








## Vadim A. Karatayev

Takeru Higuchi Bldg, University of Kansas  
Lawrence, KS 66045

Email: [vadimk@ku.edu](mailto:vadimk@ku.edu)  
Website: [aqeco-vadim.weebly.com](https://aqeco-vadim.weebly.com) 

- RESEARCH INTERESTS** I use theory and large-scale field data to understand conditions that erode or reinforce resilience in complex ecosystems. In the process, I explore fundamental questions at the interface of community and landscape ecology as well as applied questions ranging from invasive species impacts to conservation in coupled human-environment systems.
- EDUCATION** **University of California, Davis**, California USA  
Ph.D., Ecology, 2014 - December 2019. Advisor: Marissa L. Baskett  
Dissertation topic: Alternative stable states in heterogeneous and diverse ecosystems.  
**Cornell University**, Ithaca, New York USA  
B.S., Biological Sciences with honors *Summa Cum Laude*, May 2014.
- PROFESSIONAL EXPERIENCE** **NSF Postdoctoral fellow**, University of Kansas and NOAA SWFSC (2021-2024).  
**Postdoctoral scholar**, University of Guelph, Canada (2019-2021).  
**Visiting researcher**, Synergy Program for Analyzing Resilience and Critical transitions. Wageningen University, Netherlands (2018).
- GRANTS AND AWARDS** University of Kansas Postdoctoral Research Achievement Award (2023)  
National Science Foundation postdoctoral research fellowship \$320,000 (2022)  
*Collaborator*: US EPA Great Lakes Monitoring grant \$6,729,000 (2022-2027)  
National Science Foundation Graduate Research Fellowship: \$102,000 (2014)  
UC Davis Graduate Fellowship: \$58,000 (2014, 2017)  
UC Davis - University of Auckland Graduate Research Award: \$10,000 (2016)  
Outstanding poster, Ecological Society of America Conservation Science Session (2015)  
Grace Capen Award for academic excellence (SUNY Buffalo, 2012)  
Outstanding Presentation in Limnology, Great Lakes Research Consortium (2010)
- PUBLICATIONS** [Google Scholar](#)   
[ORCID](#)   
*(open access PDF links  blue)*  
**Code:** [Github](#) 
24. **Karatayev, V.A.**, M.L. Baskett, E.H. van Nes. The potential for alternative stable states in food webs depends on the feedback and on trait diversity. 2023. *American Naturalist* 202:260-275.  
23. **Karatayev, V.A.**, L.G. Rudstam, Karatayev, A.Y., *et al.* Serial species invasions disrupt the time course of ecosystem recovery. *Ecosystems*   
22. Kraemer, B.M., S. Boudet, L.E. Burlakova, L. Haltiner, B.W. Ibelings, A.Y. Karatayev, **V.A. Karatayev**, *et al.* 2023. An abundant future for quagga mussels in deep European lakes. *Environmental Research Letters* 18:124008.  
21. Cuddington, K.F., K.C. Abbot, F.R. Adler, M. Aydeniz, R. Dale, L.J. Gross, A. Hastings, E. Hobson, **V.A. Karatayev**, *et al.* 2023. Challenges and opportunities to build quantitative self-confidence in biologists. *BioScience*  73:364-375.  
20. **Karatayev, V.A.**, M.L. Baskett, D.J. Kushner, N.T. Shears, C.T. Boettiger, and J.E. Caselle. 2021. Grazer behavior can regulate large-scale patterning of community states. *Ecology Letters* 24:1917-1929.  
19. **Karatayev, V.A.**, V.V. Vasconcelos, A. Lafuite, S.A. Levin, C.T. Bauch, and M. Anand. 2021. A well-timed switch from local to global agreements accelerates climate change mitigation. *Nature Communications* 12:1-7.  
18. Fair, K.R., **V.A. Karatayev**, C.T. Bauch, and M. Anand. Behavioural dynamics can mediate the persistence of emerging infectious diseases. *medRxiv*   
17. Fair, K.R. **V.A. Karatayev**, *et al.* 2022. Estimating COVID-19 cases and deaths prevented by non-pharmaceutical interventions and individual actions. *Epidemics*.  
16. **Karatayev, V.A.**, M. Anand, and C.T. Bauch. 2020. Local lockdowns outperform global lockdown on the far side of the COVID-19 epidemic curve. *Proceedings of the National Academy of Sciences* 117(39):24575-24580.

15. **Karatayev, V.A.** and M.L. Baskett. 2020. At what spatial scales are alternative stable states relevant in highly interconnected ecosystems? [Ecology 101:e02930](#).
14. **Karatayev, V.A.**, L.E. Burlakova, A.Y. Karatayev, L. Yang, and T. Miller. 2020. Advection exacerbates population decline from habitat loss: maintaining threatened taxa while restoring natural river flow regimes. [Oecologia 193:773-785](#).
13. Karatayev, A.Y., **V.A. Karatayev**, L.E. Burlakova, K. Mehler., M.D. Rowe, A.K. Elgin, and T. Nalepa. 2021. Lake morphometry determines *Dreissena* invasion dynamics. [Biological Invasions 23:2489-2514](#).
12. Oke, K.B., P.H. Westley, C.J. Cunningham, M.L. Baskett, S.M. Carlson, J. Clark, A.P. Hendry, **V.A. Karatayev**, et al. 2020. Recent declines in salmon body size impact ecosystems and fisheries. [Nature Communications 11:4155](#).
11. Karatayev, A.Y., **V.A. Karatayev**, L.E. Burlakova, M.D. Rowe, K. Mehler, and M.D. Clapsadl. 2018. Food depletion regulates the demography of invasive dreissenid mussels in a stratified lake. [Limnology and Oceanography 63:2065-2079](#).
10. **Karatayev, V.A.**, C. Kraft, and E. Zipkin. 2015. Racing through life: maturation rate plasticity regulates overcompensation and increases persistence. [Ecosphere 6:203](#).
9. **Karatayev V.A.**, A.Y. Karatayev, L.E. Burlakova, and L.G. Rudstam. 2014. Eutrophication and *Dreissena* invasion as drivers of biodiversity: a century of change in the mollusc community of Oneida Lake. [PLoS ONE 9:e101388](#).
8. Karatayev, A.Y., L.E. Burlakova, C. Pennuto, J. Ciborowski, **V.A. Karatayev**, P.A. Juette, and M. Clapsadl. 2014. Twenty five years of changes in *Dreissena* spp. populations in Lake Erie. [Journal of Great Lakes Research 40:550-559](#).
7. **Karatayev, V.A.**, A.Y. Karatayev, L.E. Burlakova, and D.K. Padilla. 2013. Lakewide dominance does not predict the invader species for dreissenids. [Journal of Great Lakes Research 39:622-629](#).
6. Burlakova, L.E., A.Y. Karatayev, and **V.A. Karatayev**. 2012. Invasive mussels induce community changes by increasing habitat complexity. [Hydrobiologia 685:121](#).
5. Burlakova, L.E., A.Y. Karatayev, **V.A. Karatayev**, M.E. May, D. Bennett, and M. Cook. 2011. Biogeography and conservation of freshwater mussels (Bivalvia: Unionidae) in Texas: Patterns of diversity and threats. [Diversity and Distributions 17:393-407](#).
4. Burlakova, L.E., A.Y. Karatayev, **V.A. Karatayev**, M.E. May, D.L. Bennett, and M.J. Cook. 2011. Endemic species: contribution to community uniqueness, effect of habitat alteration, and conservation priorities. [Biological Conservation 144:155-165](#).
3. Karatayev, A.Y., L.E. Burlakova, **V.A. Karatayev**, and D. Boltovskoy. 2010. *Limnoperna fortunei* vs. *Dreissena polymorpha*: Population densities and benthic community impacts of two invasive freshwater bivalves. [Journal of Shellfish Research 29:975-985](#).
2. Boltovskoy, D., A.Y. Karatayev, L.E. Burlakova, D. Cataldo, **V.A. Karatayev**, F. Sylvester, and A. Mariñelarena. 2009. Significant ecosystem-wide effects of the swiftly spreading invasive freshwater bivalve *Limnoperna fortunei*. [Hydrobiologia 636:271-284](#).
1. Karatayev, A.Y., L.E. Burlakova, **V.A. Karatayev**, and D.K. Padilla. 2009. Introduction, distribution, spread, and impacts of exotic freshwater gastropods in Texas. [Hydrobiologia 619:181-194](#).

## MENTORSHIP

### Undergraduate research mentor:

Environmental data science and time series forecasting (7 students, 2023)

Theoretical ecology (9 students, 2016-2020)

**Grant writing mentor** (2017). Co-led discussion seminar and gave detailed weekly writing feedback to 8 NSF Graduate Research Fellowship applicants.

V.A. Karatayev. [Writing fundamental research papers: an informal primer \(PDF\)](#) [↗](#).

V.A. Karatayev. [Finding a good postdoc: an academic-track perspective \(PDF\)](#) [↗](#).

## TEACHING EXPERIENCE

**Environmental Data Science Workshop**, Haskell Indian Nations University (2022).  
**R Workshop**, UC Davis (2016, 2021) Introduced graduate students to programming.  
**ECL 290 Scales in Ecology**, UC Davis (2019). Organized and led a graduate seminar synthesizing research on scaling relationships and pattern formation in ecology.  
Teaching assistant, **ESP 121 Population Ecology**, UC Davis (2018). Introduced students to dynamical models and led computer labs in R.  
Teaching assistant, **WFC 122 Population Dynamics and Estimation**, UC Davis (2015). Introduced students to statistics and population models, led computer labs.  
Teaching assistant, **BIOEE 3610 Advanced Ecology**, Cornell University (2013). Labs in formulating and simulating population and community models.  
**Training** - EDU390 College Teaching: hands-on study of theory, methods, assessment.

## SERVICE AND OUTREACH

### Diversity, equity, and inclusion:

Environmental Data Science Participation: Workshop at Haskell Indian Nations University, Lawrence, KS (18 students, 2022)

Graduate mentorship - careers: EEB Mentor Match program (2021-present);  
Graduate Academic Achievement and Advocacy Program (2017);  
Postdoc-PhD mentorship panels (2019, 2020, 2021)

Graduate mentorship - research: advice and detailed feedback on writing to 15 under-represented NSF Graduate Research Fellowship applicants (2015-present)

Graduate admissions: reviewed applications and helped develop new scoring criteria to improve DEI in graduate group (2016, 2017, 2018, UC Davis)

Skype a Scientist: Teaching middle and high school lessons on kelp forests, animal behavior, and modeling (2021-present; 13 classrooms, ~320 students)

### Media outreach:

Salmon size decline: [The Guardian](#), The Narwhal, Scientific American

COVID-19 management: 750 Radio News, [The Conversation](#), [CBC The National](#), The Toronto Star, CTV News, Guelph Mercury, CBC Kitchener-Waterloo

**Manuscripts reviewed**: Ecology Letters, Proceedings of the Royal Society B, The American Naturalist, Ecological Applications, Oikos, Theoretical Ecology (2), Hydrobiologia, Journal of Great Lakes Research, PeerJ, Journal of Tropical Biology, Frontiers in Ecology and Evolution (6)

**Symposium organizer**, Beyond Equilibrium Dynamics: Causes and Consequences of Population Fluctuations in Ecology. Ecological Society of America 2023, Portland, Oregon.

**Symposium organizer**, Stability Across Spatial, Temporal, and Taxonomic Scales. Ecological Society of America 2022, Montreal, Canada.

**Review Editor**, Frontiers in Ecology and Evolution

**INVITED TALKS** Department of Ecology and Evolutionary Biology, University of Kansas. 2024.  
International Initiative for Theoretical Ecology. 2023. [YouTube](#).  
Virginia Institute of Marine Science. 2023.  
Coastal Studies Institute, East Carolina University. 2023.  
Department of Oceanography, University of Georgia. 2023.  
Department of Biology, University of Maryland. 2023.  
NOAA Southwest Fisheries Science Center. Santa Cruz, California. 2022.

Department of Ecology and Evolutionary Biology, University of Connecticut. 2022.  
 Department of Biology, University of Pittsburgh. 2021.  
 Integrative Biology Department, University of Texas, Austin. 2021.  
 International Initiative for Theoretical Ecology. 2020. [YouTube](#)   
 Biology Department Seminar, SUNY Buffalo State, NY, USA. 2020.  
 Université Paris Dauphine, COVID-19 seminar series. 2020. [YouTube](#)   
 Integrative Biology Department Seminar, University of Guelph, ON, Canada. 2020.  
 Center for Population Biology Seminar, University of California Davis, CA, USA. 2019.  
 Royal Netherlands Institute of Sea Research, Yerseke, Netherlands. 2018.  
 Synergy Program for Analyzing Resilience, Wageningen, Netherlands. 2018.  
 Cornell Biological Field Station, Bridgeport, NY, USA. 2017.  
 University of Auckland Leigh Marine Lab, Leigh, New Zealand. 2016.

## CORE TOOLS

**Software:** R, Program MARK, Slurm, Github, L<sup>A</sup>T<sub>E</sub>X

**Methods:** Nonlinear dynamics, Integral projection (integrodifference) models, Stochastic dynamics (individual-based models), Matrix models, Time-delay embedding  
 Maximum likelihood and Bayesian optimization, Generalized additive models, Mark-and-recapture, Clustering analyses, Gaussian Processes, High-performance computing

## WORKING GROUPS

Patterns, causes, and consequences of synchrony in giant kelp forest populations. (2021)

Building biologists' quantitative self-confidence. NIMBIOS working group. (2020)

Causes of Alaskan Salmon size decline. NCEAS working group, Anchorage, AK (2017)

Uncertainty, Sensitivity, and Predictability in Ecology: Mathematical Challenges and Ecological Applications. Mathematical Biosciences Institute, Columbus, OH (2015)

Biological Rhythms and Oscillations Graduate Program. Mathematical Biosciences Institute, Columbus, OH (2014)

**Membership:** Ecological Society of America, Society for Mathematical Biology, Western Society of Naturalists, American Society of Naturalists, Association for the Sciences of Limnology and Oceanography, International Association for Great Lakes Research