

# Michael J. Koontz

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## EDUCATION

- Ph.D., Ecology; University of California, Davis 2014 - 2019  
*Committee:* Andrew Latimer, Malcolm North, Connie Millar  
*Dissertation:* The effect of vegetation spatial structure on forest resilience to wildfire and bark beetle disturbance in the Sierra Nevada, California
- M.Sc., Ecology; Colorado State University 2012 - 2014  
*Committee:* Ruth Hufbauer, Tom Hobbs, Brett Melbourne  
*Thesis:* The eco-evolutionary consequences of multiple introductions for colonizing individuals
- B.Sc. with highest honors, Biology; University of Hawaii at Hilo 2007 - 2009  
*Concentration:* Ecology, Evolution, and Conservation Biology

## PROFESSIONAL EXPERIENCE

- CU Boulder Earth Lab/CIRES Research Scientist 2/2021 - present  
CU Boulder Earth Lab/CIRES Postdoctoral Research Associate 2019 - 2021  
UC Davis Department of Plant Sciences Graduate Student Researcher 2015 - 2019  
UC Davis Graduate Group in Ecology Fellow 2014 - 2016  
NSF Graduate Research Fellow 2013 - 2018

## PUBLICATIONS

12. Iglesias, Virginia, Anna E. Braswell, Maxwell B. Joseph, Caitlin McShane, Matthew W. Rossi, Megan E. Cattau, **Michael J. Koontz**, Joe McGlinchy, R. Chelsea Nagy, Jennifer K. Balch, Stefan Leyk, and William R. Travis. Risky development: Increasing exposure to natural hazards in the United States. *Earth's Future*. 9 (7): e2020EF001795. <https://doi.org/10.1029/2020EF001795>
11. Oldfather, Meagan F., **Michael J. Koontz**, Daniel F. Doak, David D. Ackerly. 2021. Range dynamics mediated by compensatory life stage responses to experimental climate manipulations. *Ecology Letters*. 24 (4): 772-280. <https://doi.org/10.1111/ele.13693>  
GitHub repository: <https://github.com/meaganoldfather/experimental-ivesia-ipms>
10. **Koontz, Michael J.**, Andrew M. Latimer, Leif A. Mortenson, Christopher J. Fettig, Malcolm P. North. 2021. Cross-scale interaction of host tree size and climatic water deficit governs bark beetle-induced tree mortality. *Nature Communications*. 12: 129. <https://doi.org/10.1038/s41467-020-20455-y>  
\*Editor's Highlight in Climate Change Impacts: <https://www.nature.com/collections/hcfhgcahdc>  
*EcoEvoRxiv* preprint: <https://doi.org/10.32942/osf.io/jz964>  
GitHub repository: <https://github.com/mikoontz/local-structure-wpb-severity>
9. **Koontz, Michael J.**, Malcolm P. North, Chhaya M. Werner, Stephen E. Fick, and Andrew M. Latimer. 2020. Local forest structure variability increases resilience to wildfire in dry western U.S. coniferous forests. *Ecology Letters*. 23 (3): 483-494. <https://doi.org/10.1111/ele.13447>  
*EcoEvoRxiv* preprint: <https://doi.org/10.32942/osf.io/k72ye>

8. Parks, Sean A., Lisa M. Holsinger, **Michael J. Koontz**, Luke Collins, Ellen Whitman, Marc-André Parisien, Rachel A. Loehman, Jennifer L. Barnes, Jean-François Bourdon, Jonathan Boucher, Yan Boucher, Anthony C. Caprio, Adam Collingwood, Ron J. Hall, Jane Park, Lisa B. Saperstein, Charlotte Smetanka, Rebecca J. Smith, and Nick Soverel. 2019. Giving ecological meaning to satellite-derived fire severity metrics across North American forests. *Remote Sensing*. 11: 1735. <https://doi.org/10.3390/rs11141735>  
\*Editor's Choice article
7. Smithers, Brian V., Meagan F. Oldfather, **Michael J. Koontz**, Jim Bishop, Catie Bishop, Jan Nachlinger, and Seema N. Sheth. 2019. Community turnover by composition and climatic affinity across scales in an alpine system. *American Journal of Botany*. 107: 239-249. <https://doi.org/10.1002/ajb2.1376>  
*bioRxiv* preprint: <https://doi.org/10.1101/659169>
6. **Koontz, Michael J.**, Meagan F. Oldfather, Brett A. Melbourne, and Ruth A. Hufbauer. 2018. Parsing propagule pressure: Number, not size, of introductions drives colonization success in a novel environment. *Ecology and Evolution*. 8 (16): 8043-8054. <https://doi.org/10.1002/ece3.4226>
5. Steel, Zachary L., **Michael J. Koontz**, and Hugh D. Safford. 2018. The changing landscape of wildfire: Burn pattern trends and implications for California's yellow pine and mixed conifer forests. *Landscape Ecology*. 33 (7): 1159-1176. <https://doi.org/10.1007/s10980-018-0665-5>
4. Oldfather, Meagan F., Matthew N. Britton, Prahlad D. Papper, **Michael J. Koontz**, Michelle M. Halbur, Celeste Dodge, Alan L. Flint, Lorraine E. Flint, and David D. Ackerly. 2016. Effects of topoclimatic complexity on the composition of woody plant communities. *AoB Plants*. 8: plw049. <https://doi.org/10.1093/aobpla/plw049>
3. Hufbauer, Ruth A., Marianna Szücs, Emily Kasyon, Courtney Youngberg, **Michael J. Koontz**, Christopher Richards, Ty Tuff, and Brett A. Melbourne. 2015. Reply to Wootton and Pfister: The search for general context should include synthesis with laboratory model systems. *Proceedings of the National Academy of Sciences*. 112 (44): E5904. <https://doi.org/10.1073/pnas.1517210112>
2. Hufbauer, Ruth A., Marianna Szücs, Emily Kasyon, Courtney Youngberg, **Michael J. Koontz**, Christopher Richards, Ty Tuff, and Brett A. Melbourne. 2015. Three types of rescue can avert extinction in a changing environment. *Proceedings of the National Academy of Sciences*. 112 (33): 10557-10562. <https://doi.org/10.1073/pnas.1504732112>
1. Cole, Rebecca J., Creighton M. Litton, **Michael J. Koontz**, and Rhonda K. Loh. 2012. Vegetation recovery 16 years after feral pig removal from a wet Hawaiian forest. *Biotropica*. 44: 463-471. <https://doi.org/10.1111/j.1744-7429.2011.00841.x>

## REFEREED BOOK CHAPTERS

1. Miller, Jesse E. D., Carly D. Ziter, and **Michael J. Koontz**. In press. Fieldwork in landscape ecology. Invited chapter in *The Routledge Handbook of Landscape Ecology*.  
*EcoEvoRxiv* preprint: <https://doi.org/10.32942/osf.io/h8gsq>

## SUBMITTED WORK

- Koontz, Michael J.**, Victoria M. Scholl, Anna I. Spiers, Megan E. Cattau, John Adler, Joe McGlinchy, Tristan Goulden, Brett A. Melbourne, Jennifer K. Balch. Democratizing macroecology: integrating uncrewed aerial systems with the National Ecological Observatory Network. Revisions requested for *Ecosphere*. [[GitHub](#)]
- Balch, Jennifer K., John T. Abatzoglou\*, Maxwell B. Joseph\*, **Michael J. Koontz\***, Adam L. Mahood\*, Joseph McGlinchy\*, Megan E. Cattau, A. Park Williams. Warming weakens the nighttime barrier to global fire. Revisions in review for *Nature*.  
\*Equally contributing second authors

Joseph, Maxwell B., Anna I. Spiers, **Michael J. Koontz**, Nayani Ilangakoon, Kylen Solvik, Nathan Quaderer, Joe McGlinchy, Victoria M. Scholl, Lise St. Denis, Chelsea Nagy, Anna Braswell, Matthew W. Rossi, Lauren Herwehe, Leah Wasser, Megan E. Cattau, Virginia Iglesias, Adam Mahood, Fangfang Yao, Stefan Leyk, and Jennifer K. Balch. Ten simple rules for working with high resolution remote sensing data.  
*EcoEvoRxiv* preprint: <https://osf.io/kehqz/>

## RESEARCH GRANTS

Gordon and Betty Moore Foundation	2020 - 2022
<i>Title:</i> "Megafires: Conditions associated with large, destructive California wildfires" (\$152,075)	
<i>Team:</i> <b>Michael J. Koontz</b> (CU Boulder PI), Malcolm P. North, Andrew M. Latimer, Brandon M. Collins, Jennifer K. Balch, Amy DeCastro	
U.S. Forest Service Western Wildlands Environmental Threat Assessment Center	2018
<i>Title:</i> "Using drones to link spatial features of forests and bark beetle-induced mortality at broad spatial scales" (\$7,500)	
<i>Team:</i> <b>Michael J. Koontz</b> (Project lead), Malcolm P. North, Chris J. Fettig, Leif A. Mortenson, Andrew M. Latimer, and Connie I. Millar	
U.S. Forest Service Western Wildlands Environmental Threat Assessment Center	2017
<i>Title:</i> "Assessing forest spatial structure and bark beetle spread using small, unmanned aerial systems (sUAS)" (\$19,420)	
<i>Team:</i> <b>Michael J. Koontz</b> (Project lead), Malcolm P. North, Chris J. Fettig, Leif A. Mortenson, Andrew M. Latimer, and Connie I. Millar	

## OPEN EDUCATIONAL RESOURCES

Michonneau, François, and 104 co-authors. 2019. Data Carpentry R Ecology Lesson v2019.06.1. Zenodo. <a href="https://doi.org/10.5281/zenodo.3264888">https://doi.org/10.5281/zenodo.3264888</a>	2019
O'Brien, Lauren, Joseph Stachelek, Tracy Teal, Dev Paudel, Paul Miller, Anne Fouilloux, Chris Prener, Ethan P. White, Katrin Leinweber, <b>Michael J. Koontz</b> , and Whalen. 2019. Data Carpentry: Introduction to Geospatial Concepts v2019.06.1. Zenodo. <a href="https://doi.org/10.5281/zenodo.3258814">https://doi.org/10.5281/zenodo.3258814</a>	2019
Peek, Ryan A. and <b>Michael J. Koontz</b> . 2018. R for Data Analysis and Visualization in Science (R-DAVIS) v1.0.0. GitHub. <a href="https://gge-ucd.github.io/R-DAVIS/">https://gge-ucd.github.io/R-DAVIS/</a>	2018
<b>Koontz, Michael J.</b> and Ryan A. Peek. 2017. Data Carpentry Week: Introduction to R. v1.0.0. GitHub. <a href="https://mikoontz.github.io/data-carpentry-week/">https://mikoontz.github.io/data-carpentry-week/</a>	2017

## TEACHING EXPERIENCE

### *Lead or Co-lead Instructor*

ECL298 R for Data Analysis and Visualization in Science (R-DAVIS)	2018
A quarter-long, 2-credit graduate course at the University of California, Davis teaching scientific computing skills (data/project management, version control, reproducible workflows using the programming language R) to 25+ ecologists. Adopted as part of the required curriculum for the graduate program.	
Data Carpentry: Data Analysis and Visualization in R for Ecologists	2018
A 1.5 hour workshop teaching scientific computing skills to undergraduates in Boulder, Colorado.	
Data Carpentry: Geospatial Workshop	2018
A 2-day workshop teaching spatial data science skills in Davis, California.	
Data Carpentry Week: Introduction to R	2017

A week-long workshop teaching scientific computing skills to 25+ learners as part of the Data Intensive Biology Summer Institute at the University of California, Davis.

ECOL592 Introduction to R 2014

A semester-long, 1-credit graduate course teaching data manipulation and visualization using R to 20+ grad students, professors, postdocs, undergraduates, and local professionals learners at Colorado State University.

*Teaching assistant*

Data Skills in R, Cornerstone Research 2016

PLS206 Applied Multivariate Modeling; University of California, Davis 2016

R Bootcamp; University of California, Davis 2015

LIFE320 Ecology, Colorado State University 2013

LIFE102 Biology Laboratory, Colorado State University 2012

*Guest lecturer*

“High quality plots using base R graphics” Davis R Users Group (D-RUG) 2015

“Invasion Biology” LIFE320 Ecology, Colorado State University 2013

*Formal training*

Educational psychology & instructional design, SoftwareCarpentry 2016

**SKILLS AND PROFICIENCIES**

*Data manipulation and visualization:* R (`tidyverse`, `data.table`, `tmap`)

*GIS:* Google Earth Engine JavaScript and Python APIs, R (`raster`, `sf`, `lidR`), QGIS, CloudCompare

*Remote sensing:* Drones, multispectral sensors, FAA-licensed Remote Pilot (2017 to present)

*Inference:* Hierarchical modeling in R using Bayesian frameworks (`brms`, `NIMBLE`) and maximum likelihood (`lme4`), population dynamics in R (simulations, integral projection models)

*Fieldwork:* Vegetation plot establishment, tree stem mapping using laser instruments, GLORIA multi-summit approach

*Version control:* git, GitHub

*Dynamic documents:* RMarkdown, L<sup>A</sup>T<sub>E</sub>X

## INVITED TALKS

- Koontz, Michael J.**, Andrew M. Latimer, Christopher J. Fettig, Leif A. Mortenson, Malcolm P. North. 2019-11-14. Drone-enabled forestry: drivers of tree mortality across multiple scales in a hot drought. Yosemite Forum. Yosemite National Park, CA. 2021 (upcoming)
- Koontz, Michael J.**, Andrew M. Latimer\*, Christopher J. Fettig, Leif A. Mortenson, Malcolm P. North. 2019-11-14. Differential response of a tree-killing bark beetle to forest structure across a gradient of climatic water deficit. California Forest Pest Council Annual Meeting. Davis, CA. 2019  
\*Presenting author
- Koontz, Michael J.**, Andrew M. Latimer, Leif A. Mortenson, Christopher J. Fettig, and Malcolm P. North. 2019-4-30: Differential response of a tree-killing bark beetle to forest structure across a gradient of climatic water deficit. Intermountain Drone Ecology Network workshop, Boulder, CO. 2019
- Koontz, Michael J.**, Malcolm P. North, Christopher J. Fettig, Leif A. Mortenson, Constance I. Millar, Malcolm P. North. 2018-03-22. Using drones to link spatial structure of forests and insect outbreaks. University of California Cooperative Extension North Coast Forest Health Meeting. Eureka, CA. 2018
- Koontz, Michael J.**, Andrew M. Latimer, Christopher J. Fettig, Leif A. Mortenson, Constance I. Millar, Malcolm P. North. 2017-11-15. Using drones to go beyond stand density: Spatial features of western pine beetle-attacked forests. California Forest Pest Council Annual Meeting. Davis, CA. 2017

## CURRENT COLLABORATIONS

- Koontz, Michael J.**, Zachary L. Steel, Andrew M. Latimer, and Malcolm P. North. Initial wildfire suppression efforts select for more extreme fuel and climate burning conditions in Sierra Nevada forests. [\[GitHub\]](#)
- Koontz, Michael J.**, Malcolm P. North, Amy DeCastro, Jennifer K. Balch, and Andrew M. Latimer. Fine-scale drivers of California megafires. [\[GitHub\]](#)
- Huesca, Margarita, **Michael J. Koontz**, Alexander Koltunov, Yuhan Huang, Andrew M. Latimer, Yufang Jin. Tree mortality assessment using imaging spectroscopy data in the Sierra Nevada mountains.
- Provost, Mikaela, Jan Ng, Jessica Rudnick, Linda Estelí Méndez Barrientos, Steven P. Lee, **Michael J. Koontz**, Emilio A. Laca. Novel integration of holistic review and statistical analysis to rank applications in an R1 STEM graduate program.

## AWARDS AND HONORS

- Plant Sciences Graduate Student Travel Award (\$1,000) 2018
- Nominated for Outstanding Graduate Student Teaching Award 2017
- Plant Sciences Graduate Student Travel Award (\$1,000) 2016
- College of Agriculture Ag Day Scholarship (\$1,000) 2014
- Front Range Student Ecology Symposium 3rd Place Oral Presentation 2014
- Colorado State Graduate Degree Program in Ecology Travel Award (\$500) 2014
- Ynez Morey and Chuck Reagin Memorial Entomology Scholarship (\$1,000) 2013
- Colorado State University Graduate Fellowship (\$1,500) 2012
- CSU Programs for Research and Scholarly Excellence Fellowship (\$2,339) 2012
- University of Hawaii at Hilo Outstanding Senior in Biology 2009
- Hawaii Audubon Society Rose Shuster Taylor Scholarship (\$1,838) 2008
- AmeriCorps Education Award (\$4,750) 2006

## REVIEWING SERVICE

rOpenSci R packages ([ccafs](#)), Environmental Research Letters, Forests, Remote Sensing in Ecology and Conservation, Journal of Theoretical Biology, Ecography, Oikos, Global Ecology and Biogeography

## PROFESSIONAL MEMBERSHIPS

GLORIA Great Basin (<https://www.gloriagreatbasin.org/>)

Secretary, Board Member, Data Manager

2017 - present

Volunteer

2013 - present

Ecological Society of America

2014 - present

American Alpine Club

2016 - present