

## Katya L. Mack

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### EDUCATION

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| University of California, Berkeley, CA<br>Ph.D., Integrative Biology<br>Advisor: Dr. Michael Nachman                               | 2013-2018 |
| University of Michigan, Ann Arbor, MI<br>Anthropology B.S., Ecology and Evolutionary Biology Minor, Highest Honors and Distinction | 2008-2012 |

### PROFESSIONAL EXPERIENCE

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| <b>Stanford University</b> , Department of Biology, Stanford CA<br>National Institute of Health NRSA Postdoctoral Fellow<br>Center for Computational, Evolutionary, and Human Genomics Postdoctoral Fellow<br>Supervisor: Dr. Hunter Fraser | 2019-Present |
| <b>University of California, Berkeley</b> , Department of Integrative Biology & Museum of Vertebrate Zoology, Berkeley, CA<br>PhD student, supervisor: Dr. Michael Nachman  | 2013-2018    |
| <b>University of Michigan, Ann Arbor</b> , MI<br>Research assistant, supervisor: Dr. Patricia Wittkopp  | 2011-2012    |
| <b>Field Museum</b> , Human Origins Department, Chicago IL<br>Undergraduate Intern, supervisor: Dr. Robert Martin   | 2009, 2010   |

### PUBLICATIONS

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\*Contributed equally

#### *Preprints and manuscripts in review*

14. **Mack KL**, Square TA, Zhao B, Miller CT, Fraser HB. Evolution of spatial and temporal cis-regulatory divergence between marine and freshwater sticklebacks. *Submitted*. BioRxiv: <https://www.biorxiv.org/content/10.1101/2022.09.30.510353v1>
13. Talbott HE\*, **Mack KL**\*, Griffin M, Guardino NJ, Parker JBL, Spielman AF, Davitt MF, Mascharak S, Berger MJ, Wan DC, Fraser HB, Longaker MT. Allele-specific expression reveals genetic drivers of tissue regeneration in mice. *In Revision* (Cell Stem Cell). BioRxiv: <https://www.biorxiv.org/content/10.1101/2022.09.23.509223v1>
12. Ballinger MA\*, **Mack KL**\*, Durkin SM, Ridell EA, Nachman MW. Cis-regulatory changes are environmentally stable and underlie rapid climatic adaptation in wild mice. *In Review* (PNAS). BioRxiv: <https://www.biorxiv.org/content/10.1101/2022.08.29.505745v1>

#### *In print*

11. Bittner NKJ, **Mack KL**, and Nachman MW. Convergent patterns of gene expression and protein evolution associated with adaptation to desert environments in rodents. *Genome Biology and*

*Evolution (Accepted)*. BioRxiv: <https://www.biorxiv.org/content/10.1101/2021.09.10.459863v1>

10. **Mack KL**, Jaggard JB, Persons JL, Roback EY, Passow CN, Stanhope BA, Ferrufino E, Tsuchiya D, Smith SE, Slaughter BD, Kowalko J. 2021. Repeated evolution of circadian clock dysregulation in cavefish populations. *PLoS genetics* 17(7):e1009642.
9. Bittner NKJ, **Mack KL**, and Nachman MW. 2021. Gene expression plasticity and desert adaptation in house mice. *Evolution* 75(6): 1477-1491.
8. Suzuki TA, Phifer-Rixey M, **Mack KL**, Sheehan MJ, Lin TT, Bi K, Nachman MW. 2019. Host genetic determinants of the gut microbiota of wild mice. *Molecular Ecology* 13: 3197-3207. (*F1000 recommended*)
7. **Mack KL**, Phifer-Rixey M, Harr B, Nachman MW. 2019. Gene expression networks across multiple tissues are associated with rates of molecular evolution in wild house mice. *Genes* 10(3): 225.
6. **Mack KL**, Ballinger MA, Phifer-Rixey M, Nachman MW. 2018. Gene regulation underlies environmental adaptation in house mice. *Genome research* 28:1636-1645.
5. Phifer-Rixey M, Bi K, Ferris KG, Sheehan MJ, Lin D, **Mack KL**, Keeble SM, Suzuki TA, Good JM, and Nachman MW. 2018. The genomic basis of environmental adaptation in house mice. *PLoS genetics* 14:e1007672.
4. **Mack KL** and Nachman MW. 2017. Gene regulation and speciation. *Trends in Genetics* 33: 68–80.
3. **Mack KL**, Campbell P, Nachman MW. 2016. Gene regulation and speciation in house mice. *Genome research* 26: 451-461.
2. Holmes MW, Hammond TT, Wogan GO, Walsh RE, LaBarbera K, Wommack EA, Martins FM, Crawford JC, **Mack KL**, Bloch LM, Nachman MW. 2016. Natural history collections as windows on evolutionary processes. *Molecular ecology* 25: 864-881.
1. Duveau F, Metzger BP, Gruber JD, **Mack K**, Sood N, Brooks TE, Wittkopp PJ. 2014. Mapping small effect mutations in *Saccharomyces cerevisiae*: impacts of experimental design and mutational properties. *G3: Genes | Genomes | Genetics* g3-114.

## SELECTED PRESENTATIONS

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### Selected conference presentations

2020. “Repeated evolution of circadian clock dysregulation in cavefish populations.” The Allied Genetics Conference (TAGC), Online due to COVID-19 (Talk).
2018. “The genomic basis of environmental adaptation in house mice.” Joint ASN/SSB/SSE/ESEB meeting, Montpellier, FR (Talk).
2018. “Copy number variation in natural populations of house mice (*Mus musculus domesticus*) along an environmental gradient.” Population, Evolutionary and Quantitative Genetics Conference, Madison, WI (Poster).
2018. “Adaptive variation in gene regulation in mice.” Society for Integrative and Comparative Biology, San Francisco, CA (Talk).
2016. “Environmental adaptation in house mice: the role of gene regulation along a latitudinal cline.” Society for the Study of Evolution, Portland, OR (Talk).

2016. "A role for disrupted gene regulation in speciation in house mice." Society for the Study of Evolution, Austin, TX (Talk).
2015. "Divergence in gene regulation associated with reproductive isolation in house mice." Genetics, Development & Evolution Symposium, 2015, Berkeley, CA (Talk).
2014. "Divergence in gene regulation associated with reproductive isolation in house mice." Society for the Study of Evolution, Raleigh, NC (Talk).

Invited talks

2021. "Complex trait evolution through the lens of gene regulation." University of Chicago, IL (online).
2020. "Gene expression regulation and environmental adaptation." PEEC seminar, University of Illinois, Urbana-Champaign, IL (online).
2018. "Gene regulation in speciation and adaptation." Duke University, Durham, NC.
2017. "Environmental adaptation in house mice: the role of gene regulation along a latitudinal cline." UC Berkeley, Berkeley, CA.
2017. "A role for regulatory evolution in house mouse adaptation and speciation." Center for Population Biology Seminar Series. UC Davis, Davis, CA.
2015. "Gene regulation and speciation in house mice. Integrative Biology Seminar Series." UC Berkeley, Berkeley, CA.

**FELLOWSHIPS AND AWARDS**

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National Institute of Health NRSA Postdoctoral Fellowship (\$192,170)	2019
National Science Foundation Postdoctoral Fellowship in Biology ( <i>declined</i> ) (\$138,000)	2019
Center for Computational, Evolutionary, and Human Genomics Postdoctoral Fellowship Stanford University, CA (\$30,000)	2019
Jerry O. Wolff Graduate Student Fellowship (\$11,000) Museum of Vertebrate Zoology, UC Berkeley, CA	2017
Doctorate Dissertation Improvement Grant, National Science Foundation (\$20,357)	2016
Integrative Biology Research Grant, UC Berkeley (\$1,929)	2015
David and Marvalee Wake Fund Grant, UC Berkeley (\$2,000)	2015
Reshetko Family Scholarship Grant, UC Berkeley (\$2,061)	2015
Louise Kellogg Fund Grant, UC Berkeley (\$2,000)	2014

**TEACHING EXPERIENCE**

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- Cold Spring Harbor Laboratory**, Watson School of Biological Sciences 2018
- Instructor, Population Genetics, Evolution Topics Course
- UC Berkeley**, Department of Integrative Biology 2013-2018
- Graduate Student Instructor: Human Genetics (2018), Evolutionary Medicine (2015, 2017), Evolution and Earth History: From Genes to Fossils (2016), General Biology (2013, 2014, 2015, 2016, 2018)
  - Guest lecturer, Evolution and Earth History: From Genes to Fossils (IB167) (2016)
- UC Berkeley, Computational Genomics Resource Laboratory** 2016, 2017, 2018
- Instructor, developed and taught five workshops on data analysis for computational genomics for the UC Berkeley Computation Resource Laboratory
  - Workshops: (1) Introduction to gene expression analysis, (2) RNA-seq for eukaryotic organisms, (2) RNA-seq workshop for model and non-model systems (x 2), (3) RNAseq workshop: from FASTQ files to differential expression

Monmouth University, Department of Biology

2018, 2019

- Guest lecturer, Evolution course

University of Michigan, Ann Arbor, Science Learning Center

2011-2012

- Study Group Facilitator for the Science Learning Center, Introductory Biology (Molecular, Cellular, and Developmental) course

## SERVICE AND OUTREACH

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### 1. Mentoring undergraduates in research:

- Mentored undergraduates through the UC Berkeley's Undergraduate Research Apprenticeship Program (URAP) and in individual research projects (2016-2022)
- Primary postdoctoral mentor for a graduate rotation student, Fraser Lab, Stanford (2019)

### 2. Science outreach & education:

- Volunteer teacher in Berkeley middle schools through the Community Resources for Science "Be A Scientist" program (for K-12 students) (2017-2018)
- Mentor and volunteer for Stanford University Biology Preview Program (geared towards undergraduates applying to biology PhD programs from diverse backgrounds) (2019-2022)
- Pen pal for Letters to a Pre-Scientist program (for K-12 students) (2019-2021)
- Volunteer and presenter at UC Berkeley's campus outreach event CalDay (2014-2018)

### 3. Resource and curriculum development:

- Developed and taught 5 freely available and online accessible workshops for the UC Berkeley Computational Genomics Resource Laboratory
- Developed course material for the graduate student evolution course at Cold Spring Harbor Laboratory
- Created and presented guest lectures for courses at UC Berkeley and Monmouth University, NJ

### 4. Service to scientific community:

- Session chair for Early Career Gordon Research Seminar (Speciation 2022, topic: Genetics of speciation - from simple incompatibilities to complex traits)
- Student representative for Quantitative Systems Biology Search committee, UC Berkeley
- Manuscript reviewer for scientific journals including Genetics, Molecular Biology and Evolution, Biology Letters, Evolution Letters, Molecular Ecology, PLoS Genetics