

# Jonathan Chang

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## EDUCATION

- 2017 Ph.D Biology, University of California, Los Angeles  
“Diversity, disparity, and exploitation in the ray-finned fishes”  
Advisor: Michael E Alfaro
- 2011 B.S. in Biology, University of California, Los Angeles.

## APPOINTMENTS

- 2018–2020 Monash University
- 2018 University of Michigan, Ann Arbor

## HONORS & AWARDS

- 2017 A. M. Schechtman Award for distinguished teaching, UCLA.
- 2016 David and Marvalee Wake Award for best student presentation, Society for Integrative and Comparative Biology.

## GRANTS & FELLOWSHIPS

- 2017 George A. Bartholomew Fellowship and Research Award, UCLA. \$9,000.
- 2016–2019 Doctoral Dissertation Improvement Grant (Co-PI), National Science Foundation. \$20,020. Testing macroevolutionary predictions of diversity and disparity in the ray-finned fishes.
- 2013–2015 David M. Rubenstein Fellowship (PI), Encyclopedia of Life. \$52,280. Using massively crowd-sourced data to examine morphological impacts of extinction risk in ray-finned fishes.
- 2010 Whitcome Summer Undergraduate Research Fellowship, UCLA. \$3,000. Phylogenomic approaches to resolving evolutionary relationships among ray-finned fishes.

## PUBLICATIONS

### Peer-reviewed manuscripts

- 2171 citations
- h-index: 14
- i10-index: 17
- via [Google Scholar](#)
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16. 2021 BF Melo, BL Sidlauskas, TJ Near, FF Roxo, A Ghezelayagh, LE Ochoa, MLJ Stiassny, J Arroyave, **J Chang**, BC Faircloth, DJ MacGuigan, RC Harrington, RC Benine, MD Burns, K Hoekzema, NC Sanches, JA Maldonado Ocampo, RMC Castro, F Foresti, ME Alfaro, C Oliveira. Accelerated diversification explains the exceptional species richness of tropical characoid fishes. *Systematic Biology* 71(1):78-92 [doi:10.1093/sysbio/syab040](https://doi.org/10.1093/sysbio/syab040)
15. 2020 LE Ochoa, A Datovo, C DoNascimento, FF Roxo, MH Sabaj, **J Chang**, BF Melo, GSC Silva, F Foresti, ME Alfaro, C Oliveira. Phylogenomic analysis of trichomycterid catfishes (Teleostei: Siluriformes) inferred from ultraconserved elements. *Scientific Reports* 10(1):2697 [doi:10.1038/s41598-020-59519-w](https://doi.org/10.1038/s41598-020-59519-w)

14. 2020 E Gjesfjeld, D Silvestro, **J Chang**, B Koch, JG Foster, ME Alfaro. A quantitative workflow for modeling diversification in material culture. *PLOS ONE* 15(2):e0227579 doi:10.1371/journal.pone.0227579
13. 2019 **J Chang**, DL Rabosky, ME Alfaro. Estimating diversification rates on incompletely sampled phylogenies: theoretical concerns and practical solutions. *Systematic Biology* 69(3):602-611 doi:10.1093/sysbio/syz081
12. 2019 **J Chang**, DL Rabosky, SA Smith, ME Alfaro. An R package and online resource for macroevolutionary studies using the ray-finned fish tree of life. *Methods in Ecology and Evolution* 10(7):1118-1124 doi:10.1111/2041-210X.13182
11. 2019 FF Roxo, LE Ochoa, MH Sabaj, NK Lujan, R Covain, GSC Silva, BF Melo, JS Albert, **J Chang**, F Foresti, ME Alfaro, C Oliveira. Phylogenomic reappraisal of the Neotropical catfish family Loricariidae (Teleostei: Siluriformes) using ultraconserved elements. *Molecular Phylogenetics and Evolution* 135:148-165 doi:10.1016/j.ympev.2019.02.017
10. 2018 JD DiBattista, ME Alfaro, L Sorenson, JH Choat, JA Hobbs, TH Sinclair-Taylor, LA Rocha, **J Chang**, OJ Luiz, PF Cowman, M Friedman, ML Berumen. Ice ages and butterflyfishes: Phylogenomics elucidates the ecological and evolutionary history of reef fishes in an endemism hotspot. *Ecology and Evolution* 8(22):10989-11008 doi:10.1002/ece3.4566
9. 2018 DL Rabosky, **J Chang**, PO Title, PF Cowman, L Sallan, M Friedman, K Kaschner, C Garilao, TJ Near, M Coll, ME Alfaro. An inverse latitudinal gradient in speciation rate for marine fishes. *Nature* 559(7714):392-395 doi:10.1038/s41586-018-0273-1
8. 2018 G Burin, LRV de Alencar, **J Chang**, ME Alfaro, TB Quental. How well can we estimate diversity dynamics for clades in diversity decline?. *Systematic Biology* 68(1):47-62 doi:10.1093/sysbio/syy037
7. 2018 SV Liu, B Fr  d  rich, S Lavou  , **J Chang**, MV Erdmann, GN Mahardika, PH Barber. Buccal venom gland associates with increased of diversification rate in the fang blenny fish Meiacanthus (Blenniidae; Teleostei). *Molecular Phylogenetics and Evolution* 125:138-146 doi:10.1016/j.ympev.2018.03.027
6. 2018 MGM Lima, J de Sousa e Silva-J  nior, D   ern  , JC Buckner, A Aleixo, **J Chang**, J Zheng, ME Alfaro, A Di Fiore, JP Boubli, JW Lynch Alfaro. A phylogenomic perspective on the robust capuchin monkey (Sapajus) radiation: First evidence for extensive population admixture across South America. *Molecular Phylogenetics and Evolution* 214:137-150 doi:10.1016/j.ympev.2018.02.023
5. 2017 DL Rabosky, JS Mitchell, **J Chang**. Is BAMM flawed? Theoretical and practical concerns in the analysis of multi-rate diversification models. *Systematic Biology* 66(4):477-498 doi:10.1093/sysbio/syx037
4. 2016 E Gjesfjeld, **J Chang**, D Silvestro, C Kelty, ME Alfaro. Competition and extinction explain the evolution of diversity in American automobiles. *Palgrave Communications* 2(1):16019 doi:10.1057/palcomms.2016.19
3. 2015 **J Chang**, ME Alfaro. Crowdsourced geometric morphometrics enable rapid large-scale collection and analysis of phenotypic data. *Methods in Ecology and Evolution* 7(4):472-482 doi:10.1111/2041-210x.12508

2. 2015 PS Gilbert, **J Chang**, E Sobel, JS Sinsheimer, BC Faircloth, ME Alfaro. Genome-wide ultra-conserved elements exhibit higher phylogenetic informativeness than traditional gene markers for the fish series Percomorpha. *Molecular Phylogenetics and Evolution* 92:140-146 [doi:10.1016/j.ympev.2015.05.027](https://doi.org/10.1016/j.ympev.2015.05.027)
1. 2013 DL Rabosky, F Santini, JM Eastman, SA Smith, BL Sidlauskas, **J Chang**, ME Alfaro. Rates of speciation and morphological evolution are correlated across the largest vertebrate radiation. *Nature Communications* 4:1958 [doi:10.1038/ncomms2958](https://doi.org/10.1038/ncomms2958)

### **Other manuscripts**

- 2012 BC Faircloth, **J Chang**, ME Alfaro. TAPIR enables high-throughput estimation and comparison of phylogenetic informativeness incorporating locus-specific substitution models.

### **PRESENTATIONS**

#### **Invited presentations**

- 2021 Joint Meeting of Ichthyologists and Herpetologists, July 21–25, Phoenix, Arizona
- 2021 iEvoBio, June 26 (online)
- 2021 Systematics, Biogeography, and Evolution, June 22 (online)
- 2020 American Museum of Natural History, October 5, New York, NY
- 2019 Gruter Institute for Law and Behavioral Research, May 19–23, Olympic Valley, CA
- 2019 Museums Victoria, February 15, Melbourne, Australia
- 2019 Université de Liège, February 6, Liège, Belgium
- 2018 Monash University, November 1, Melbourne, Australia
- 2017 Gruter Institute for Law and Behavioral Research, May 21–25, Olympic Valley, CA

#### **Contributed presentations**

- 2023 I Trinidade-Santos, ME Alfaro, **J Chang**, L Sallan. Macroevolutionary patterns of diversity imbalance and persistence of depauperate lineages across fishes. Indo-Pacific Fish Conference and the Australian Society for Fish Biology, November 20–24, Auckland, New Zealand
- 2021 JA Sime, **J Chang**, ME Alfaro, L Sallan. Megaphylogenies elucidate the pervasiveness and ecology of the 'living-fossil' phenomenon. Joint Meeting of Ichthyologists and Herpetologists, July 21–25, Phoenix, Arizona
- 2020 **J Chang**, MD McGee. Tree thinking for comparative genomics: lessons from whole genome sequencing in killifishes. Systematic Biology, January 3–6, Gainesville, FL
- 2019 **J Chang**. A macroevolutionary perspective on the distribution of commercially exploited fish species. Australian Society for Fish Biology, October 14–18, Canberra, Australia
- 2019 **J Chang**, MD McGee. Comparative genomics and the evolution of lifespan in ray-finned fishes. Australian Academy of Sciences Boden Research Conference, August 2–4, Melbourne, Australia
- 2019 **J Chang**, MD McGee. Comparative genomics and the evolution of lifespan in ray-finned fishes. Evolution, June 21–25, Providence, RI
- 2019 ME Alfaro, EA Karan, **J Chang**, LK Woo. High throughput phenoscaping for comparative studies. Integrative and Comparative Biology, January 3–7, Tampa, FL

- 2019 **J Chang**, ME Alfaro, DL Rabosky. Extending and remixing the complete ray-finned fish tree of life via [fishtreeoflife.org](http://fishtreeoflife.org). Integrative and Comparative Biology, January 3–7, Tampa, FL
- 2018 JW Lynch Alfaro, MG Lima, D Černý, **J Chang**, J Zheng, JC Buckner, ME Alfaro, A Martins, J de Sousa e Silva-Júnior, A Aleixo. Phylogenomics and population genomic analyses for the Neotropical robust capuchin monkey radiation: UCEs reveal extensive population admixture within *Sapajus*. International Primatological Society, August 19–25, Nairobi, Kenya
- 2018 **J Chang**, DL Rabosky, ME Alfaro. Incomplete sampling in phylogenies: when likelihoods go flat. Systematic Biology, June 1–4, Columbus, OH
- 2018 **J Chang**, ME Alfaro. Building the complete ray-finned fish tree of life. Integrative and Comparative Biology, January 3–7, San Francisco, CA
- 2017 JA Sime, **J Chang**, ME Alfaro, L Sallan. Does the ecology of clade imbalance explain the “living fossil” phenomenon within a mega-phylogeny of ray-finned (actinopterygian) fishes?. Geological Society of America, October 22–25, Seattle, WA
- 2017 JA Sime, **J Chang**, ME Alfaro, L Sallan. Pervasive diversity imbalance among sister clades of ray-fin fishes. Evolution, June 23–27, Portland, OR
- 2017 **J Chang**, ME Alfaro. A complete ray-finned fish phylogeny using taxonomy and birth-death models. Evolution, June 23–27, Portland, OR (Poster)
- 2017 **J Chang**, PF Cowman, M Friedman, LC Sallan, JT Clarke, ME Alfaro. A complete ray-finned fish phylogeny using taxonomy and birth-death models. Systematic Biology, January 8–10, Baton Rouge, LA
- 2017 **J Chang**, K Roy, JK Baum, PF Cowman, M Friedman, LC Sallan, JT Clarke, ME Alfaro. Size-selective harvesting and the macroevolutionary implications of an “anthropogenic filter” in ray-finned fishes. Integrative and Comparative Biology, January 4–8, New Orleans, LA
- 2016 **J Chang**, K Roy, JK Baum, ME Alfaro. Size-selective harvesting and the macroevolutionary impacts of the “anthropogenic filter” in ray-finned fishes. Southwest Organismal Biologists, November 19, Fullerton, CA (Poster)
- 2016 **J Chang**, K Roy, JK Baum, ME Alfaro. Size-selective harvesting and the macroevolutionary impacts of the “anthropogenic filter” in ray-finned fishes. Luskin Inaugural Symposium, October 19, Los Angeles, CA (Poster)
- 2016 EJ Gjesfjeld, **J Chang**, D Silvestro, ME Alfaro. Modeling diversification dynamics in the pharmaceutical industry. Human Behavior and Evolution, June 28–July 2, Vancouver, BC (Poster)
- 2016 **J Chang**, K Roy, JK Baum, PF Cowman, M Friedman, LC Sallan, JT Clarke, ME Alfaro. Eating away the fish tree of life: the phylogenetic distribution of human exploitation. Evolution, June 17–21, Austin, TX
- 2016 ME Alfaro, **J Chang**, PF Cowman, M Friedman, LC Sallan, JT Clarke, DL Rabosky, TJ Near. An evolutionary timescale for the diversification of ray-finned fishes. Evolution, June 17–21, Austin, TX
- 2016 EJ Gjesfjeld, **J Chang**, D Silvestro, C Kelty, ME Alfaro. A quantitative macroevolutionary approach to exploring the pharmaceutical drug innovation crisis. Evolution, June 17–21, Austin, TX

- 2016 **J Chang**, ME Alfaro. The tempo of body shape evolution in ray-finned fishes: bringing morphology into the "phenomic era" with crowdsourced morphometrics. Integrative and Comparative Biology, January 3–7, Portland, OR (Won David and Marvalee Wake Award for Best Student Presentation)
- 2016 ME Alfaro, DL Rabosky, **J Chang**, P Title, M Venzon. Global patterns of diversification across the ray-finned fish tree of life. Integrative and Comparative Biology, January 3–7, Portland, OR
- 2016 MB Balisi, **J Chang**. Hypercarnivory and extinction risk in North American fossil dogs. Integrative and Comparative Biology, January 3–7, Portland, OR (Poster)
- 2015 EJ Gjesfjeld, **J Chang**, D Silvestro, C Kelty, ME Alfaro. Investigating the diversification of car models using macroevolutionary methods. Evolution, June 26–30, Guarujá, Brazil
- 2015 **J Chang**, ME Alfaro. Patterns of shape diversity across ray-finned fishes with crowdsourced morphometrics. Evolution, June 26–30, Guarujá, Brazil (Ernst Mayr Symposium)
- 2015 EJ Gjesfjeld, **J Chang**, D Silvestro, ME Alfaro. Investigating the diversification of car models using macroevolutionary methods. Human Behavior and Evolution, May 27–30, Columbia, MO (Poster)
- 2015 **J Chang**, ME Alfaro. Crowdsourced morphometrics for large-scale analysis of phenotypic data. Systematic Biology, May 20–22, Ann Arbor, MI
- 2015 **J Chang**, ME Alfaro. Crowdsourced morphometric data are as accurate as traditionally collected data in 7 ray-finned fish families. Integrative and Comparative Biology, January 3–7, West Palm Beach, FL
- 2015 MD McGee, SR Borstein, **J Chang**, ME Alfaro, PC Wainwright. Progressive functional innovation in cichlid adaptive radiations. Integrative and Comparative Biology, January 3–7, West Palm Beach, FL
- 2014 J Zheng, **J Chang**, ME Alfaro. Novel approach measures the topological accuracy of large phylogenetic reconstruction. UCLA Biology Research Symposium., May 17, Los Angeles, CA (Jimmy won Best Student Presentation)
- 2014 **J Chang**, DL Rabosky, ME Alfaro. Crowdsourced morphometrics: a method to overcome bottlenecks in collecting phenotype data. Integrative and Comparative Biology, January 3–7, Austin, TX
- 2013 **J Chang**, DL Rabosky, ME Alfaro. Morphology and exploitation in ray-finned fishes using crowdsourced data. Evolution, June 21–25, Snowbird, UT
- 2013 **J Chang**, JM Eastman, ME Alfaro. Family-level analysis of exploited and at-risk ray-finned fish species shows high potential loss of biodiversity. Integrative and Comparative Biology, January 3–7, San Francisco, CA
- 2012 **J Chang**, K Roy, JM Eastman, SA Smith, F Santini, JK Baum, PA Hastings, BL Sidlauskas, ME Alfaro. Phylogenetic clustering of commercially exploited fish species. Integrative and Comparative Biology, January 3–7, Charleston, SC
- 2012 ME Alfaro, BC Faircloth, L Sorenson, **J Chang**, F Santini. A 500-locus phylogenomic study of ray-finned fishes. Integrative and Comparative Biology, January 3–7, Charleston, SC
- 2012 PS Gilbert, **J Chang**, BC Faircloth, ME Alfaro. Genome-wide ultraconserved elements exhibit higher phylogenetic informativeness than traditional fish markers. Integrative and Comparative Biology, January 3–7, Charleston, SC (Poster)

- 2011 ME Alfaro, K Roy, **J Chang**, JM Eastman, SA Smith, F Santini, JK Baum, PA Hastings, BL Sidlauskas. Phylogenetic distribution of commercially exploited fish species: How many times has 'tastiness' evolved?. Evolution, June 17–21, Norman, OK

## TEACHING

### Courses (as instructor of record)

- 2018 Instructor (50%). Genetics, Evolution, and Ecology.  
2016–2017 TA Consultant (100%). Preparation for Teaching Biology in Higher Education. 3x

### Courses (as teaching assistant)

- 2017 TA. Genetics, Evolution, and Ecology.  
2011–2015 TA/Head TA. Ecology, Evolution, and Biodiversity. 11x  
2015 TA. Practical Computing for Ecologists and Evolutionary Biologists.  
2013 TA. Ecology.  
2013 TA. Comparative Biology and Macroevolution.

### Workshops

- 2017 Panelist. UCLA Office of Instructional Development, Experienced STEM TAs.  
2017 Organizer. UCLA Psychology and EEB, Success in Science Bootcamp.  
2017 Instructor. UCLA Graduate Writing Center, Writing Successful Grant and Fellowship Applications (Science and Engineering Focus).  
2010–2017 Assistant. UCLA, Introduction to R for Ecologists and Evolutionary Biologists. 8x  
2017 Consultant. UCLA Career Center, Academic Job Market Summer Intensive Workshop for Graduate Students and Postdoctoral Scholars in STEM.  
2017 Instructor. Oregon State University, Analysis of Diversification Rates from Phylogenies.  
2016–2017 Instructor. UCLA Office of Instructional Development, Teaching Scientific Writing. 2x  
2016 Instructor. UCLA Ecology and Evolutionary Biology, NSF Doctoral Dissertation Improvement Grant Workshop.  
2016 Instructor. UCLA Office of Instructional Development, Time Management for TAs.  
2013–2015 Instructor. UCLA La Kretz Center, Workshop in Conservation Genomics. 3x

### Other

- 2016–2017 Writing Consultant. UCLA, Graduate Writing Center.

## MENTORING

Maya Chari (2022–2024, UCLA), Jonathan Chau (2021–2022, UCLA), Bhругu Bharathi (2022, UCLA), Bhuvan Kommineni (2022, UCLA), Austyn Adams (2022, UCLA), Lindsay Reedy (2022, UCLA), Kevin Wang (2021, UCLA), Natalie Zhu (2021, UCLA), Chris Rice (2015–2018, UCLA), Binal Patel (2015, UCLA), Jimmy Zheng (2014, UCLA), Zack Herbst (2012–2014, Chadwick School, Palos Verdes Peninsula, CA)

## SERVICE

### Professional

Reviewer for: *Molecular Biology and Evolution* (2020), *Current Zoology* (2020), *American Naturalist* (2020), *PLOS ONE* (2019), *Methods in Ecology and Evolution* (2019–2020), *Nature Communications* (2019–2020), *Bioinformatics* (2018), *Journal of Biogeography* (2018–2019), *Journal of Evolutionary Biology* (2018), *Ecography* (2017–2019), *Systematic Biology* (2016–2022), *BMC Evolutionary Biology* (2016) ([Publons profile](#))

- 2023— Society of Systematic Biologists, Graduate Student Research Awards, Reviewer
- 2022— National Science Foundation, Reviewer
- 2022 Experiment Foundation, Reviewer
- 2018–2020 Society for Integrative and Comparative Biology, Broadening Participation Mentorship Program
- 2017–2020 Society for Integrative and Comparative Biology, Student/Postdoctoral Affairs Committee

### University

- 2021— UCLA Ecology and Evolutionary Biology Research Symposium, Judge
- 2016–2017 UCLA Ecology and Evolutionary Biology, Faculty–Grad Liason
- 2015–2017 UCLA Teaching Assistant Conference, Panelist
- 2014–2015 UCLA Ecology and Evolutionary Biology, Seminar and EcoEvoPub Committee

### Outreach

- 2014–2017 Los Angeles County Science Fair, Judge
- 2016 UCLA Art/Sci LASER Symposium, Panelist
- 2013–2015 Exploring Your Universe, Volunteer

### Other

- 2022–2023 tea.xyz, Inc., Packaging Consultant
- 2019–2023 Homebrew package manager, Project Leadership Committee
- 2016–2023 Homebrew and Brewsci package managers, Maintainer

## SCIENTIFIC AFFILIATIONS

- 2013— Society of Systematic Biologists (life member)
- 2013— Society for the Study of Evolution (life member)
- 2019–2020 Australian Society for Fish Biology
- 2011–2020 Society for Integrative and Comparative Biology

## TRAVEL AWARDS

- 2019 iEvoBio Travel Award, iEvoBio. \$252.
- 2019 Early Career Researcher National Conference Support Award, Monash University. \$500.
- 2017 NSF Travel Stipend, Society of Systematic Biologists. \$500.
- 2017 Conference/Travel Award, UCLA. \$1,500.
- 2016 NSF AVATOL Travel Stipend, University of Maine. \$750.
- 2015 Research and Travel Grant, UCLA. \$1,991.
- 2014 Stephen and Ruth Wainwright Fellowship, University of Washington. \$1,200.

2014 Conference and Research Grant, UCLA. \$1,500.  
2014 Travel Award, National Evolutionary Synthesis Center. \$600.  
2013 Travel Stipend, Society for the Study of Evolution. \$500.

## COMPUTER SKILLS

Computer programming (Python, R, Ruby, JavaScript, Perl, C, C++, Rust); System administration (macOS, Linux, Docker); Document markup (CSS,  $\text{\LaTeX}$ , HTML, Pandoc); Database administration (MySQL, PostgreSQL, SQLite)

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Last updated: April 7, 2024