rattlesnake. *Functional Ecology*. 33, 1099-1109.
- 86) Pinto, B.J., G.R. Colli, **T.E. Higham**, A.P. Russell, D.P. Scantlebury, L.J. Vitt, and T. Gamble. 2019. Population Genetic Structure and Species Delimitation of a Widespread, Neotropical Dwarf Gecko, *Gonatodes humeralis* (Sphaerodactylidae: Gekkota). *Molecular Phylogenetics and Evolution*. 133, 54-66.
- 85) Kumar, C., A. Palacios\*, V.A. Surapaneni, G. Bold, M. Thielen, **T.E. Higham**, T. Speck, and V. Le Houerou. 2019. Replicating the complexity of natural surfaces: technique validation and applications for biomimetics, ecology, and evolution. *Philosophical Transactions of the Royal Society A*. 377, 20180265.
- 84) **Higham, T.E.** 2019. Lizard locomotion: behavior, performance, and function. In: Lizard Behavior: Evolutionary and Mechanistic Perspectives. V. Bels and A.P. Russell (eds.). CRC Press. pp. 47-86.
- 83) Thompson, K. \*, S. Van Wassenbergh, S.M. Rogers, S.G. Seamone, and **T.E. Higham**. 2018. Suction feeding performance and hydrodynamics are negatively impacted by angling-induced injuries in marine shiner perch, *Cymatogaster aggregata*. *Journal of Experimental Biology*. 221, 180935.
- 82) Foster, K.L., T. Garland, Jr., L. Schmitz, and **T.E. Higham**. 2018. Skink ecomorphology: forelimb and hind limb lengths, but not static stability, correlate with habitat use and demonstrate multiple solutions. *Biological Journal of the Linnean Society*. 125, 673-692.
- 81) Jagnandan, K. and **T.E. Higham**. 2018. Neuromuscular control of locomotion is altered by tail autotomy in geckos. *Journal of Experimental Biology*. 221, 179564.
- 80) **Higham, T.E.** S.G. Seamone, A. Arnold, D. Toews, Z. Janmohamed, S.J. Smith, and S.M. Rogers. 2018. The ontogenetic scaling of form and function in the spotted rattfish, *Hydrolagus colliei* (Chondrichthyes: Chimaeriformes): fins, muscles, and locomotion. *Journal of Morphology*. 279, 1408-1418.
- 79) Schmitz, L. and **T.E. Higham**. 2018. Non-uniform evolutionary response of gecko eye size to changes in diel activity patterns. *Biology Letters*. 14, 20180064.
- 78) Jagnandan, K. and **T.E. Higham**. 2018. How rapid changes in body mass affect the locomotion of terrestrial vertebrates: ecology, evolution and biomechanics of a natural perturbation. *Biological Journal of the Linnean Society*. 124, 279-293.
- 77) Gamble, T., E. McKenna, W. Meyer, S.V. Nielsen, B.J. Pinto, D.P. Scantlebury, and **T.E. Higham**. 2018. XX/XY Sex Chromosomes in the South American Dwarf Gecko (*Gonatodes humeralis*). *Journal of Heredity*. 109, 462-468.
- 76) Harrington, S., B. Hollingsworth, **T.E. Higham**, and T. Reeder. 2018. Pleistocene climatic fluctuations drive historical isolation and secondary contact in the Red Diamond Rattlesnake (*Crotalus ruber*) in Baja California. In Press. *Journal of Biogeography*. 45, 64-75.
- 75) Collins, C.E. and **T.E. Higham**. 2017. Individuals of the common Namib day gecko vary in how adaptive simplification alters sprint biomechanics. *Scientific Reports*. 7, 15595.

- 74) Jagnandan, K. and **T.E. Higham**. 2017. Lateral movements of a massive tail influence gecko locomotion: an integrative study comparing tail restriction and autotomy. *Scientific Reports*. 7, 10865.
- 73) Freymiller, G.A., M.D. Whitford, T.E. Higham, and R.W. Clark. 2017. Recent interactions with snakes enhance escape performance of desert kangaroo rats exposed to a simulated attack. In Press. *Biological Journal of the Linnean Society*. 122, 651-660.
- 72) **Higham, T.E.**, H.A. Jamniczky, K. Jagnandan, S.J. Smith, T.N. Barry, and S.M. Rogers. 2017. Comparative dynamics of suction feeding in marine and freshwater three-spined stickleback, *Gasterosteus aculeatus*: kinematics and geometric morphometrics. *Biological Journal of the Linnean Society*. 122, 400-410.
- 71) **Higham, T.E.**, A.P. Russell, and K.J. Niklas. 2017. Leaping lizards landing on leaves: escape-induced jumps in the rainforest canopy challenge the adhesive limits of geckos. *Journal of the Royal Society Interface*. 14, 20170156
- 70) **Higham, T.E.**, T. Gamble, and A.P. Russell. 2017. On the origin of frictional adhesion in geckos: small morphological changes lead to a major biomechanical transition in the genus *Gonatodes*. *Biological Journal of the Linnean Society*. 120, 503-517.
- 69) Foster, K.L. and **T.E. Higham**. 2017. Integrating gastrocnemius force-length properties, in vivo activation, and operating lengths reveals how *Anolis* deal with ecological challenges. *Journal of Experimental Biology*. 220, 796-806
- 68) **Higham, T.E.**, R.W. Clark, C.E. Collins, M.D. Whitford, and G.A. Freymiller. 2017. Rattlesnakes are extremely fast and variable when striking at kangaroo rats in nature: Three-dimensional high-speed kinematics at night. *Scientific Reports*. 7, 40412.
- 67) Birn-Jeffery, A. and **T.E. Higham**. 2016. Light level impacts locomotor biomechanics in a secondarily diurnal gecko, *Rhoptropus afer*. *Journal of Experimental Biology*. 219, 3649-3655.
- 66) **Higham, T.E.**, S.M. Rogers, R.B. Langerhans, H.A. Jamniczky, G.V. Lauder, W.J. Stewart, C.H. Martin, and D.N. Reznick. 2016. Speciation through the lens of biomechanics: locomotion, prey capture, and reproductive isolation. *Proceedings of the Royal Society B*. 283, 20161294.
- 65) Gillis, G. and **T.E. Higham**. 2016. Consequences of lost endings: caudal autotomy as a lens for focusing attention on tail function during locomotion. *Journal of Experimental Biology*. 219, 2416-2422.
- 64) Zhuang, M.V. and **T.E. Higham**. 2016. Arboreal day geckos (*Phelsuma madagascariensis*) modulate their fore- and hind limb kinematics differentially in response to changes in habitat structure. *PLoS ONE*. doi: 10.1371/journal.pone.0153520
- 63) Birn-Jeffery, A. and **T.E. Higham**. 2016. Geckos decouple fore- and hind limb kinematics in response to changes in incline. *Frontiers in Zoology*. 13:11, DOI 10.1186/s12983-016-0144-2.
- 62) Irschick, D.I. and **T.E. Higham**. 2016. Animal Athletes: An Ecological and Evolutionary Approach. Oxford University Press.
- 61) Olberding, J.P., A. Herrel, **T.E. Higham**, and T. Garland, Jr. 2016. Limb segment contributions to the evolution of hind limb length in phrynosomatid lizards. *Biological Journal of the Linnean Society*. 117, 775-795.
- 60) **Higham, T.E.**, W.J. Stewart, and P.C. Wainwright. 2015. Turbulence, temperature, and turbidity: The ecomechanics of predator-prey interactions in fishes. *Integrative and Comparative Biology*. 55, 6-20.

- 59) Day, S.W., **T.E. Higham**, R. Holzman, and S. Van Wassenbergh. 2015. Morphology, kinematics, and dynamics: The mechanics of suction feeding in fishes. *Integrative and Comparative Biology*. 55, 21-35.
- 58) Kane, E.A. and **T.E. Higham**. 2015. Complex systems are more than the sum of their parts: Using integration to understand performance, biomechanics, and diversity. *Integrative and Comparative Biology*. 55, 146-165.
- 57) Russell, A.P., J. Baskerville, T. Gamble, and **T.E. Higham**. 2015. The evolution of digit form in Gonatodes (Gekkota: Sphaerodactylidae) and its implications for the transition from frictional to adhesive contact in gekkotans. *Journal of Morphology*. In press.
- 56) **Higham, T.E.** 2015. Bolting, bouldering, and burrowing: functional morphology and biomechanics of pedal specializations in desert-dwelling lizards. In: All Animals are Interesting: A Festschrift in Honour of Anthony P. Russell. O.R.P. Bininda-Emonds, G.L. Powell, H.A. Jamniczky, A.M. Bauer & J. Theodor (eds.) BIS-Verlag der Carl von Ossietzky Universität Oldenburg. pp. 279-302.
- 55) Van Wassenbergh, S., Day, S.W., Hernandez, P., **Higham, T.E.**, and T. Skorczewski. 2015. Suction power output and the inertial cost of rotating the neurocranium to generate suction in fish. *Journal of Theoretical Biology*. 372, 159-167.
- 54) **Higham, T.E.**, G.J. Measey, A.V. Birn-Jeffery, A. Herrel, and K.A. Tolley. 2015. Functional divergence between morphs of a dwarf chameleon: Differential locomotor kinematics in relation to habitat structure. *Biological Journal of the Linnean Society*. 116, 27-40.
- 53) **Higham, T.E.**, A. Birn-Jeffery, C.E. Collins, C.D. Hulsey, and A.P. Russell. 2015. Adaptive simplification and the evolution of gecko locomotion: Morphological and biomechanical consequences of losing adhesion. *Proceedings of the National Academy of Sciences*. 112, 809-814.
- 52) Collins, C.E., A.P. Russell, and **T.E. Higham**. 2015. Subdigital adhesive pad morphology varies in relation to structural habitat use in the Namib Day Gecko, *Rhoptropus afer*. *Functional Ecology*. 29, 66-77.
- 51) Foster, K.L., C.E. Collins, **T.E. Higham** and T. Garland, Jr. In Press. Determinants of lizard escape performance: decision, motivation, ability, and opportunity. In *Escaping from predators: An integrative view of escape decisions and refuge use*, eds. W.E. Cooper, Jr. and D.T. Blumstein. pp. 287-321.
- 50) Stewart, W.J. and **T.E. Higham**. 2014. Passively stuck: death does not affect gecko adhesion strength. *Biology Letters*. 10, 20140701.
- 49) Jagnandan, K., A.P. Russell, and **T.E. Higham**. 2014. Tail autotomy and subsequent regeneration alter the mechanics of locomotion in lizards. *Journal of Experimental Biology*. 271, 3891-3897.
- 48) Birn-Jeffery, A. and **T.E. Higham**. 2014. Geckos significantly alter foot orientation to facilitate adhesion during downhill locomotion. *Biology Letters* 10, 20140456.
- 47) Blob, R.W. and **T.E. Higham**. 2014. Terrestrial locomotion - Where do we stand, where are we going? *Integrative and Comparative Biology*. 54, 1051-1057.
- 46) Seamone, S., T.A. Blaine and **T.E. Higham**. 2014. Sharks modulate their escape behavior in response to predator size, speed, and approach orientation. *Zoology*. 117, 377-382.
- 45) Birn-Jeffery, A. and **T.E. Higham**. 2014. The scaling of uphill and downhill locomotion in legged animals. *Integrative and Comparative Biology*. 54, 1159-1172.
- 44) Kane, E.A. and **T.E. Higham**. 2014. Modeled 3D suction accuracy predicts prey capture success in three centrarchids. *Journal of the Royal Society Interface*. 11, 20140223. doi: 10.1098/rsif.2014.0216

- 43) Russell, A.P., E.K. Lai, G.L. Powell and **T.E. Higham**. 2014. Density and distribution of cutaneous sensilla on tails of Leopard Geckos (*Eublepharis macularius*) in relation to caudal autotomy. *Journal of Morphology*. 275, 961-979. doi: 10.1002/jmor.20269
- 42) Foster, K.L. and **T.E. Higham**. 2014. Context-dependent changes in motor control and kinematics during locomotion: modulation and decoupling. *Proceedings of the Royal Society B*. 281, 20133331. doi: 10.1098/rspb.2013.3331
- 41) **Higham, T.E.**, A.P. Russell, and P.A. Zani. 2013. Integrative biology of tail autotomy in lizards. *Physiological and Biochemical Zoology*. 86, 603-610.
- 40) **Higham, T.E.**, K.R. Lipsett, D.A. Syme, and A.P. Russell. 2013. Controlled chaos: muscle contractile dynamics, fiber types, and three-dimensional kinematics of autotomized lizard tails. *Physiological and Biochemical Zoology*. 86, 611-630.
- 39) Anderson, C.V. and **T.E. Higham**. 2013. Anatomy. In: *The Biology of Chameleons*. Tolley, K.A. and Herrel, A. (eds). University of California Press. pp. 7-56
- 38) **Higham, T.E.** and C.V. Anderson. 2013. Function and Adaptation. In: *The Biology of Chameleons*. Tolley, K.A. and Herrel, A. (eds). University of California Press. pp. 63-84.
- 37) **Higham, T.E.** and D.J. Irschick. 2013. Springs, steroids, and slingshots: the roles of enhancers and constraints in animal movement. *Journal of Comparative Physiology B*. 183, 583-595.
- 36) Kane, E.A. and **T.E. Higham**. 2012. Life in the flow lane: differences in pectoral fin morphology suggest transitions in station-holding demand across species of marine sculpin. *Zoology*. 115, 223-232.
- 35) Foster, K.L. and **T.E. Higham**. 2012. How forelimb and hindlimb function changes with incline and perch diameter in the green anole (*Anolis carolinensis*). *Journal of Experimental Biology*. 215, 2288-2300.
- 34) **Higham, T.E.** and A.P. Russell. 2012. Time-varying motor control of autotomized leopard gecko tails: multiple inputs and behavioral modulation. *Journal of Experimental Biology*. 215, 435-441.
- 33) Olberding, J.P. L.D. McBrayer, and **T.E. Higham**. 2012. Performance and three-dimensional kinematics of bipedal lizards during obstacle negotiation. *Journal of Experimental Biology*. 215, 247-255.
- 32) O'Connor, J.L., L.D. McBrayer, **T.E. Higham**, J.F. Husak, I.T. Moore, and D.C. Rostal. 2011. Effects of training and testosterone on locomotor performance in male six-lined racerunners (*Aspidoscelis sexlineata*). *Physiological and Biochemical Zoology*. 84, 394-405.
- 30) **Higham, T.E.**, P.G. Korchari, and L.D. McBrayer. 2011. How muscles define maximum locomotor performance in lizards: An analysis using swing and stance phase muscles. *Journal of Experimental Biology*. 214, 1685-1691.
- 29) Kane, E.A. and **T.E. Higham**. 2011. The integration of locomotion and feeding in cottid fishes: Functional disparity despite morphological similarity. *Journal of Experimental Biology*. 214, 1092-1099.
- 28) Clark, A.J. and **T.E. Higham**. 2011. Slipping, sliding, and stability: locomotor strategies for overcoming low-friction surfaces. *Journal of Experimental Biology*. 214, 1369-1378.
- 27) **Higham, T.E.** and A.A. Biewener. 2011. Functional and architectural complexity within and between muscles: regional variation and intermuscular force transmission. *Philosophical Transactions of the Royal Society B*. 366, 1477-1487.

- 26) **Higham, T.E.**, A.A. Biewener, and S. Delp. 2011. Mechanics, modulation and modeling: how muscles actuate and control movement. *Philosophical Transactions of the Royal Society B*. 366, 1463-1465.
- 26) Fuller, P.O, **T.E. Higham**, and A.J. Clark. 2011. Posture, speed, and habitat structure: Three-dimensional hindlimb kinematics of two species of padless geckos. *Zoology*. 114, 104-112.
- 25) **Higham, T.E.**, P.G. Korchari, and L.D. McBrayer. 2011. How to climb a tree: Lizards accelerate faster, but pause more, when escaping on vertical surfaces. *Biological Journal of the Linnean Society*. 102, 83-90.
- 24) **Higham, T.E.** 2011. The biomechanics of feeding in fishes. In: *Encyclopedia of Fish Physiology: From Genome to Environment*. Farrell, A.P. (ed.), volume 1, pp. 597-602. Sand Diego: Academic Press.
- 23) **Higham, T.E.** 2010. Book review of "Feeding and Digestive Functions of Fishes". *Quarterly Review of Biology*. 85, 374.
- 22) **Higham, T.E.** and A.P. Russell. 2010. Divergence in locomotor performance, ecology, and morphology between two sympatric sister species of desert-dwelling gecko. *Biological Journal of the Linnean Society*. 101, 860-869.
- 21) Foster, K.L. and **T.E. Higham**. 2010. How to build a pectoral fin: Functional morphology and steady swimming kinematics of the spotted ruffin, *Hydrolagus colliei*. *Canadian Journal of Zoology*. 88 (8), 774-780.
- 20) **Higham, T.E.** and A.P. Russell. 2010. Flip, flop and fly: modulated motor control and highly variable movement patterns of autotomized gecko tails. *Biology Letters*. 6, 70-73. doi:10.1098/rsbl.2009.0577
- 19) Russell, A.P. and **T.E. Higham**. 2009. A new angle on clinging in geckos: Incline, not surface structure, triggers the deployment of adhesive system. *Proceedings of the Royal Society B*. 276, 3705-3709.
- 18) **Higham, T.E.** and A.A. Biewener. 2009. Fatigue alters *in vivo* function within and between limb muscles during locomotion. *Proceedings of the Royal Society B*. 276, 1193-1197.
- 17) Wainwright, P.C., R.S. Mehta and **T.E. Higham**. 2008. Stereotypy, flexibility and coordination: key concepts in behavioral functional morphology. *Journal of Experimental Biology*. 211, 3523-3528.
- 16) **Higham, T.E.** and F.E. Nelson. 2008. The integration of lateral gastrocnemius muscle function and kinematics in running turkeys. *Zoology*. 111, 483-493.
- 15) **Higham, T.E.** and A.A. Biewener. 2008. Integration within and between muscles during terrestrial locomotion: effects of incline and speed. *Journal of Experimental Biology*. 211, 2303-2316.
- 14) **Higham, T.E.**, A.A. Biewener and J.M. Wakeling. 2008. Functional diversification within and between muscle synergists during locomotion. *Biology Letters*. 4, 41-44.
- 13) Day, S. W., **T. E. Higham** and P. C. Wainwright. 2007. Time resolved measurements of the flow generated by suction feeding fish. *Experiments in Fluids*. 43, 713-724.
- 12) Wainwright, P.C., A.M. Carroll, D.C. Collar, S.W. Day, **T.E. Higham** and R.A. Holzman. 2007. Suction feeding mechanics, performance and diversity in fishes. *Integrative and Comparative Biology*. 47, 96-106.
- 11) **Higham, T.E.** 2007. The integration of locomotion and prey capture in vertebrates: evolution of morphology, behavior and performance. *Integrative and Comparative Biology*. 47, 82-95

- 10) **Higham, T.E.**, C.D. Hulsey, O. Rican and A.M. Carroll. 2007. Feeding with speed: prey capture evolution in cichlids. *Journal of Evolutionary Biology*. 20, 70-78.
- 9) **Higham, T.E.** 2007. Feeding, fins and braking maneuvers: locomotion during prey capture in centrarchid fishes. *Journal of Experimental Biology*. 210, 107-117.
- 8) **Higham, T.E.**, S.W. Day, and P.C. Wainwright. 2006. The pressures of suction feeding: the relation between buccal pressure and induced fluid speed in centrarchid fishes. *Journal of Experimental Biology*. 209, 3281-3287.
- 7) **Higham, T.E.**, S.W. Day, and P.C. Wainwright. 2006. Multidimensional analysis of suction feeding performance in fishes: fluid speed, acceleration, strike accuracy and the ingested volume of water. *Journal of Experimental Biology*. 209, 2713-2725.
- 6) **Higham, T.E.**, B. Malas, B.C. Jayne and G.V. Lauder. 2005. Constraints on starting and stopping: behavior compensates for reduced pectoral fin area during braking of the bluegill sunfish *Lepomis macrochirus*. *Journal of Experimental Biology*. 208, 4735-4746.
- 5) Day, S.W., **T.E. Higham**, A.Y. Cheer, and P.C. Wainwright. 2005. Spatial and temporal patterns of water flow generated by suction feeding bluegill sunfish *Lepomis macrochirus* resolved by Particle Image Velocimetry. *Journal of Experimental Biology*. 208, 2661-2671. Also see cover.
- 4) **Higham, T.E.**, S.W. Day and P.C. Wainwright. 2005. Sucking while swimming: evaluating the effects of ram speed on suction generation in bluegill sunfish *Lepomis macrochirus* using digital particle image velocimetry. *Journal of Experimental Biology*. 208, 2653-2660. Also see cover.
- 3) **Higham, T.E.**, and B.C. Jayne. 2004. *In vivo* muscle activity in the hindlimb of the arboreal lizard, *Chamaeleo calyptratus*: general patterns and the effects of incline. *Journal of Experimental Biology*. 207, 249-261.
- 2) **Higham, T.E.**, and B.C. Jayne. 2004. Locomotion of lizards on inclines and perches: hindlimb kinematics of an arboreal specialist and a terrestrial generalist. *Journal of Experimental Biology*. 207, 233-248.
- 1) **Higham, T.E.**, M.S. Davenport, and B.C. Jayne. 2001. Maneuvering in an arboreal habitat: the effects of turning angle on the locomotion of three sympatric ecomorphs of *Anolis* lizards. *Journal of Experimental Biology*. 204, 4141-4155.

## FELLOWSHIPS AND AWARDS (approximately 2.4 million USD over past 10 years):

- 2019-2023: NSF Award (\$240,874). Collaborative Research: Strike while the snake is hot: will increasing nighttime temperatures make an endothermic keystone species more susceptible to ectothermic predators? Awarded by the Physiological Mechanisms & Biomechanics program in the Division of Integrative and Organismal Systems (IOS). Award Number: 1856408 (in collaboration with Jeet Sukumaran and Rulon Clark).
- 2018-2022: NSF Award (\$294,022). The genetic architecture of biomechanical integration in fishes. Awarded by the Physiological Mechanisms & Biomechanics program in the Division of Integrative and Organismal Systems (IOS). Award Number: 1838297.
- 2021: Company of Biologists Meeting Grant (\$3,500).
- 2018-2021: NSF Award (\$43,318). Workshop: Reciprocal illumination between ecology and biomechanics: evolution, integration, and constraint, March 2019, Portland, Oregon



2018-2021: NSF Award (\$15,000). Symposium grant for 2019 annual meeting of the Society for Integrative and Comparative Biology, Tampa, Florida.

2017-2018: Alexander von Humboldt Fellowship for Experienced Researchers. University of Freiburg and the Museum Koenig in Bonn, Germany (€40,000).

2017: Nouragues Travel Grant for travel to French Guiana (€7,000).

2012-2018: NSF Award (\$420,000). Locomotion and adhesion in geckos: The link between ecology, form, and function. Awarded by the Physiological and Structural Systems Cluster in the Division of Integrative and Organismal Systems (IOS). Award Number: 1147043.

2015-2018: GAANN Fellowship (\$1,477,758): Ecology, Evolution, Organismal Biology: SustainLife (co-wrote with David Reznick).

2015: Junior Excellence in Teaching Award (JET) – Honoree Select. UC Riverside.

2014: Meeting grant from the Company of Biologists (\$3,130)

2013-2015: UC MEXUS Small Grant (\$1,500).

2013: Meeting grant from the Company of Biologists (\$4,630).

2012: Meeting grant from the Company of Biologists (\$2,300).

2010: University Research Grant Committee (URGC) award (\$7,346).

2008: NSERC postdoctoral fellowship (\$80,000 – declined)

2006: *Journal of Experimental Biology* Traveling Fellowship (\$3,300).

2006: William S. Hoar Award for best student oral presentation at the 2006 annual meeting of the Canadian Society of Zoologists (\$500).

2006: Fellowship for travel to the 2006 annual meeting of the Canadian Society of Zoologists (\$300).

2004: UC Davis Graduate fellowship (\$14,000).

2003: UC Davis Graduate fellowship (\$21,500).

2003: University of Cincinnati Harry L. Wieman Summer Fellowship (\$1,100).

2002: University of Cincinnati Harry L. Wieman Summer Fellowship (\$1,000).

### **INVITED SEMINARS:**

2020: American Museum of Natural History, Comparative Biology series  
2019: University of Calgary, Department of Biological Sciences  
2017: University of Bonn, Germany  
2017: University of Konstanz, Germany  
2016: University of Hawaii at Manoa, Department of Biology  
2016: La Sierra University, Department of Biology.  
2014: University of Calgary. Department of Biological Sciences.  
2013: San Diego State University. Biology Department.

2013: Claremont Colleges. Keck Science Department.  
2013: California State University, San Bernardino. Department of Biology.  
2013: University of Alabama, Department of Biological Sciences.  
2011: University of California, Irvine. School of Biological Sciences.  
2011: California State University, Long Beach. Biological Sciences.  
2011: University of California, Riverside. Department of Cell Biology and Neuroscience.  
2011: Bamfield Marine Sciences Centre. Evening seminar series.  
2011: University of Calgary. Department of Comparative Biology and Experimental Medicine.  
2011: University of Regina. Department of Biology.  
2011: University of California, Riverside. Department of Biology.  
2009: Simon Fraser University. Department of Biomedical Physiology and Kinesiology.  
2009: University of British Columbia. Department of Zoology.  
2008: College of Charleston. Department of Biology.  
2008: Georgia Southern University. Department of Biology.  
2008: Clemson University. Environmental Toxicology.  
2008: Clemson University. Department of Biological Sciences.  
2008: University of Wyoming. Department of Zoology and Physiology.  
2007: University of Missouri-Columbia. Integrative Anatomy.  
2007: University of Guelph. Department of Biomedical Sciences.  
2005: University of California, Davis. Molecular, Cellular and Integrative Physiology.

## **MEDIA ATTENTION:**

2021: UCR Today, BBC News, (Pub #100)  
2020: Phys.org, UCR Today, SDSU Newsletter, Inside JEB (Pub #95)  
2019: Scientific American, Newsweek, Live Science, and many more (Pubs #87 and #88)  
2018: Discover Magazine, CBC Quirks and Quarks, NY Post, and many more (Pub #83)  
2017: The Wire, UCR Today (<https://ucrtoday.ucr.edu/48808>) (Pub #74)  
2017: Cornell Chronicle, Phys.Org, ScienceDaily, UCR Today (<https://ucrtoday.ucr.edu/48070>) (Pub #71)  
2017: UCR Today (<https://ucrtoday.ucr.edu/40236>) (Pub #70)  
2017: The Mirror, Gizmodo, Press-Enterprise, Live Science (Pub #68)  
2015: Los Angeles Times, IFL Science, UCR Today (<http://ucrtoday.ucr.edu/26570>), Science Daily, and many others (Pub #53)  
2014: UCR Today (<http://ucrtoday.ucr.edu/25123>), ScienceDaily, EH Science (Pub #45)  
2014: UCR Today (<http://ucrtoday.ucr.edu/21049>), Science News (Pub #42)  
2012: National Geographic Wild – work on tail autotomy highlighted in “Animal Superpowers”, hosted by Patrick Stewart  
2012: NeuroDojo, NewScientist, i09 (Pub #34)  
2011: New York Times, The Telegraph (Pub #28)  
2009: New York Times, Scientific American, Discovery News, Wired, Smithsonian (Pub #20)  
2009: Washington Post, Science Daily, Discovery News, Globe and Mail, Physics World (Pub #19)  
2008: Inside JEB (2008: The Journal of Experimental Biology **211**)  
2007: Harvard Gazette & HarvardScience (Pub #14)  
2006: Inside JEB (The Journal of Experimental Biology **209(17)**, ii)  
2006: Inside JEB (The Journal of Experimental Biology **209(14)**, iii)  
2005: Inside JEB (The Journal of Experimental Biology **208(14)**, iii)

## **TEACHING EXPERIENCE:**

Instructor, **Herpetology** (BIOL 170), UC Riverside, 2020, 2022

Instructor, **Functional Anatomy of the Vertebrates** (BIOL 161B), UC Riverside, 2012-2022

Instructor, **Organismal Biology** (EEOB 210 – graduate course), UC Riverside, 2020-2022

Instructor, **Comparative Biomechanics** (BIOL 176), UC Riverside, 2013-2021

Instructor, **Introduction to Organismal Biology** (BIOL 5B), UC Riverside, 2015 and 2017

Lead Faculty, **Functional Ecology and Herpetology in Namibia**, UC Riverside, 2019

Invited instructor, **Functional Ecology**, Bamfield Marine Sciences Centre, Vancouver Island, Canada, Summer 2016

Invited instructor, **Biology of Marine Fishes**, Bamfield Marine Sciences Centre, Vancouver Island, Canada, Summer, 2009, 2011, 2015, 2017, and 2019 (2015 & 2017 was co-taught with Sean Rogers from the University of Calgary)

Invited instructor, **Comparative Biomechanics**, Bamfield Marine Sciences Centre, Vancouver Island, Canada, Summer, 2010, 2012, 2014

Instructor, **Evolutionary Physiology** (EEOB 220), UC Riverside, 2012 & 2014

Instructor and lab coordinator, **Comparative Physiology** (BIOSC 475), Clemson University, 2009, 2010

Instructor and lab coordinator, **Herpetology** (BIOSC 468), Clemson University, 2011

Instructor and lab coordinator, **Ichthyology** (BIOSC 477), Clemson University, 2009

Guest lecturer, **Comparative Biomechanics** (OEB 173), Harvard University, 2008

## **FIELD WORK:**

2009-present: Bamfield Marine Sciences Centre, Vancouver

2010-present: Namibia (Gobabeb, Swakopmund, Spitzkoppe)

2015-present: French Guiana

2012-present: Trinidad & Tobago

2012-present: Mojave Desert, USA

2012: Baja, California

2012: Western and Eastern Cape, South Africa

2000: Discovery Bay Marine Laboratory, Jamaica

## **CURRENT AND PAST LAB MEMBERS:**

### **Postdoctoral fellows:**

David Ryan (September 2020 – present)

Dina Navon (February 2019 – September 2020, now Postdoc at Rutgers)

William Stewart (April 2013 – August 2014; now Assistant Professor at Eastern Florida State College)

Aleksandra Birn-Jeffery (December 2012 – August 2014; now a Lecturer at Queen Mary University of London)

Andrew Clark (August 2009 – July 2010; now an Associate Professor at the College of Charleston)

### **Graduate students:**

Michael Remington (September, 2021 – present) – Joint PhD program with SDSU  
Ryan Hanscom (September, 2021 – present) - Joint PhD program with SDSU  
Seth Shirazi (September, 2021 – present) - PhD  
Connor Christensen (September, 2021 – present) - PhD  
Phil Sternes (September, 2019 – present) - PhD  
Marina Vollin (September, 2019 – present) - PhD  
Grace Freymiller (September, 2016 – 2021) – Joint PhD program with SDSU  
Emily Naylor (August, 2015 – August, 2020) – PhD (now postdoc at George Washington University)  
Vicky Zhuang (August, 2012 - 2018) – PhD (now Collection Manager at UTEP Biodiversity Collections)  
Kevin Jagnandan (August, 2012 - 2016) – PhD (now Assistant Professor at San Diego City College)  
Clint Collins (August, 2012 - 2016) - PhD (now Assistant Professor at CSU Sacramento)  
Kathleen Foster (August, 2010 – 2016) – PhD (now Assistant Professor at Ball State University)  
Emily Kane (August 2009 – 2014) - PhD (now Assistant Professor at Louisiana State University)  
Jeff Olberding (July, 2010 – June 2013) – MS (now Assistant Professor at Cal Stat Fullerton)

### **Undergraduates:**

Christina Ho (2022 – present)  
Chultze Mora (2022 – present)  
Mya Rodriguez (2020 – 2021)  
Kitty Lam (2020 – 2021)  
Sophia Rogers (2019 – 2021)  
Laura Kollmorgen (2019 – 2020)  
Jason Ta (2018 – 2020)  
Diana Srioudom (2018 – 2020)  
Michelle Modert (2018) - University of Freiburg  
Mara Hofmann (2018) - University of Freiburg  
Elizabeth Mendoza (2015) (now MS student at Oklahoma State University)  
Azeem Rahman (2015 - 2016)  
Jennifer Shedden (2014 – 2016) (now MS student at Cal State Fullerton)  
Angelyn Nepacena (2013 – 2016)  
Jessica Vivas (2014 – 2015)  
Joseph Soquiat (2013 – 2015)  
Steven Torres (2014)  
Shayan Amiri (2013 – 2014)  
Amy Cheu (2013 – 2014) (now PhD student at Clark University with Philip Bergmann)  
Cindy Olivas (2013 – 2014)  
Amir Azamian (2013 – 2014)  
Kevin Dinh (2012 – 2014)  
Stephanie Valiente (2012 – 2013)  
Sofia Iribarren (2012 – 2013)  
Stephen Cabalatungan (2012)  
Daryl Cheung (2012)  
Stacy Tran (2012)  
Clare O'Brien (2012)  
Zachary Zboch (2011)  
Christine Dumler (2010-2011)  
Alice Goodman (2010-2011)  
Erin Patten (2010)  
Patrick Fuller, Undergraduate (2009-2010)  
Heidi Lindler, Undergraduate (2009)

Katelyn Doerr, Undergraduate (2009)  
Danielle Hulseley, Undergraduate (2009)

## PROFESSIONAL ACTIVITIES:

2022: Joined the editorial board of ***Scientific Reports***.

2019: Co-organized an NSF-funded working group (with Lara Ferry) about biomechanics and the rules of life. This led to a 25-authored paper that was published in ***Trends in Ecology and Evolution***.

2019: Co-organized a symposium (with Alyssa Stark and Anthony Russell) for the annual meeting of the **Society for Integrative and Comparative Biology** (Tampa, Florida) titled: The path less traveled: Reciprocal illumination of gecko adhesion by unifying material science, biomechanics, ecology, and evolution.

2016-2017: Chair of the Comparative Morphology & Development section of the **Canadian Society of Zoologists**.

2015: Organized a symposium (with Rich Palmer) for the annual meeting of the **Canadian Society of Zoologists** (Calgary, Canada) titled "From head to toe: Integrative vertebrate morphology and evolution". See <http://www.biology.ualberta.ca/CMD/home.htm> for more information.

2015: Organized a symposium (with Rich Palmer) for the annual meeting of the **Canadian Society of Zoologists** (Calgary, Canada) titled "Ten Years of The Triple Helix: Development, Morphology, Evolution". See <http://www.biology.ualberta.ca/CMD/home.htm> for more information.

2015: Organized a symposium (with Peter Wainwright) for the annual meeting of the **Society for Integrative and Comparative Biology** (West Palm Beach, Florida) titled "New insights into suction feeding biomechanics and evolution". See <http://www.sicb.org/meetings/2015/symposia/index.php> for more information.

2014-2021: Co-editor of ***Physiological and Biochemical Zoology***.

2014: Organized a symposium (with Rick Blob) for the annual meeting of the **Society for Integrative and Comparative Biology** (Austin, Texas) titled "Terrestrial locomotion: Where do we stand, where are going?" See <http://www.sicb.org/meetings/2014/symposia/locomotion.php> for more information.

2013: Organized a regional SICB conference at the University of California, Riverside. Conference consisted of 80 scientists from the SW representing the Divisions of Vertebrate Morphology and Comparative Biomechanics. See <http://www.biomechanics.ucr.edu/ucr2013/> for more information.

2013: Elected to the Executive Council of the **Canadian Society of Zoologists**.

2013: Organized a symposium (with Ted Garland) for the **International Congress of Vertebrate Morphology** (Barcelona, Spain) titled "The evolution of locomotion: reciprocal illumination from a diversity of approaches".

2013: Organized a symposium (with Anthony Herrel) for the **International Congress of Vertebrate Morphology** (Barcelona, Spain) titled "Sticks, stones, and slopes: the link between substrate characteristics, morphology, and biomechanics.

2012: Invited to join ***Functional Ecology*** as an editor.

2012: Organized a symposium (with Anthony Russell) for the **World Congress of Herpetology** (Vancouver, Canada) titled "Caudal Autotomy and Regeneration in Lizards: Patterns, Costs, and Benefits".

2011: Elected as Secretary of the Division of Comparative Biomechanics of the **Society for Integrative and Comparative Biology**.

2011-2014: Editorial board member of the *Journal of Evolutionary Biology*.

2010: Guest Editor (with Andrew Biewener) for a *Philosophical Transactions of the Royal Society B* theme issue titled "Integration of muscle function for producing and controlling movement". Volume 366, issue 1570, April 2011.

2010: Organized a symposium (with Andrew Biewener) for the annual meeting of the **American Physiological Society** (Westminster, Colorado) titled "Off the beaten path: Integrative aspects of muscle function during locomotion".

2007: Organized a symposium (with Peter Wainwright) for the annual meeting of the **Society for Integrative and Comparative Biology** (Phoenix, Arizona) titled "The evolution of feeding mechanisms in vertebrates".

**Reviewed manuscripts for the following journals:**

*American Naturalist*  
*Behavioural Processes*  
*Biological Bulletin*  
*Biological Journal of the Linnean Society*  
*Biology Letters*  
*BMC Evolutionary Biology*  
*Bulletin of the Museum of Comparative Zoology*  
*Canadian Journal of Zoology*  
*Current Biology*  
*Ecology*  
*Ecology Letters*  
*Evolution*  
*Experimental Neurology*  
*Functional Ecology*  
*Journal of Arid Environments*  
*Journal of Biomechanics*  
*Journal of Comparative Physiology A*  
*Journal of Evolutionary Biology*  
*Journal of Experimental Biology*  
*Journal of Experimental Zoology A*  
*Journal of Herpetology*  
*Journal of Fish Biology*  
*Journal of the Royal Society Interface*  
*Limnology and Oceanography*  
*Naturwissenschaften*  
*North American Journal of Fisheries Management*  
*Physiological and Biochemical Zoology*  
*PLoS ONE*  
*Proceedings of the Royal Society B*  
*Scientific Reports*  
*Zoology*  
*Zootaxa*

**Member of:**

Canadian Society of Zoologists  
Society for Experimental Biology

## Society for Integrative and Comparative Biology

### Service:

Member of the Comparative Biomechanics Search Committee at UCR (2022)  
Member of the UCEAP Biological Sciences Faculty Advisory Committee (2020 – present)  
UC Riverside EEOB Chair of Graduate Admissions (2019 – present)  
UC Riverside Highlander Abroad Advisory Committee (2020 – 2021)  
UC Riverside CNAS Executive Committee (2018 – present)  
UC Riverside Natural Reserve System Advisory Committee (2013 – 2017)  
Graduate Advisor for joint doctoral program between UC Riverside and SDSU (2016-2017)  
Vice Chair of IACUC at UC Riverside (2016 - 2017)  
Member of the IACUC at UC Riverside (2015 - 2017)  
Faculty Search Committee for Community Ecology at UC Riverside (2015-2016)  
GAANN Advisory Committee (2015 - 2017)  
Graduate advisor for admissions, Evolution, Ecology and Organismal Biology (2015 – 2017)  
Graduate Written Exam Committee, UC Riverside (2014 – Present)  
University of California Education Abroad Program Faculty Advisory Committee for Africa (2015 – Present)  
Ad hoc committee for the Shipley-Skinner grants at UC Riverside (2015)  
Committee on Scholarships and Honors at UC Riverside (2014 – 2017)  
Ad hoc committee for merit advances at UC Riverside (2013 – present)  
Committee for Continuing Graduate Students at UC Riverside (2012 – 2015)  
Faculty Search Committee for Behavioral Ecologist at UC Riverside (2012)  
EEOB Program Committee at UC Riverside (2011 – present)  
Chair of Seminar Organizing Committee at UC Riverside (2012 – 2014)  
Mathias Award Committee at UC Riverside (2011)  
Curriculum Committee at Clemson University (2010 – 2011)  
Seminar Committee at Clemson University (2010 – 2011)

### VOLUNTEER ACTIVITIES:

2019 – present: Co-organizing a Design Challenge at the Riverside STEM Academy for middle school and high school students.

2016-2017: Guest symposium speaker at the Riverside STEM Academy. Involves a half day with hundreds of students from grades 5 to 12.

2014: Riverside Metropolitan Museum outreach all-day event. This event, termed “Animal Olympics”, highlighted the research in the Higham Lab by performing exercises and presentations.

2013: Animal Superpowers outreach event for grades K-6 at Alcott Elementary in Riverside, CA.

2013: Session chair at the International Congress of Vertebrate Morphology (ICVM) in Barcelona, Spain.

2013: Session chair at the annual meeting of the Canadian Society of Zoologists in Guelph, Ontario, Canada.

2013: Volunteer teaching at Alcott Elementary in Riverside, CA.

2011: Judge for the Best Poster Award of the CBP section of the Canadian Society of Zoologists, Ottawa, Ontario, Canada.

2010: Judge for the Division of Vertebrate Morphology and the Division of Comparative Biomechanics at the annual meeting of the Society for Integrative and Comparative Biology in Seattle, WA.

2010: Session chair at the annual meeting of the Society for Integrative and Comparative Biology in Seattle, WA