

CHRIS J. LAW, PHD

NSF Postdoctoral Fellow | Gerstner Scholar | American Museum of Natural History

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EDUCATION

- 2013–19 **Ph.D. Ecology and Evolutionary Biology.** University of California, Santa Cruz
2008–12 **B.S. Environmental Systems.** University of California, San Diego
2010 **Marine Biology and Terrestrial Ecology Program.** University of Queensland

ACADEMIC HISTORY

- 2019–22 **NSF Postdoctoral Fellow and Gerstner Postdoctoral Scholar,** American Museum of Natural History
Advisors: Dr. John Flynn, Dr. Robert Voss, & Dr. Sharlene Santana
2013–19 **PhD Student,** Ecology & Evolutionary Biology, University of California Santa Cruz
Advisor: Dr. Rita Mehta
2012–13 **Staff Research Associate,** Scripps Institution of Oceanography
Advisors: Dr. Kelly Dorgan & Dr. Greg Rouse
2011–12 **Research Assistant,** Scripps Institution of Oceanography
Advisors: Dr. Kelly Dorgan & Dr. Greg Rouse

FELLOWSHIPS and AWARDS

\$473,428 in awarded fellowships

- 2019–21 **Postdoctoral Fellowship,** National Science Foundation. (DBI–1906248) *\$138,000*
Gerstner Scholars Postdoctoral Fellowship, American History *\$127,030*
Museum of Natural. *Declined to accept NSF postdoctoral fellowship*
2018–19 **Chancellor’s Dissertation Quarter Fellowship,** UC Santa Cruz. *\$13,086*
ARCS Scholar Award, ARCS Foundation. *\$11,000*
EEB Departmental Quarter Fellowship, UC Santa Cruz. *\$15,500*
2015–18 **Graduate Research Fellowship,** National Science Foundation. *\$138,000*
2014–15 **Regent’s Fellowship,** UC Santa Cruz. *\$15,406*
2014 **NSF GRFP Honorable Mention,** National Science Foundation.
Global Oceans Student Award, Friends of Long Marine Laboratory.
2013–14 **Regent’s Fellowship,** UC Santa Cruz. *\$15,406*

RESEARCH and TRAVEL GRANTS

\$92,544 in awarded funding for research and travel

2019	Research Grant , American Museum of Natural History.	\$20,000
	Graduate Student Association Travel Grant , UC Santa Cruz. [2013–2019]	\$2,234
2018	Collections Study Award , Natural History Museum of Los Angeles County.	\$1,175
	Student Travel Award , American Society of Mammalogists.	\$400
	Graduate Fellowship in Marine Mammals , Rebecca & Steve Sooy Fund.	\$3,500
2017	Doctoral Dissertation Improvement Grant , National Science Foundation.	\$19,189
	“DISSERTATION RESEARCH: The effects of sexual dimorphism on morphological diversification of Musteloidea.” Co-PIs: Law and Mehta (DEB–1700989)	
	Packard Endowment Grant , Packard Foundation.	\$17,844
	“Linking feeding performance & energetics to dietary specialization & fitness in southern sea otters.” Co-PIs: Law and Mehta.	
	Field Museum Visiting Scholarship , Field Museum.	\$1,520
	Grant-in-Aid of Research , Society of Integrative & Comparative Biology.	\$1,894
	IMC-12 Travel Grant , American Society of Mammalogists.	\$1,250
2016	James L. Patton Grant , American Society of Mammalogists.	\$5,000
2015	Research Grant , American Cetacean Society—Monterey Bay Chapter.	\$1,500
	Collection Study Grant , American Museum of Natural History.	\$700
	Rosemary Grant Student Grant , Society for the Study of Evolution.	\$1,800
	Grant-in-Aid of Research , Sigma Xi.	\$700
	Graduate Fellowship in Marine Mammals , Rebecca & Steve Sooy Fund.	\$5,500
2014	Lerner Gray Fund , American Museum of Natural History.	\$2,000
	Grant-in-Aid of Research , American Society of Mammalogists.	\$1,500
	Myers Trust Grant , Myers Oceanographic & Marine Biology Trust.	\$2,000
	Student Research Grant , Friends of Long Marine Laboratory.	\$850
	<i>*Chosen as one of the top two recipients</i>	
2013	Graduate Fellowship in Marine Mammals , Rebecca & Steve Sooy Fund.	\$1,250

Unfunded grant applications

2017	National Science Foundation Grant , Division of Integrative Organismal Systems.	
	“Collaborative Research: Anvil or Jaws: The biomechanics, safety, and profitability of using tools in the southern sea otter.” Co-PIs: Mehta & Tinker. I wrote the first draft and contributed preliminary data collection and analyses. <i>Invited to submit full proposal</i>	

PEER-REVIEWD PUBLICATIONS

high school student mentee; undergraduate student mentee

- 19) **Law CJ**. *In press*. Solitary meat-eaters: solitary, carnivorous carnivorans exhibit the highest degree of sexual size dimorphism. *Scientific Reports*. doi.org/10.1038/s41598-019-51943-x

- 18) **Law CJ** & Mehta RS. 2019. Dry versus wet and gross: Comparisons between the dry skull method and gross dissection-based modeling in bite force estimations. *Journal of Morphology*. 280:1706–1713. doi.org/10.1002/jmor.21061
- 17) **Law CJ**. 2019. Evolutionary shifts in extant mustelid (Mustelidae: Carnivora) cranial shape, body size, and body shape coincides with the Mid-Miocene Climate Transition. *Biology Letters*. 15:20190155. doi.org/10.1098/rsbl.2019.0155
- 16) **Law CJ**, Slater GJ, & Mehta RS. 2019. Shared extremes by ectotherms and endotherms: body elongation in mustelids is associated with small size and reduced limbs. *Evolution*. 73:735–749. doi.org/10.1111/evo.13702
- 15) **Law CJ**, Duran E, Hung N, Richards E, Santillan I, & Mehta RS. 2018. Effects of diet on cranial morphology and biting ability in musteloid mammals. *Journal of Evolutionary Biology*. 31:1918-1931. doi.org/10.1111/jeb.13385
- 14) Higgins BA, **Law CJ**, & Mehta RS. 2018. Eat whole and less often: ontogenetic shift reveals size specialization on kelp bass by the California moray eel, *Gymnothorax mordax*. *Oecologia*. 188:875–887. doi.org/10.1007/s00442-018-4260-x
- 13) **Law CJ** & Mehta RS. 2018. Carnivory maintains cranial dimorphism between males and females: Evidence for niche divergence in extant Musteloidea. *Evolution*. 72:1950–1961. doi.org/10.1111/evo.13514
- 12) **Law CJ**, Slater G, & Mehta RS. 2018. Lineage diversity and size disparity in Musteloidea: testing patterns of adaptive radiation using molecular and fossil-based methods. *Systematic Biology*. 67:127–144. doi.org/10.1093/sysbio/syx047
- 11) **Jones K[†]** & **Law CJ[†]**. 2018. Differentiation of craniomandibular morphology in two sympatric *Peromyscus* mice (Cricetidae: Rodentia). *Mammal Research*. 63:277–283. doi.org/10.1007/s13364-018-0364-2 [†]Joint first authors
- 10) **Law CJ**. 2018. *Mustela sibirica* (Carnivora: Mustelidae). *Mammalian Species*. 50:109–118. doi.org/10.1093/mspecies/sev013
- 9) Kienle SS, **Law CJ**, Costa DP, Berta A, & Mehta RS. 2017. Revisiting the behavioural framework of feeding in predatory aquatic mammals. *Proceedings of the Royal Society B*. 284:20171035. doi.org/10.1098/rspb.2017.1035
- 8) **Law CJ**, Baliga VB, Tinker MT, & Mehta RS. 2017. Asynchrony in craniomandibular development and growth in *Enhydra lutris nereis* (Carnivora: Mustelidae): Are southern sea otters born to bite? *Biological Journal of Linnean Society*. 121:420-438. doi.org/10.1093/biolinnean/bhw050
- 7) **Hung N** & **Law CJ**. 2016. *Lutra lutra* (Carnivora: Mustelidae). *Mammalian Species*. 48:109–122. doi.org/10.1093/mspecies/sew011
- 6) **Law CJ**, Young C, & Mehta RS. 2016. Ontogenetic scaling of theoretical bite forces in southern sea otters (*Enhydra lutris nereis*). *Physiological and Biochemical Zoology*. 89:347-363. doi.org/10.1086/688313
- 5) **Law CJ**, **Venkatram V**, & Mehta RS. 2016. Sexual dimorphism of craniomandibular morphology in southern sea otters (*Enhydra lutris nereis*). *Journal of Mammalogy*. 97:1764-1773. doi.org/10.1093/jmammal/gyw148

- 4) Baliga VB & **Law CJ**. 2016. Cleaners amongst wrasses: phylogenetics and evolutionary patterns of cleaning behavior within Labridae. *Molecular Phylogenetics and Evolution*. 94:424-435. doi.org/10.1016/j.ympev.2015.09.006
- 3) **Law CJ**, Dorgan KM, & Rouse GW. 2014. Relating divergence in polychaete musculature to different burrowing behaviors: A study using Opheliidae (Annelida). *Journal of Morphology*. 571:548–571. doi.org/10.1002/jmor.20237
- 2) Dorgan KM, **Law CJ**, & Rouse GW. 2013. Meandering worms: Mechanics of undulatory burrowing in muds. *Proceedings of the Royal Society B*. 280:20122948. doi.org/10.1098/rspb.2012.2948
- 1) **Law CJ**, Dorgan KM, & Rouse GW. 2013. Validation of three sympatric *Thoracophelia* species (Annelida: Opheliidae) from Dillon Beach, California using mitochondrial and nuclear DNA sequence data. *Zootaxa*. 3608:67–74. doi.org/10.11646/zootaxa.3608.1.4

INVITED BOOK REVIEWS

- 1) **Law CJ**. 2019. Book review of *Biology and Conservation of Musteloids* by David W. Macdonald, Chris Newman, and Lauren A. Harrington. *The Quarterly Review of Biology*. 94:297–298. doi.org/10.1086/705063

TEACHING EXPERIENCE

University of California, Santa Cruz

Co-instructor: **Comparative Vertebrate Anatomy Lab** (Fall 2017); **Comparative Vertebrate Anatomy Lab** (Summer 2017)

Guest lecturer: **Comparative Vertebrate Anatomy Lab** (Spring 2019); **Functional Anatomy** (Spring 2017); **Mammalogy** (Fall 2015); **Development and Physiology** (Fall 2015); **Biology of Marine Mammals** (Spring 2015); **Comparative Vertebrate Anatomy Lab** (Fall 2014)

Teaching Assistant: **Marine Mammals** (Spring 2015); **Comparative Vertebrate Anatomy Lab** (Fall 2014); **Development & Physiology** (Spring 2014)

STUDENTS MENTORED

Undergraduate Researchers. **student co-author**

Mentored 9 UCSC undergraduate students: **Ana Moreland** (Jun 2018–Apr 2019); **Carly Sanchez** (Jun–Sept 2018); **Parker Kaye** (Sept 2017–Mar 2018); **Jennilyn Stenske** (June 2017–present); **Ekai Richards** (Jan–Aug 2017); **Sam Sambado** (Jan–Apr 2017); **Kaz Jones** (Sept 2016–June 2017); **Meghan Yap-Chiongco** (Aug 2016–Jun 2017); **Shohei Burns** (Mar–Aug 2014)

Science Internship Program. **student co-author**

Mentored 5 high school students: **Emma Duran** (June–Aug 2017); **Isaac Santillan** (June–Aug 2017); **Anna Wadhwa** (June–Aug 2016); **Vikram Venkatram** (June–Aug 2015); **Nancy Hung** (June–Aug 2014)

Cultivamos Excelencia Program

Mentored 2 community college students: **Jasmin Lara** (Sept 2018–June 2019); **Joanna Gonzalez Lugo** (Sept 2018–June 2019)

Small Mammal Undergraduate Research in the Forest (SMURF) Program (2015–2019)

Trained and supervised 52 SMURF interns in mammal trapping: **Jasmin Regalado** (Apr–June 2019), **Filippa Erixon** (Apr–June 2019), **Jamie Becher** (Apr–June 2019), **Olivia Wilms** (Apr–June 2019), **Josue Lopez** (Apr–June 2019), **Maria Zepeda** (Apr–June 2019), **Marie Gredell** (Apr–June 2019), **Christina Olague** (Apr–June 2019), **Amanda Smith** (Jan–Mar 2019), **Ari Statler** (Jan–Mar 2019), **Giselle Wendt** (Jan–Mar 2019), **Ishana Shukla** (Jan–Mar 2019), **Linnea Gullikson** (Jan–Mar 2019), **Lucy Malamud-Roam** (Jan–Mar 2019), **Nicholas Bergeron** (Jan–Mar 2019), **Vanessa Cortez** (Jan–Mar 2019), **Gabby Reynosa** (Sept–Jun 2019); **Maggie Choi** (Sept–Dec 2018); **Ray Hunter** (Sept–Dec 2018); **Benji Le** (Sept–Dec 2018); **Freddy Manzarex** (Sept–Dec 2018); **Shelby Thompson** (Sept–Jun 2019); **Jingyun Wu** (Sept–Dec 2018); **Samantha Abarca** (Apr–June 2018); **Lia Del Vecchio** (Apr–June 2018); **Maggy Feng** (Apr–June 2018); **Esmeralda Reyes** (Apr–June 2018); **Ciera Castillo** (Jan–Apr 2018); **Noelle Duerwald** (Jan–Apr 2018); **Shaun Kehrmeyer** (Jan–Apr 2018); **Samuel Sacco** (Jan–Apr 2018); **Samantha Gautreaux** (CSMB, Jan–Apr 2018); **Jazmin Rios** (CSMB, Jan–Apr 2018); **David Castaneda** (Sept–Dec 2017); **Aaron Gormley** (Sept–Dec 2017); **Sabrina Sanchez** (Sept–Dec 2017); **Kaz Jones** (Sept 2016–June 2017); **Jessica Elgersma** (Sept 2016–June 2017); **Deanna Rhoades** (Sept 2016–June 2017); **Carly Sanchez** (Sept 2016–June 2018); **Jazzmin Ilas** (Sept 2016–June 2017); **Sami Akiba** (Sept 2016–June 2017); **Isabelle Panza** (Sept 2016–June 2017); **Megan Pasternak** (Sept 2016–June 2017); **Erin Huntsinger** (Sept 2016–June 2017); **Iлона Wilde** (Sept 2016–June 2017); **Tatiana Delgadillo** (Sept 2016–Dec 2016); **Ana Moreland** (Sept 2016–Dec 2016); **Aliya Cacanindin** (Sept 2016–Dec 2016); **Ethan Slattery** (Sept 2016–Dec 2016); **John Ahrens** (Sept 2016–Dec 2016); **Natalie Neff** (Sept 2015–June 2017)

RELEVANT RESEARCH EXPERIENCE

Museum Collections Work

Collection visits (8 institutions): American Museum of Natural History; California Academy of Sciences; Field Museum; Kansas University Natural History Museum; Natural History Museum of Los Angeles County; National Museum of Natural History; UC Berkeley Museum of Vertebrate Zoology; UC Santa Cruz Norris Center for Natural History

Loans (12 institutions): Academy of Natural Sciences of Drexel University; University of Washington Burke Museum; Cornell University Museum of Vertebrates; Denver Museum of Nature and Sciences; Florida Museum of Natural History; Louisiana Museum of Natural History; Museum of Comparative Zoology; Moore Laboratory of Zoology; Museum of Southwestern Biology; Texas Cooperative Wildlife Collection; University of Arkansas Collections Facility; University of Michigan Museum of Zoology.

Field Experience

UC Santa Cruz Natural Reserve, CA, USA. Trapped and tagged small mammals for long-term population study. [2015–2019].

Fort Ord Natural Reserve, CA, USA. Trapped and tagged small mammals for long-term population study. [2015–2019].

Catalina Island, CA, USA. Trapped, tagged, and collected moray eels for morphological analyses and long-term population. [2015, 2016, 2018, 2019].

Rancho los Pinos, Baja California, Mexico. Trapped, tagged, and collected moray eels for morphological analyses and long-term population. [2019].

San Juan Island, WA, USA. Trapped and collected marine invertebrates for biomechanical analyses and accession in Scripps Institution of Oceanography collection [2010–2012].

San Diego, CA, USA. Trapped and collected marine invertebrates for biomechanical analyses and accession in Scripps Institution of Oceanography collection [2010–2012].

PROFESSIONAL SERVICE

Research Mentor

2018–19 *Cultivamos Excelencia* Community College Research Program

2015–19 Small Mammal Undergrad Research in Forest (SMURF) Program

2014–17 Science Internship Program (SIP)

Reviewer for Scientific Journals

Proceedings of the National Academy of Sciences, Functional Ecology, Evolution, Journal of Mammalogy, Proceedings of the Royal Society B, Biological Journal of the Linnean Society, Journal of Experimental Biology, Journal of Mammalian Biology, Journal of Zoology, PLOS One, Integrative Organismal Biology

SCIENCE COMMUNICATION

K–12

2019 **Presenter.** Watsonville Wetlands Watch, CA

2018 **Presenter.** Boys and Girls Clubs of Santa Cruz County, CA.

2017 **Presenter.** Ocean Explorers Summer Camp, Seymour Center, CA

2016 **Presenter.** Ocean Explorers Summer Camp, Seymour Center, CA

2014 **Presenter.** Science Alive Workshop, Gavilan College, Gilroy, CA

Public Talks

2018 **Presenter.** Coastal Student Awards Celebration.

2015 **Presenter.** Citizen Science at the Santa Cruz Public Libraries.

Presenter. Annual Sea Otter Awareness Week.

INVITED SEMINARS

2019 **Santa Clara University.** Biology Department Seminar. *Individuals to clades: Examination of intraspecific and interspecific variation in sea otters and other charismatic musteloids.*

University of California, Davis. Center for Population Biology Seminar. *The ecomorphology and evolution of sea otters and other musteloids.*

INVITED WORKING GROUPS

- 2019 **National Science Foundation Rules of Life: Forecasting and Emergence in Living Systems (RoL:FELS) Working Group.** *Reciprocal illumination between ecology and biomechanics: evolution, integration, and constraint.* PIs: Tim Higham and Lara Ferry.

CONTRIBUTED PRESENTATIONS

high school student mentee; undergraduate student mentee

- 2019 **Law CJ.** Ecomorphology and evolution of carnivoran body plans. 2019 International Congress of Vertebrate Morphology, Prague, Czech Republic. 7.23.19.
Law CJ & Mehta RS. Carnivory maintains cranial dimorphism between males and females: Evidence for niche divergence in extant Musteloidea. 2019 Society for Integrative and Comparative Biology Annual Meeting, Tampa, FL. 1.4.19.
Law CJ, Duran E, Hung N, Richards E, Santillan I, & Mehta RS. Cranial shape differences do not translate to bite force differences between musteloids with distinct dietary ecologies. 2019 Society for Integrative and Comparative Biology Annual Meeting, Tampa, FL. 1.4.19.
- 2018 **Law CJ, Slater G, & Mehta RS.** Shared extremes by ectotherms and endotherms: body elongation in mustelids is associated with small size and reduced limbs. 2018 American Society of Mammalogists Annual Meeting, Manhattan, KS. 6.27.18.
Maresh JL, Corl A, Costa DP, & **Law CJ.** Predictors of metabolic rates in aquatic mammals. 2018 American Society of Mammalogists Annual Meeting, Manhattan, KS. 6.26.18.
Law CJ, Tinker T, & Mehta RS. Strike force in tool using otters. Sea Otter Research Update Meeting, Santa Cruz, CA. 3.20.18.
Law CJ, Slater G, & Mehta RS. Small and slender: evolutionary shifts towards elongate body plans within Mustelidae. 2018 Society for Integrative and Comparative Biology Annual Meeting, San Francisco, CA. 1.4.18.
Mehta RS, **Law CJ, Duran E, Hung N, Richards E, Santillan I.** Effects of diet on the evolution of bite force in adult musteloids. 2018 Society for Integrative and Comparative Biology Annual Meeting, San Francisco, CA. 1.6.18.
Higgins BA, **Law CJ, & Mehta RS.** Functional Ecology of the California moray eel (*Gymnothorax mordax*): dietary breadth and bite force over ontogeny. 2018 Society for Integrative and Comparative Biology Annual Meeting, San Francisco, CA. 1.6.18.
Maresh JL, Corl A, Costa DP, & **Law CJ.** Predictors of metabolic rates in aquatic mammals. 2018 Society for Integrative and Comparative Biology Annual Meeting, San Francisco, CA. 1.5.18.
- 2017 **Law CJ, Slater G, & Mehta RS.** Lineage diversity and size disparity in Musteloidea: testing patterns of adaptive radiation using molecular and fossil-based methods. 12th Annual Mammalogical Congress, Perth, Western Australia. 7.14.17.
Law CJ & Mehta RS. Evolution of sexual dimorphism in musteloid crania. 12th Annual Mammalogical Congress, Perth, Western Australia. 7.10.17.

- 2016 **Law CJ**, Young C, & Mehta RS. Ontogenetic scaling of theoretical bite forces in southern sea otters (*Enhydra lutris nereis*). 2017 Society for Integrative and Comparative Biology Annual Meeting, New Orleans, LA. 1.8.17.
Law CJ. Sexual dimorphism in cranial form and function of southern sea otters. 2016 Southern Sea Otter Research Update Meeting, Santa Cruz, CA. 2.19.16.
Law CJ, Baliga VB, Tinker MT, & Mehta RS. Sexual dimorphism in the cranial morphology of southern sea otters. 2016 Society for Integrative and Comparative Biology Annual Meeting, Portland, OR. 1.6.16.
- 2015 **Law CJ** & Mehta RS. Divergent times and diversification rates of Musteloidea (Mammalia:Carnivora). 2015 Society for Integrative and Comparative Biology Annual Meeting, West Palm Beach, FL. 1.4.15.
- 2013 **Law CJ**, Dorgan KM, & Rouse GW. Differences in polychaete musculature lead to distinctive burrowing behaviors. 2013 Society for Integrative and Comparative Biology Annual Meeting, San Francisco, CA.
- 2012 **Law CJ**, Dorgan KM, & Rouse GW. The anatomical features and kinematics of undulatory burrowing in the polychaete *Armandia brevis*. 2012 Society for Integrative and Comparative Biology Annual Meeting, Charleston, SC.

STUDENT PRESENTATIONS

- 2019 Gonzalez Lugo, J. The values and impact of Mexican American Studies on Latinx students in San Jose City College. *Cultivamos Excelencia* Research Program, Santa Cruz, CA. Talk.
 Lara, JA. The limitations of recycling in the Latinx community. *Cultivamos Excelencia* Research Program, Santa Cruz, CA. Talk.
- 2017 Yap-Chiongco M. A phylogenetic analysis of amphibious fishes within the perciformes. Koret Scholars Undergraduate Research Slam, Santa Cruz, CA. Poster.
 Duran E & Santillan I. 2017. Effects of diet on the scaling of bite forces in Musteloidea. 2017 SIP Annual Symposium, Santa Cruz, CA. Talk.
- 2016 Wadhwa A. Sexual dimorphism of North American river otters. 2016 SIP Annual Symposium, Santa Cruz, CA. Talk.
- 2015 Venkatram V. Craniodental sexual dimorphism in southern sea otters. 2015 SIP Annual Symposium, Santa Cruz, CA. Talk.
- 2014 Hung N. Dietary variation across procyonids. 2014 SIP Annual Symposium, Santa Cruz, CA. Talk.