

Elena Litchman

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Research Interests

Community and ecosystem ecology, algal ecology, physiology and evolution, microbial ecology, aquatic ecology, trait-based approaches, limnology and oceanography, global change, experimental evolution, invasive microbes, harmful algal blooms, algal biofuels

Education

- 1997 Ph.D. in Ecology, University of Minnesota
Dissertation: *Competition and coexistence of phytoplankton under fluctuating light*
Advisors: Robert W. Sterner and David Tilman
- 1990 Honors Diploma in Biology (Ecology and Hydrobiology), Moscow State University, Russia

Positions Held

- 2016- MSU Foundation Professor, Kellogg Biological Station and Department of Integrative Biology (formerly Zoology), Michigan State University
- 2015-2016 Professor, MSU
- 2006–present Adjunct Assistant, Associate and Full Professor, Plant Biology Department, MSU
- 2010-2015 Associate Professor, Kellogg Biological Station and Zoology Department, MSU
- 2011-2012 Sabbatical Visiting Scientist, Section of Ocean Ecology and Climate, Danish Technical University (DTU), Denmark
- 2005–2010 Assistant Professor, Michigan State University, W.K. Kellogg Biological Station and Zoology Department
- 2003–2005 Research Scientist II (equivalent to non tenure-track assistant professor), School of Biology, Georgia Institute of Technology, GA
- 2001–2002 Postdoctoral Associate, Institute of Marine and Coastal Sciences, Rutgers University, NJ (with Paul G. Falkowski and Oscar M. Schofield)
- 2000–2001 Postdoctoral Researcher, Limnological Research Centre, Swiss Federal Institute for Environmental Science and Technology, Switzerland (with Peter Bossard)
- 1998–2000 Smithsonian Institution Postdoctoral Fellow, Smithsonian Environmental Research Center, MD (with Patrick J. Neale)
- 1995 Visiting Research Fellow, Swiss Federal Institute for Environmental Science and Technology, Switzerland (with Claudia Pahl-Wostl)
- 1992–1993, 1997 Research Assistant, Limnological Research Center, University of Minnesota (with Joe Shapiro and Amy Leventer)

Awards and Honors

- 2017 Petersen Foundation Excellence Award, IFM-GEOMAR, Germany
- 2016 Michigan State University Foundation Professorship

- 2010 Presidential Early Career Award for Scientists and Engineers (PECASE)
- 2009 NSF CAREER Award
- 2009 Editor's citation, Outstanding Reviewer for *Limnology and Oceanography*
- 2005 President's Undergraduate Research Faculty Mentor Award, Georgia Tech
- 1998–2000 Smithsonian Institution Postdoctoral Fellowship
- 1997 Outstanding Teaching Assistant Award, College of Biological Sciences, University of Minnesota
- 1995–1996 Summer Fellowship, Department of Ecology, Evolution and Behavior, University of Minnesota
- 1995 NSF Doctoral Dissertation Improvement Grant (DDIG) Award
- 1995–1997 University of Minnesota Travel Awards
- 1995 Summer Fellowship, Swiss Federal Institute for Environmental Science and Technology
- 1988–1990 Academician Ovchinnikov Fellowship, Moscow State University, Russia

External Funding

- 2017 National Institute for Mathematical and Biological Synthesis (NIMBioS) Investigative Workshop: *Ecology meets systems biology: developing a pan-microbial trait-based framework for community ecology and ecosystem functioning*, **Lead PI**, with C. Hawkes (UT Austin) and C. Klausmeier (MSU)
- 2016-2020 NSF (Dimensions of Biodiversity): Collaborative Research: *Genetic, functional and phylogenetic diversity determines marine phytoplankton community responses to changing temperature and nutrients* (\$2M, MSU part \$640,989). **Lead PI**, with C. Klausmeier (MSU), D. Hutchins (USC) and T. Rynearson (URI)
- 2015-2018 Simons Foundation (Targeted Grants in the Mathematical Modeling of Living Systems): *Microscopic foundations for macroecological patterns* (\$599,583), co-PI with C. Klausmeier (PI)
- 2015-2017 Defense Advanced Research Projects Agency (DARPA) Biological Robustness in Complex Systems (BRICS): *Trait-based Models for Complex Microbial Communities* (\$801,210), co-PI with C. Klausmeier (PI)
- 2014 National Evolutionary Synthesis Center (NESCent) Catalysis Meeting on *Evolution and Community Ecology of Host-Associated Microbiota*, **lead PI**, with T. Schmidt (U Michigan)
- 2013-2016 NSF (Cyber-enabled sustainability science and engineering [CyberSEES]): *Towards sustainable aquatic ecosystems: a new adaptive sampling and data-enabled monitoring and modeling framework* (\$800,000), co-PI with X. Tan (PI), P. Mantha, H. Radha, G. Xing (MSU)
- 2011-2016 NSF (Dimensions of Biodiversity): Collaborative Research: *Lake Baikal responses to global change: the role of genetic, functional and taxonomic diversity in the plankton* (\$2M, MSU part \$599,941), **lead PI**, with C. Klausmeier (MSU), S. Hampton (UCSB), M. Moore (Wellesley), E. Theriot (UT Austin) and L. Yampolsky (ETSU)
- 2011-2016 NSF (Chemical, Bioengineering, Environmental and Transport Systems: Energy for Sustainability): *Experimental and theoretical trait-based approaches to optimizing algal biofuel polycultures* (\$328,537), **lead PI**, with C. Klausmeier

- 2009-2015 NSF (Bio Oceanography): *Phytoplankton Traits, Functional Groups and Community Organization: A Synthesis* (\$544,871), **lead PI**, with C. Klausmeier, REU supplement 2010 (\$10,070)
- 2009-2014 NSF (Information & Intelligent Systems): *AquaSWARM: Small Wireless Autonomous Robots for Monitoring of Aquatic Environments* (\$409,999), co-PI with X. Tan
- 2009-2015 NSF CAREER (Ecology): *Mechanisms of Phytoplankton Community Reorganization Under Global Change* (\$529,626), **sole PI**
- 2005-2010 James S. McDonnell Foundation (Studying Complex Systems): *Plankton Community Assembly: Theory and Practice* (\$449,965 direct costs), co-investigator with C.A. Klausmeier (PI)
- 2005-2008 NSF (Ecology): *Vertical Distribution of Phytoplankton* (\$350,000), **lead PI**, with C.A. Klausmeier. REU supplement (\$8,850).
- 2005-2008 NSF (Ecology): *QEIB: Novel Approaches to Plankton Seasonal Succession* (\$350,000), co-PI with C.A. Klausmeier (PI) and L. Bunimovich. REU supplement (\$8,850)
- 1998–2001 Swiss National Science Foundation (SNF): *Effects of Dynamic Light and Phosphorus Supplies on Phytoplankton* (\$150,000), with C. Pahl-Wostl and P. Bossard
- 1995–1997 National Science Foundation Doctoral Dissertation Improvement Grant (\$5,500) with D. Tilman
- 1994 Sigma Xi Grants-in-Aid of Research Grant

Internal Funding

- 2011-2014 BEACON NSF Center for Evolution in Action (MSU): *Rapid Evolutionary Responses of Marine Phytoplankton to Rising Temperatures* (\$102,468), **lead PI**, with C. Klausmeier and E.V. Armbrust (U Washington)
- 2008-2010 Biogeochemistry Environmental Research Initiative (BERI), MSU grant *Development of an autonomous robotic fish-based sensor to detect Harmful Algal Blooms (HABs)* (\$10,000 direct costs), PI, with Dr. X. Tan (MSU College of Engineering)
- 2007-2009 MSU Center for Water Sciences grant *Interactive effects of turbulence, light and phosphorus on Microcystis blooms in Michigan lakes* (\$145,336 direct costs), **lead PI**, with Drs. P. Mantha, O. Sarnelle and S. Hamilton
- 2006-2007 MSU Center for Water Sciences venture grant *Physical-biological coupling in the pelagic: the role of dynamic physical processes in structuring phytoplankton communities* (\$10,200 direct costs), **lead PI**, with Dr. P. Mantha (College of Engineering)
- 1994 James W. Wilkie Research Grant, University of Minnesota

Peer-reviewed Articles (*denotes supervised students and postdocs)

Accepted Meunier CL, M Boersma, R El-Sabaawi, H Halvorson, EM Herstoff, DB Van de Waal, RJ Vogt and **E Litchman**. From elements to function: towards unifying ecological stoichiometry and trait-based ecology. *Frontiers in Environmental Science*. Accepted pending revisions.

- Nalley JO*, ET Miller*, J Pino*, S Schulz* and **E Litchman**. Complementarity and stability in algal biofuel communities under fluctuating light. *Ecology and Evolution*. Accepted pending revisions.
- Ryan C*, MK Thomas* and **E Litchman**. The effects of phosphorus and temperature on the competitive success of an invasive cyanobacterium. *Aquatic Ecology*. Accepted pending revisions.
- 2017 Thomas, MK*, M Aranguren-Gassis*, CT Kremer*, MR Gould*, K Anderson*, CA Klausmeier and **E Litchman**. 2017. Temperature-nutrient interactions exacerbate sensitivity to warming in phytoplankton. *Global Change Biology*. doi: 10.1111/gcb.13641
- O'Donnell DR*, P Wilburn*, E Silow, LY Yampolsky and **E Litchman**. 2017. Nitrogen and phosphorus co-limitation of phytoplankton in Lake Baikal, Siberia: insights from the lake survey and nutrient enrichment experiments. *Limnology and Oceanography*. doi: 10.1002/lno.10505.
- Kremer CT*, MK Thomas* and **E Litchman**. 2017. Scaling of phytoplankton growth rate with temperature and size: reconciling the Eppley curve and metabolic theory of ecology framework. *Limnology and Oceanography*. doi: 10.1002/lno.10523.
- Roselli L*, **E Litchman**, E Stanca, F Cozzoli and A Basset. 2017. Individual trait variation in phytoplankton communities across multiple spatial scales. *Journal of Plankton Research*.
- 2016 Yema L, **E Litchman** and P De Tezanos Pinto. 2016. The role of heterocytes in the physiology and ecology of bloom-forming harmful cyanobacteria. *Harmful Algae* 60: 131-138.
- Edwards KF*, MK Thomas*, CA Klausmeier and **E Litchman**. 2016. Phytoplankton growth and the interaction of light and temperature: a synthesis at the species and community level. *Limnology and Oceanography* 61: 1232–1244.
- Zhang F, O Ennasr, **E Litchman** and X Tan. 2016. Autonomous sampling of water columns using gliding robotic fish: algorithms and harmful algae sampling experiments. *IEEE Systems Journal* 10: 1271-1281.
- Lewandowska A and 33 others. 2016. The influence of balanced and imbalanced resource supply on biodiversity-functioning relationship across ecosystems. *Philosophical Transactions of the Royal Society B* 371.
- Thomas MK*, CT Kremer* and **E Litchman**. 2016. Environment and evolutionary history determine the global biogeography of phytoplankton temperature traits. *Global Ecology and Biogeography* 25: 75-86.
- Bonachela JA, CA Klausmeier, KF Edwards, **E Litchman** and SA Levin. 2016. The role of phytoplankton diversity in the emergent oceanic stoichiometry. *Journal of Plankton Research* doi: 10.1093/plankt/fbv087.
- Thomas MK* and **E Litchman**. 2016. Interactive effects of temperature, nitrogen availability and toxicity on the growth of invasive and native cyanobacteria. *Hydrobiologia* 763: 357-369.
- 2015 **Litchman E**, P de Tezanos Pinto*, KF Edwards*, CT Kremer*, CA Klausmeier, MK Thomas*. 2015. Global biogeochemical impacts of phytoplankton: a trait-based perspective. *Journal of Ecology* 103: 1384-1396.

Litchman E, KF Edwards* and CA Klausmeier. 2015. Microbial resource utilization traits and trade-offs: implications for community structure, functioning and biogeochemical impacts at present and in the future. *Frontiers in Microbiology* 6: 254. doi: 10.3389/fmicb.2015.00254.

Edwards, KF*, CA Klausmeier and **E Litchman**. 2015. Nutrient utilization traits in phytoplankton. Data paper. *Ecology* 96: 2311.

Zhang F, O Ennasr, **E Litchman** and X Tan. 2015. Autonomous sampling of water columns using gliding robotic fish: Control algorithms and field experiments. *Proceedings of 2015 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 517-522.

Edwards KF*, MK Thomas*, CA Klausmeier and **E Litchman**. 2015. Light and growth in marine phytoplankton: allometric, taxonomic, and environmental variation. *Limnology and Oceanography* 60: 540-552.

2014 Nalley JO*, M Stockenreiter* and **E Litchman**. 2014. Community ecology of algal biofuels: complementarity and trait-based approaches. *Industrial Biotechnology* 10: 191-201.

Zhang F, J Wang, J Thon, C Thon, **E Litchman** and X Tan. 2014. Gliding robotic fish for mobile sampling of aquatic environments. Invited. *IEEE 11th Conference Proceedings on Networking, Sensing, and Control*: 167-172.

2013 Kreft J-U, CM Plugge, V Grimm, C Prats, JHJ Leveau, T Banitz, S Baines, J Clark, A Ros, I Klapper, CJ Topping, AJ Field, A Schuler, **E Litchman**, FL Hellweger. 2013. Mighty small: observing and modeling individual microbes becomes big science. *PNAS* 110: 18027–18028.

Shurin JB, RL Abbott, MS Deal, G Kwan, **E Litchman**, R McBride, S Mandal and VH Smith. 2013. Industrial-strength ecology: Tradeoffs and opportunities in algal biofuel production. *Ecology Letters* 16: 1393-1404.

Edwards KF*, CA Klausmeier and **E Litchman**. 2013. A three-way tradeoff maintains functional diversity under variable resource supply. *American Naturalist* 182: 786-800. Highlighted in *Faculty of 1000*.

Edwards KF*, **E Litchman** and CA Klausmeier. 2013. Functional traits predict variation in phytoplankton community structure across lakes of the United States. *Ecology* 94: 1626–1635.

Boyd PW, TA Ryneerson, EA Armstrong, F-X Fu, K Hayashi, Z Hu, DA Hutchins, RM Kudela, **E Litchman**, MR Mulholland, U Passow, RF Strzepek, KA Whittaker, E Yu and MK Thomas*. Marine phytoplankton temperature versus growth responses from polar to tropical waters - outcome of a scientific community-wide study. *PLoS ONE* 8 (5): e63091.

Litchman E, MD Ohman and T Kiørboe. 2013. Trait-based approaches to zooplankton communities. *Journal of Plankton Research*. Horizons paper. 35: 473-484.

Barton AD, AJ Pershing, **E Litchman**, NR Record, KF Edwards*, ZV Finkel, T Kiørboe and BA Ward. 2013. The biogeography of marine plankton traits. *Ecology Letters* 16: 522-534.

Edwards KF*, **E Litchman** and CA Klausmeier. 2013. Functional traits explain phytoplankton community structure and seasonal dynamics in a marine ecosystem. *Ecology Letters* 16: 56-63.

- 2012 **Litchman E**, KF Edwards*, CA Klausmeier and MK Thomas*. 2012. Phytoplankton niches, traits and eco-evolutionary responses to global environmental change. Theme section on *Biological responses in an anthropogenically modified ocean*. **Marine Ecology Progress Series** 470: 235-248.
- ISI highly cited* Thomas MK*, CT Kremer*, CA Klausmeier and **E Litchman**. 2012. A global pattern of thermal adaptation in marine phytoplankton. **Science** 338: 1085-1088. Highlighted in *Nature, New Scientist, Faculty of 1000* and many other outlets.
- Edwards KF*, MK Thomas*, CA Klausmeier and **E Litchman**. 2012. Allometric scaling and taxonomic variation in nutrient utilization traits and growth rates of marine and freshwater phytoplankton. **Limnology and Oceanography** 57: 554-566.
- Klausmeier CA and **E Litchman**. 2012. Successional dynamics in the seasonally forced diamond food web. **American Naturalist** 180: 1-16.
- Steiner CF*, CA Klausmeier and **E Litchman**. 2012. Transient dynamics and the destabilizing effects of weak trophic interactions in aquatic food webs. **Ecology** 93: 632-644. Highlighted in *Faculty of 1000*.
- Mellard JP*, K Yoshiyama*, CA Klausmeier and **E Litchman**. 2012. Experimental test of the phytoplankton competition for light and nutrient in poorly mixed water columns. **Ecological Monographs** 82: 239-256.
- 2011 Stomp M*, J Huisman, GG Mittelbach, **E Litchman** and CA Klausmeier. 2011. Large scale biodiversity gradients in freshwater phytoplankton. **Ecology** 92: 2096-2107. Highlighted in *Science* and *Faculty of 1000*.
- Edwards KF*, CA Klausmeier and **E Litchman**. 2011. Evidence for a three-way tradeoff between nitrogen and phosphorus competitive abilities and cell size in phytoplankton. **Ecology** 92: 2085-2095. Highlighted in *Faculty of 1000*.
- Izmet'seva LR, EA Silow and **E Litchman**. 2011. Long-term dynamics of the Lake Baikal pelagic phytoplankton under climate change. **Inland Water Biology** 4: 301-307.
- Schwaderer AS*, K Yoshiyama*, P de Tezanos Pinto*, NG Swenson, CA Klausmeier and **E Litchman**. 2011. Eco-evolutionary differences in light utilization traits and distributions of freshwater phytoplankton. **Limnology and Oceanography** 56: 589-598. Highlighted in *Faculty of 1000*.
- Mellard JP*, K Yoshiyama*, **E Litchman** and CA Klausmeier. 2011. The vertical distribution of phytoplankton in stratified water columns. **Journal of Theoretical Biology** 269: 16-30.
- 2010 **Litchman E** 2010. Invisible invaders: non-pathogenic invasive microbes in aquatic and terrestrial ecosystems. **Ecology Letters** 13: 1560-1572.
- Litchman E**, P de Tezanos Pinto*, CA Klausmeier, MK Thomas* and K Yoshiyama*. 2010. Linking traits to species diversity and community structure in phytoplankton. *Invited review*. **Hydrobiologia** 653: 15-38.
- De Tezanos Pinto P* and **E Litchman**. 2010. Interactive effects of N:P ratios and light on nitrogen-fixing abundance. **Oikos** 119: 567-575.
- De Tezanos Pinto P* and **E Litchman**. 2010. Eco-physiological responses of nitrogen-fixing cyanobacteria to light. **Hydrobiologia** 639: 63-68.
- 2009 MacKay MD, PJ Neale, CD Arp, LN De Senerpont Domis, X Fang, G Gal, KD Jöhnk, G Kirillin, JD Lenters, **E Litchman**, S MacIntyre, P Marsh, J Melack, WM Mooij, F Peeters,

- A Quesada, SG Schladow, M Schmid, C Spence and SL Stokes. 2009. Modeling lakes and reservoirs in the climate system. *Limnology and Oceanography* 54: 2315-2329.
- Steiner* CF, AS Schwaderer*, V Huber*, CA Klausmeier and **E Litchman**. 2009. Periodically forced food chain dynamics: model predictions and experimental validation. *Ecology* 90: 3099–3107.
- Yoshiyama K*, JP Mellard*, **E Litchman** and CA Klausmeier. 2009. Phytoplankton competition for nutrients and light in a stratified water column. *American Naturalist* 174: 190-203.
- Litchman E**, CA Klausmeier and K Yoshiyama*. 2009. Contrasting size evolution in marine and freshwater diatoms. *Proceedings of the National Academy of Sciences USA* 106: 2665-2670.
- 2008 **Litchman E** and BLV Nguyen*. 2008. Alkaline phosphatase activity as a function of internal phosphorus concentration in freshwater phytoplankton. *Journal of Phycology* 44:1379-1383.
- ISI highly cited* **Litchman E** and CA Klausmeier. 2008. Trait-based community ecology of phytoplankton. *Annual Review of Ecology, Evolution and Systematics* 39: 615-639.
- Klausmeier CA, **E Litchman**, T Daufresne and SA Levin. 2008. Phytoplankton stoichiometry. *Ecological Research* 23: 479-485.
- 2007 Klausmeier CA, **E Litchman** and SA Levin. 2007. A model of flexible uptake of two essential resources. *Journal of Theoretical Biology* 246: 278-289.
- ISI highly cited* **Litchman E**, CA Klausmeier, OM Schofield and PG Falkowski. 2007. The role of functional traits and trade-offs in structuring phytoplankton communities: scaling from cellular to ecosystem level. *Ecology Letters* 10: 1170-1181. Featured in *Faculty of 1000*.
- 2006 **Litchman E**, CA Klausmeier, JR Miller, OM Schofield and PG Falkowski. 2006. Multi-nutrient, multi-group model of present and future oceanic phytoplankton communities. *Biogeosciences* 3: 585-606.
- 2005 **Litchman E** and PJ Neale. 2005. UV effects on photosynthesis, growth and acclimation of an estuarine diatom and cryptomonad. *Marine Ecology Progress Series* 300: 53-62.
- Kay AD, IW Ashton, E Gorokhova, AJ Kerkhoff, A Liess and **E Litchman**. 2005. Toward a stoichiometric framework for evolutionary biology. *Oikos* 109: 6-17.
- 2004 **Litchman E**, CA Klausmeier and P Bossard. 2004. Phytoplankton nutrient competition under dynamic light regimes. *Limnology and Oceanography* 49: 1457-1462.
- ISI highly cited* Klausmeier CA, **Litchman E**, Daufresne T, Levin SA. 2004. Optimal N:P stoichiometry of phytoplankton. *Nature* 429: 171-174.
- Klausmeier CA, **E Litchman** and SA Levin. 2004. Phytoplankton growth and stoichiometry under multiple nutrient limitation. *Limnology and Oceanography* 49: 1463-1470.
- 2003 **Litchman E** 2003. Competition and coexistence of phytoplankton under fluctuating light: experiments with two cyanobacteria. *Aquatic Microbial Ecology* 31: 241-248.
- Litchman E**, D Steiner and P Bossard. 2003. Photosynthetic and growth responses of three freshwater algae to phosphorus limitation and daylength. *Freshwater Biology* 48: 2141-2148.

- 2002 **Litchman E**, PJ Neale and AT Banaszak. 2002. Increased sensitivity to ultraviolet radiation in nitrogen-limited dinoflagellates: photoprotection and repair. *Limnology and Oceanography* 47: 86-94.
- 2001 Klausmeier CA and **E Litchman**. 2001. Algal games: the vertical distribution of phytoplankton in poorly mixed water columns. *Limnology and Oceanography* 46: 1998-2007.
- Callieri C, G Morabito, Y Huot, PJ Neale and **E Litchman**. 2001. Photosynthetic response of pico- and nanoplanktonic algae to UVB, UVA and PAR in a high mountain lake. *Aquatic Sciences* 63: 286-293.
- Neale PJ, **E Litchman**, C Sobrino, C Callieri, G Morabito, V Montecino, Y Huot, P Bossard, C Lehmann and D Steiner. 2001. Quantifying the response of phytoplankton photosynthesis to ultraviolet radiation: biological weighting functions versus *in situ* measurements in two Swiss lakes. *Aquatic Sciences* 63: 265-285.
- Köhler J, M Schmitt, H Krumbeck, M Kapfer, **E Litchman** and PJ Neale. 2001. Effects of UV on carbon assimilation of phytoplankton in a mixed water column. *Aquatic Sciences* 63: 294-309.
- Litchman E** and CA Klausmeier. 2001. Competition of phytoplankton under fluctuating light. *American Naturalist* 157: 170–187.
- 2000 **Litchman E** 2000. Growth rates of phytoplankton under fluctuating light. *Freshwater Biology* 44: 223–235.
- 1998 **Litchman E** 1998. Population and community responses of phytoplankton to fluctuating light. *Oecologia* 117: 247–257.
- 1992 Levich AP and **E Litchman** (EG Lichman). 1992. A model-based investigation of possibilities for the directed change in the structure of phytoplankton communities. *J. General Biology*, 53: 689–703. (In Russian with English abstract).

Book Chapters (*denotes supervised students and postdocs)

- 2014 Edwards KF* and **E Litchman**. Phytoplankton communities. In *Marine Community Ecology and Conservation*, edited by M. Bertness, J. Bruno, B. Silliman and J. Stachowicz. pp. 365-382. Sinauer.
- 2012 **Litchman E** Phytoplankton. In *Metabolic Ecology: a Scaling Approach*, edited by R.M. Sibly, J.H. Brown and A. Kodric-Brown. pp. 154-163. Wiley.
- 2007 **Litchman E** Resource competition and the ecological success of phytoplankton. In *Evolution of Primary Producers in the Sea*, edited by P.G. Falkowski and A.H. Knoll. pp. 351-375. Academic Press.
- 1990 Levich AP, EA Titova, **E Litchman** (EG Lichman) and AA Vasin. Model analysis of the manipulation of algal community structure. *In: Mathematical models in environmental management*. Rostov-on-Don (In Russian).

Manuscripts in Review/Revision (*supervised students and postdocs)

- Edwards KF*, CT Kremer*, ET Miller*, MM Osmond, **E Litchman** and CA Klausmeier. Evolution and the maintenance of species and trait diversity. In revision.
- Van De Waal D and **E Litchman**. Dealing with depletion: a silver lining of climate change for oceanic primary production? Submitted.

Robson B et al. Towards evidence-based parameter priors for aquatic ecosystem modeling. In revision.

Nalley JO*, DR O'Donnell* and **E Litchman**. Temperature effects on growth rates and fatty acid content in freshwater microalgae and cyanobacteria. *Algal Research*. Submitted.

Safaie A, **E Litchman** and M.S. Phanikumar. Evaluating the role of groundwater in circulation and thermal structure of a deep inland lake. *Advances in Water Resources*. In revision.

Popular Articles and Reports

Dyble J, M-A Evans, D Hyndman, **E Litchman**, MS Phanikumar, O Sarnelle, RJ Stevenson. 2008. Complex interactions among land, water, and harmful algal blooms. GESI Report.

Litchman E, CA Klausmeier, D Steiner, D Hohmann and P Bossard. 2002. Wie die Tageslänge bei Phosphorknappheit die Lebensgemeinschaften von Algen in Seen beeinflussen kann. EAWAG yearly report.

Weiler CS et al. 2000. Perspectives on graduate education experiences in aquatic sciences. ASLO Bulletin 9: 20-22.

Invited Workshops and Symposia

2017 Invited speaker, Symposium on "Linking Functional Traits to Species Coexistence in Changing Environments", Ecological Society of America Meeting, Portland, OR

Invited speaker, Simons Foundation Conference on Mathematical Modeling of Living Systems, New York, NY

2016 Invited Marie Tharp Lecture, GEOMAR Helmholtz Centre for Ocean Research, Kiel, Germany

Invited speaker, workshop on "Global co-evolution of the ocean environment and its ecology", University of Bristol, UK

Invited plenary speaker at the Netherlands Annual Ecology Meeting (declined)

2015 Invited keynote speaker, 9th Symposium for European Freshwater Sciences, Geneva, Switzerland

Invited keynote speaker, DynaTrait Priority Programme meeting, German National Science Foundation (DFG), Hannover, Germany

Invited speaker, "Trait-based Approaches to Marine Life" Symposium, Waterville Valley, NH

Invited speaker, "Trait-based ecology at the micro-scale" Symposium, Ecological Society of America Annual Meeting, Baltimore, MD

Invited speaker, 2015 European Ecological Federation Congress, Rome, Italy

Invited speaker, Royal Society workshop on marine microbial experimental evolution, Kavli Royal Society International Centre, Buckinghamshire, Great Britain

Invited keynote speaker, Biodiversity workshop, Leibniz Institute of Freshwater Ecology and Inland Fisheries (IGB), Berlin, Germany (declined)

2014 Invited plenary speaker, Ocean Carbon and Biogeochemistry scoping workshop on "Improving predictive biogeochemical models through single cell-based analyses of marine plankton physiological plasticity, genetic diversity and evolutionary processes", Bigelow Laboratory for Ocean Sciences, ME

Invited discussion leader, Gordon Research Conference “Unifying Ecology Across Scales”, University of New England, ME

Invited speaker, Gordon Research Conference “Ocean Global Change Biology”, NH

Invited speaker, organized oral session “Whether in Life or in Death: Fresh Perspectives on How Plants Affect Biogeochemical Cycling”, Ecological Society of America Annual Meeting, Sacramento, CA

- 2013 Invited participant, Workshop on “Stoichiometric constraints of biodiversity – functioning relationships (StoichFun)”, Leipzig, Germany
- Invited speaker, CNRS School on Innovative Approaches in Marine Environment Modeling. European Institute of Marine Studies (IUEM), Brest, France
- Invited speaker, Ocean Carbon and Biogeochemistry workshop on “Evolutionary responses of plankton to climate change”, Woods Hole, MA
- Invited speaker, Gordon Research Conference on Microbial Population Biology, Andover, NH (declined)
- Invited keynote speaker, ESF EuroEEFG workshop “Understanding, managing and protecting microbial communities in aquatic and terrestrial ecosystems: Exploring the trait-based functional biodiversity approach”, Wageningen, the Netherlands
- 2012 Invited participant, working group on Plankton community assembly, EAWAG, Switzerland
- Invited discussion leader, Gordon Research Conference on Metabolic Basis of Ecology (declined)
- Invited participant, workshop on improving the representation of phytoplankton physiology in marine ecosystem models, University of Exeter, Great Britain
- Invited participant, roundtable discussion on microbial invasions, ISME meeting (declined)
- Invited speaker, workshop on “Mechanisms underlying biodiversity-ecosystem functioning relationships”, Jena, Germany
- Invited participant, RCN “Enzymes in the Environment” workshop, Colorado (declined)
- 2011 Invited participant, NSF workshop on “Bioenergy from photosynthetic microorganisms: What are the basic research needs?” Washington, DC
- Invited plenary speaker, IX Latin American and Caribbean Conference of Phycology, La Plata, Argentina (declined)
- Invited participant, Investigative workshop “Individual-based Ecology of Microbes”, NIMBioS, University of Tennessee
- Invited keynote speaker at the roundtable discussion of the new Research Priority Program for the German Research Foundation "The importance of trait variation for the dynamics of ecological systems", Potsdam, Germany
- Invited tutorial speaker, ASLO Aquatic Sciences meeting, session on “Mechanistic descriptions of diverse plankton communities: from observations to models”, San Juan, Puerto Rico
- 2010-13 Invited participant, working group on “Food web dynamics and stoichiometric constraints in meta-ecosystems”, NIMBioS, University of Tennessee
- 2010 Invited participant, NSF workshop on “Evolution and Climate Change in the Oceans (ECCO)”, Catalina Island, California

Invited participant, workshop on “Open problems in biological oceanography”, Princeton University, NJ

Invited speaker, Gordon Research Conference on “Metabolic basis of ecology”, University of New England, ME

Invited plenary speaker, International workshop on “Predictability of Plankton Communities in an Unpredictable World”, Amsterdam, The Netherlands

Invited speaker, ASLO Ocean Sciences Meeting, session on “Climate Change and Ocean Biology: Integrating Conceptual Frameworks and Experimental Approaches to Predict Planktonic Responses”, Portland, OR

Invited speaker, ASLO Ocean Sciences Meeting, session on “Understanding Diatom Interactions with Their Environment”, Portland, OR (declined)

Invited speaker, Gordon Research Conference on Environmental Bioinorganic Chemistry, Biological Stoichiometry session, Newport, RI (declined)

2009 Invited speaker, Symposium on the “Interactions between ecological and evolutionary processes in aquatic ecosystems”, Kastanienbaum, Switzerland

2008 Invited speaker, EAWAG symposium, Swiss Federal Institute for Water Science and Technology, Dübendorf, Switzerland (declined)

Invited discussion leader, EUROCEANS workshop on “Constraining, understanding and modeling biocomplexity in plankton communities.” Naples, Italy

2007 Invited participant, US-French Symposium on Environmental Sensor Networks, French Embassy and Georgetown University, Washington, D.C.

2007-12 Invited core participant, TraitNet, Research Coordination Network (PIs: S. Naeem and D. Bunker), Columbia University, NY

2004 Invited speaker, Gordon Research Conference “Metabolic Basis of Ecology”, Lewiston, ME

Invited participant, Workshop on the “Present and future of ecological stoichiometry (Woodstoich 2004)”, Finse, Norway

2002 Invited participant, NSF Biocomplexity Conference “Biodiversity of planktonic communities: scaling up and down”. Ann Arbor, MI

1999 Invited participant, American Society for Limnology and Oceanography DIALOG III Symposium, Bermuda

Invited Seminars

2017 GEOMAR, Germany

2016 University of Vienna, Austria

2015 University of Amsterdam, the Netherlands

University of Basel, Switzerland

University of Texas-Austin

Michigan State University, Department of Plant Biology

2014 Duke University Marine Lab, Beaufort, NC

WasserCluster Lunz, Austria

Kellogg Biological Station and Department of Integrative Biology, MSU

2013 University of Zürich, Switzerland

2012 University of Texas-Arlington

- Umeå University, Sweden
 Lund University, Sweden
 EAWAG, Switzerland
- 2011 Danish Technical University, Section of ocean ecology and climate, Charlottenlund, Denmark
 Center for Macroecology, Evolution and Climate, University of Copenhagen
 Marine Ecological Modeling Centre, Aarhus, Denmark
- 2010 University of California-San Diego, CA
 McGill University, Canada
- 2009 EEBB Program, MSU
- 2008 Western Michigan University, Kalamazoo, MI
 Swiss Federal Institute for Environmental Science and Technology (EAWAG), Zürich, Switzerland (declined)
- 2007 Frontier Research Center for Global Change, Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Japan
 Center for Ecological Research, Kyoto, Japan
 Department of Zoology, University of Wisconsin, Madison, WI
- 2006 Kenyon College, Ohio
 Oakland University, Michigan
 Annis Water Resources Institute, Grand Valley State University, Michigan
- 2005 Curriculum in Ecology, University of North Carolina-Chapel Hill
 Department of Ecology and Evolutionary Biology, University of Michigan
 School of Biology, Georgia Institute of Technology, Atlanta, GA
 W.K. Kellogg Biological Station and Zoology Department, Michigan State University
- 2004 Department of Zoology, University of Toronto
 Department of Ecology, Evolution and Marine Biology, University of California–Santa Barbara
- 2002 Large Lakes Observatory, University of Minnesota–Duluth
- 2001 Max Planck Institute for Limnology, Plön, Germany
- 2000 University of Basel, Basel, Switzerland
 Swiss Federal Institute for Environmental Science and Technology, Zürich, Switzerland
 Ludwig Maximilians–Universität, Munich, Germany
 Horn Point Laboratory, Center for Environmental Studies, University of Maryland

Teaching

- 2005–pres ZOL/PLB 896 *Population and Community Ecology*, EEBB core graduate course (20-32 students each year) (with G. Mittelbach). Fall semesters, MSU
- 2016 Invited lectures at the International Summer School on *Marine Ecology and the Earth System*, University of Bristol, UK
- 2015 *Topics in Quantitative Microbial Ecology and Evolution: Robustness and stability in microbial communities* (w/S. Evans and C. Klausmeier), spring semester
- 2013, 2015 *Algal Biology*, 2-week intensive field summer course at KBS, MSU (with R. Lowe)
- 2013 Guest lecture, Wellesley College field course at Lake Baikal, Russia

- Invited lecturer, International Summer School on *Innovative Approaches in Marine Environment Modeling*, IUEM, Plouzané, France
- 2012 Guest lecture in *Biological oceanography*, DTU Aqua, Denmark
Invited lecturer at the International Summer School on *Large Lakes Biology*, Irkutsk State University, Russia
- 2010 Graduate seminar on *Quantitative Microbial Ecology and Evolution*, (w/J. Lennon, J. Lau and C. Klausmeier), fall semester
Field Aquatic Ecology, 2-week intensive graduate/undergraduate summer course at KBS
Phytoplankton Ecology, Guest Lecture in MMG *Microbial Ecology* undergraduate/graduate class (J. Lennon and N. Walker)
- 2009 Graduate seminar on *Advances in microbial community ecology and biogeography* (w/J. Lennon and C. Klausmeier), fall semester
Invited lecturer, International Summer School for PhD students on *Interactions between ecological and evolutionary processes in aquatic ecosystems*, Kastanienbaum, Switzerland
- 2008 Graduate seminar on *Trait-based approaches to community ecology and evolution* (w/J. Lau), spring semester;
Phytoplankton Ecology guest lecture in *Algal Biology* (J. Stevenson)
Biogeochemistry MMG 426 (with J. Lennon and S. Hamilton), summer
- 1991–1997 Teaching Assistant, University of Minnesota. *General Biology*, *Introduction to Ecology* (non-majors), *Ecology* (majors), *Limnology* and *Limnology Laboratory*

Students Advised

PhD students

Jarad Mellard (2004-2010, co-advised with C. Klausmeier), now researcher at Tromsø University, Norway

Mridul Thomas (2007-2013), Best presentation award at IAGLR conference (2009), Marvin Hensley Fellowship, MSU dissertation completion fellowship, co-1st author *Science* paper, now postdoc at EAWAG/ETH, Switzerland

Colin Kremer (2009-2014, co-advised with C. Klausmeier), NSF predoctoral fellowship, co-1st author *Science* paper, NSF postdoctoral fellowship in mathematical biology, now postdoc at Yale and Princeton

Jakob Nalley (2011-2016), MSU Plant Sciences Fellowship, NSF GK-12 graduate fellowship, NSF predoctoral fellowship honorable mention, Future Academic Scholars in Teaching Fellow

Daniel O'Donnell (2012-), NSF predoctoral fellowship

Paul Wilburn (2012-), NSF predoc fellowship honorable mention, C-MORE Marine Microbiology field course, PSA research grant, MSU Continuation Fellowship

PhD Committees and visiting graduate students

Alan Wilson (2004-2005, GA Tech), Geoff Horst (2005-2012, MSU), Kevin Wyatt (2005-2010, MSU), Linda Novitski (2006-2013, MSU), Paula de Tezanos Pinto (2006-2008, U of Buenos Aires, Argentina), Stephanie Miller (2007-, MSU), Veronika Huber (2007, U of Berlin, Germany), Micalaella Dell Desotelle (2008-, MSU), Justin Meyer (2008-2012, MSU), Allison Rober (2008-2012, MSU), Jacob Gillette (2009-2015, SUNY ESF), Elizabeth Miller (2009-2016), Patrick Hanly (2012-), Carlos

Cáceres (2012, U of Oviedo, Spain), Alexandra Rafalski (2013-), Kirill Shchapov (2013-2016, Irkutsk State University, Russia), Bo Liu (2013-), Şeyda Erdogan (2015-2016, Middle East Technical University, Turkey), Ammar Safaie (2015-), Connie Rojas (2016-).

MS Committees

Kampanat Rungruengchaisri (2000-2001, EAWAG), Nicole Reid (2005, MSU), Elizabeth Muellen (2005-2007, MSU), Allison Rober (2006-2008, MSU), Joshua Booker (2008-2010, MSU).

Undergraduates

Amber Phillips (1996, Hampshire College), Kelly Maynard (1999, OSU), Binh L.V. Nguyen (2004-2005, GA Tech) **best presentation award at ASLO 2005**, Kelly Amrhein (2006, 2007, Kalamazoo College), Rico Javier (2008, Kalamazoo College), Kelly Hickman (2008, UCSC), Caitlyn Ryan (2009, NSF REU, SUNY Geneseo) **best presentation award at ESA 2010**, Alexandra David (2009, 2010, NSF REU, MSU), Marilyn Gould (2011, NSF BEACON REU, U Connecticut), Mirae Guenther (2011, Kalamazoo College), Lydia Auner (2012, Carleton College), Farhana Haque (2014, NSF BEACON REU, UT Austin), Evan Johnson (2014, 2015, Kalamazoo College), Jake Pino (2015, NSF REU, New Mexico State U), Scott Schultz (2015, URA, MSU), Krista Anderson (2015, NSF REU, UIC), Casey Geisland (2015, URA, MSU), Clare Harper (2016, NSF REU, Beloit College), Olivia Porth (2016, URA, MSU), Katie McCullen (2016, URA, MSU).

High School Students

Tanisha McKoy (2007, Kalamazoo public school).
Carolyn Hamman (2013-2015, Kalamazoo Area Mathematics and Science Center).
Mary Griffith (2014, Kalamazoo Area Mathematics and Science Center).

Postdoctoral Associates

Drs. Christopher Steiner (2005-08, MSU) now associate professor at Wayne State U, MI; Kohei Yoshiyama (2006-08, Kyoto U), now asst. professor at Gifu U Japan; Anne Schwaderer (2006-07, Kiel U), Mary Anne Evans (2007-09, U Michigan), now research scientist at U Mich; Maayke Stomp (2008, U of Amsterdam), now assist. professor at U of Amsterdam; Paula de Tezanos Pinto (2009-10, U of Buenos Aires, Argentina), now research scientist at U Buenos Aires, Kyle Edwards (2010-13, UC Davis), now assist. professor at U of Hawai'i, Maria Stockenreiter (2013-14, U Munich), now assist. professor LMU Munich, Sabine Wollrab (2013-14, U Munich), now group leader at the IGB, Germany, Leonilda Roselli (2014, U Salento, Italy), Maria Aranguren-Gassis (2014-16, U Vigo, Spain), Ghjuvan Grimaud (2016-, Villefranche Oceanographic Laboratory), Kaito Umemura (2016-), John Guittar (2017-, U of Michigan).

School Teachers

Connie High, Delton, MI High School (summer 2010, 2011, 2014, 2015, 2016).
Becky Drayton, Gobbles, MI Middle School (summer 2014).
Jodie McManus, Parchment, MI High School (summer 2014).

Papers Presented at Meetings

Selected Invited Talks

Litchman, E, DR O'Donnell, CT Kremer, MK Thomas. 2015. Trait-based assessment of ecological and evolutionary responses of microbes to temperature. ESA Annual Meeting, Baltimore, MD.

- Litchman, E**, P de Tezanos Pinto, KF Edwards, CA Klausmeier, CT Kremer and MK Thomas. 2014. Biogeochemical impacts of phytoplankton community structure and their alteration by global change stressors. ESA Annual Meeting, Sacramento, CA.
- Litchman, E**. 2014. Phytoplankton responses to temperature and their interactions with nutrients and light. Gordon Research Conference on "Ocean Global Change Biology", NH.
- Litchman, E**. 2014. Microbial traits and trade-offs: implications for community structure and biogeochemistry. Ocean Carbon and Biogeochemistry Workshop, Bigelow Lab for Ocean Sciences, ME.
- Litchman, E** and CA Klausmeier. 2011. Linking traits and ecological niches of phytoplankton to predict community structure and ecosystem functioning. ASLO Aquatic Sciences Meeting, San Juan, Puerto Rico.
- Litchman, E** 2010. Integrating stoichiometry-, size- and trait-based approaches in phytoplankton. Gordon Research Conference on "Metabolic Basis of Ecology", University of New England, ME.
- Litchman, E** and CA Klausmeier. 2010. Trait-based approaches to phytoplankton ecology and evolution. Workshop on "Predictability of plankton communities in an unpredictable world", Amsterdam, the Netherlands.
- Litchman, E** and CA Klausmeier. 2010. Trait-based approaches to predicting phytoplankton community re-organizations under global change. ASLO Ocean sciences meeting, Portland, OR.
- Litchman, E** and CA Klausmeier. 2009. Trait-based community ecology of phytoplankton. ASLO Aquatic Sciences Meeting. Nice, France.
- Klausmeier, CA and **E Litchman**. 2009. Trait-based community ecology of phytoplankton: theoretical approaches. ASLO Aquatic Sciences Meeting. Nice, France.
- Litchman, E** 2007. Understanding and predicting harmful algal blooms in freshwaters. US-French Symposium on Environmental Sensor Networks, French Embassy and Georgetown University, Washington, D.C.
- Litchman, E** 2007. The role of phytoplankton traits and trade-offs in determining community structure under changing climate. Ecological Society of Japan Annual Meeting, Matsuyama, Japan.
- Klausmeier, CA and **E Litchman**. 2006. Theoretical approaches to plankton ecology. International Workshop on Modeling Approaches in Biodiversity Research. Sede Boqer, Israel.
- Litchman, E** 2006. Resource competition and ecological success of phytoplankton. Biocomplexity Symposium on the Evolution of Aquatic Photoautotrophs. Rutgers University, New Jersey.
- Klausmeier, CA, **E Litchman**, T Daufresne and SA Levin. 2005. Phytoplankton stoichiometry. ASLO Summer Meeting, Santiago de Compostela, Spain.
- Litchman, E** 2004. Physiological trade-offs and ecological strategies in marine and freshwater phytoplankton. Gordon Research Conference "Metabolic basis of ecology", Lewiston, ME.
- Litchman, E**, CA Klausmeier, B van de Schootbrugge, O Schofield and PG Falkowski. 2003. Applying phytoplankton community models to understanding phytoplankton distributions in the paleocean. ASLO Annual Meeting, Salt Lake City, UT.
- Litchman, E**, CA Klausmeier and P Bossard. 2002. Phytoplankton nutrient competition and stoichiometry under dynamic light regimes. Biodiversity of planktonic communities: scaling up and down. NSF Biocomplexity Conference, Ann Arbor, MI.

- Klausmeier, CA, **E Litchman**, SA Levin and T Daufresne. 2002. Functional stoichiometry. Biodiversity of planktonic communities: scaling up and down. NSF Biocomplexity Conference, Ann Arbor, MI.
- Litchman, E** 1999. Competition and coexistence of phytoplankton under fluctuating light. ASLO DIALOG III Symposium, Bermuda.
- Neale, PJ, AT Banaszak, **E Litchman**, JJ Fritz and RF Davis. 1999. Dynamics of photosynthetic response to UV: the varying balance between damage and recovery in different aquatic environments. SIL/GAP International Workshop, Zürich, Switzerland.
- Litchman, E** 1996. Population- and community-level responses of phytoplankton to light fluctuations: predicting the patterns. ASLO Annual Meeting, Milwaukee, WI.

*Contributed Talks (2007-present, *denotes supervised students and postdocs)*

- Safaie A, ZK Curtis, H Qiu, H-S Liao, S-G Li, **E Litchman**, MS Phanikumar. 2017. The importance of groundwater–lake interactions in stratification in a deep inland lake. IAGLR Annual Meeting, Detroit, MI.
- Litchman E**, DR O'Donnell, M Aranguren-Gassis. 2016. Rapid adaptation to high temperature in marine diatoms alters their nutrient utilization traits and extreme temperature tolerance. ISME Meeting, Montreal, Canada.
- Wilburn P*, K Shchapov*, T Ozersky and **E Litchman**. 2016. Seasonal differences in environmental drivers of bacterioplankton in Lakes Baikal, Superior and other lakes in Minnesota and Michigan. ISME Meeting, Montreal, Canada.
- Safaie A, Nguyen TD, Litchman E, Phanikumar MS. 2016. Circulation and Thermal Structure in Michigan's Inland Lakes: A Comparative Analysis Across Lakes. ASLO Ocean Sciences Meeting, New Orleans, LA
- Litchman E**, DR O'Donnell*, M Aranguren-Gassis*. 2016. Rapid adaptation to high temperature in marine diatoms reveals a growth rate-competitive ability trade-off and increases extreme temperature tolerance. ASM Meeting on Microbial Experimental Evolution, Washington, DC.
- O'Donnell DR*, C Hamman*, E Johnson*, CA Klausmeier, **E Litchman**. 2016. Consequences of 400 generations of experimental thermal adaptation in a marine diatom. Evolution Annual Meeting, Austin, TX.
- Aranguren-Gassis M* and **E Litchman**. 2016. Interactive effects of high temperature and nitrogen limitation influence the evolution potential of warm water marine diatoms. ASLO Meeting, Santa Fe, NM.
- Ozersky T, K Shchapov*, P Wilburn* and **E Litchman**. 2016. Limnological drivers of zooplankton community structure in Minnesota Lakes: contrasting winter and summer patterns. ASLO Meeting, Santa FE, NM.
- O'Donnell* DR, R Corkrey and **E Litchman**. 2015. (Co)variation of microbial thermal traits across the thermokinetic range of life on Earth. Astrobiology Conference on “Habitability, Habitable Worlds, and Life”, Chicago, IL.
- Wilburn P*, K Shchapov*, E Pislegina, T Ozersky, TK Teal, A Shade and **E Litchman**. 2015. Microbial survey of Lake Baikal: insights and limitations of taxonomic and network-based functional analyses. ASLO Meeting, Granada, Spain.
- O'Donnell DR*, P Wilburn*, L Yampolsky and **E Litchman**. 2015. Nitrogen and phosphorus co-limit primary production in Lake Baikal: results of a spatial survey and nutrient enrichment experiments. ASLO Meeting, Granada, Spain.
- Yema L, **E Litchman** and P de Tezanos Pinto. 2015. The role of heterocystes in the ecology of two bloom-forming nitrogen-fixing cyanobacteria. ASLO Meeting, Granada, Spain.

- Thomas MK*, CT Kremer* and **E Litchman**. 2014. Environment and evolutionary history determine the global biogeography of phytoplankton temperature traits. ESA Annual Meeting, Sacramento, CA.
- Miller ET*, CA Klausmeier, **E Litchman**, KF Edwards*. 2013. Trait-based investigation of phytoplankton communities reveals predictable responses to seasonal environmental variation. ESA Annual Meeting, Minneapolis, MN.
- Edwards KF*, CA Klausmeier and **E Litchman**. 2013. A three-way tradeoff maintains functional diversity under variable resource supply. ESA Annual Meeting, Minneapolis, MN.
- Nalley JO* and **E Litchman**. 2013. The performance of algal biofuel monocultures and polycultures under fluctuating light. 3rd International Conference on Algal Biomass, Biofuels and Bioproducts. Toronto, Canada.
- Stockenreiter M*, JO Nalley* and **E Litchman** 2013. Lipid production in the right light-complementarity and trait-based approaches. 7th Algae Biomass Summit, Orlando, FL.
- Thomas MK*, MR Gould* and **E Litchman**. 2012. Phytoplankton fitness landscapes across gradients in temperature and nutrient concentration. ESA Annual Meeting, Portland, OR.
- Edwards KF*, **E Litchman** and CA Klausmeier. 2012. Functional traits predict phytoplankton community structure and successional pattern in a marine ecosystem. ESA Annual Meeting, Portland, OR.
- Edwards KF*, **E Litchman** and CA Klausmeier. 2012. Functional traits predict phytoplankton community structure and seasonal dynamics in the English Channel. ASLO summer meeting, Japan.
- Thomas MK*, CT Kremer*, CA Klausmeier and **E Litchman**. 2011. Ocean warming drives diversity changes and range shifts in the fundamental niches of marine phytoplankton. ESA Annual meeting, Austin, TX.
- Kremer CT*, MK Thomas*, **E Litchman** and CA Klausmeier. 2011. Adapting to variable thermal environments: a trait-based, eco-evolutionary approach. ESA Annual meeting, Austin, TX.
- Edwards KF*, CA Klausmeier and **E Litchman**. 2011. Evidence for a three-way tradeoff between nitrogen and phosphorus competitive abilities and cell size in phytoplankton. ESA Annual meeting, Austin, TX.
- Edwards KF*, CA Klausmeier and **E Litchman**. 2011. Evidence for a fundamental three-way trade-off in a trait compilation of marine and freshwater phytoplankton. ASLO Aquatic Sciences Meeting, San Juan, Puerto Rico.
- Klausmeier CA and **E Litchman**. 2011. Modeling plankton seasonal succession. ASLO Aquatic Sciences Meeting, San Juan, Puerto Rico.
- Thomas MK*, CT Kremer*, CA Klausmeier and **E Litchman**. 2011. Phytoplankton adaptation to temperature across the world oceans. ASLO Aquatic Sciences Meeting, San Juan, Puerto Rico. ASLO Aquatic Sciences Meeting, San Juan, Puerto Rico.
- Kremer CT*, CA Klausmeier and **E Litchman**. 2011. Detecting the role of resource competition in nitrogen-fixing cyanobacteria blooms: a mechanistic approach. ASLO Aquatic Sciences Meeting, San Juan, Puerto Rico.
- Kremer CT*, **E Litchman**, P de Tezanos Pinto*, I Dworkin and CA Klausmeier. 2010. Revisiting the causes of cyanobacteria blooms: a mixture model analysis of resource competition and abiotic factors. ESA Annual Meeting, Pittsburgh, PA.
- Ryan C*, MK Thomas* and **E Litchman**. 2010. Nutrient and temperature effects on the success of an invasive cyanobacterium. ESA Annual Meeting, Pittsburgh, PA (**won Best Undergraduate Presentation award**).

- Thomas MK*, **E Litchman** and CA Klausmeier. 2010. Phytoplankton temperature-response traits determine biogeography and seasonal succession patterns. ESA Annual Meeting, Pittsburgh, PA.
- Litchman E**, AS Schwaderer*, K Yoshiyama*, P de Tezanos Pinto*, NG Swenson and CA Klausmeier. Eco-evolutionary patterns in light utilization traits and distributions of freshwater phytoplankton. ESA Annual Meeting, Pittsburgh, PA.
- Thomas MK* and **E Litchman**. 2010. Temperature niches of phytoplankton in the world oceans. Gordon Research Conference on "Metabolic Basis of Ecology", University of New England, ME.
- De Tezanos Pinto P* and **E Litchman**. 2010. The role of absolute and relative nutrient levels in determining phytoplankton productivity and community composition. Amsterdam, The Netherlands.
- Steiner CF*, CA Klausmeier and **E Litchman**. 2009. The effects of prey heterogeneity and enrichment on the transitory dynamics and persistence of aquatic food webs. ESA Annual Meeting, Albuquerque, NM.
- Mellard JP*, K Yoshiyama*, **E Litchman** and CA Klausmeier. 2009. Games algae play: vertical distributions of phytoplankton in poorly mixed water columns. ESA Annual Meeting, Albuquerque, NM.
- Litchman, E, MA Evans* and P de Tezanos Pinto*. 2009. Trait-based approaches to harmful algal blooms. International Association for Great Lakes Research Meeting. Toledo, OH.
- Thomas MK* and **E Litchman**. 2009. Growth responses of invasive and native cyanobacteria to temperature. International Association for Great Lakes Research Meeting. Toledo, OH (**won best student poster award**).
- Evans*, MA, CA Klausmeier, K Yoshiyama* and **E Litchman**. 2009. Climate driven variability in *Microcystis* abundance, dominance, and toxin production. International Association for Great Lakes Research Meeting. Toledo, OH.
- De Tezanos Pinto*, P and **E Litchman**. 2009. Interactive effects of N:P ratios and light on nitrogen-fixing cyanobacteria. International Association for Great Lakes Research Meeting. Toledo, OH.
- Yoshiyama*, K, CA Klausmeier, JP Mellard* and **E Litchman**. 2009. Phytoplankton competition for nutrients and light in a stratified water column. ASLO Aquatic Sciences Meeting. Nice, France.
- Evans*, MA, K Hickman*, RA Javier*, CA Klausmeier, K Yoshiyama* and **E Litchman**. 2009. Trait-based approaches to harmful algal blooms. ASLO Aquatic Sciences Meeting. Nice, France.
- de Tezanos Pinto*, P and **E Litchman**. 2008. Interactive effects of N:P ratios and light on phytoplankton community structure. International Association of Phytoplankton Taxonomy and Ecology 15th Workshop. Ramot, Israel.
- de Tezanos Pinto*, P and **E Litchman**. 2008. The effects of different N:P ratios on competitive interactions between a nitrogen fixer and a non nitrogen fixer. International Association of Phytoplankton Taxonomy and Ecology 15th Workshop. Ramot, Israel.
- Litchman, E** and CA Klausmeier. 2008. Modeling phytoplankton community reorganizations under global change. American Geophysical Union Chapman Conference on Lakes and Climate. Lake Tahoe, NV.
- Evans*, M-A and **E Litchman**. 2008. Physical and biological controls on abundance of *Microcystis*, a harmful algal bloom (HAB) species. ESA, Milwaukee, WI.
- Klausmeier, CA and **E Litchman**. 2008. Modeling plankton seasonal succession. ESA, Milwaukee, WI.

- Litchman, E** and CA Klausmeier. 2008. Trait-based community ecology of phytoplankton. ESA, Milwaukee, WI.
- Mellard*, JP, K Yoshiyama*, **E Litchman** and CA Klausmeier. 2008. The vertical distribution of phytoplankton in stratified water columns. Ecological Society of America Annual Meeting, Milwaukee, WI.
- Yoshiyama*, K, JP Mellard*, **E Litchman** and CA Klausmeier. 2008. Phytoplankton competition in stratified water columns. Ecological Society of America Annual Meeting, Milwaukee, WI.
- Steiner*, CF, AS Schwaderer*, V Huber*, **E Litchman** and CA Klausmeier. 2008. Periodically forced food chain dynamics: model predictions and experimental validation. Ecological Society of America Annual Meeting, Milwaukee, WI.
- Evans*, M-A and **E Litchman**. 2008. Physical and biological controls on abundance of *Microcystis*, a harmful algal bloom (HAB) species. International Association for Great Lakes Research Annual Conference, Peterborough, Canada.
- Klausmeier, CA and **E Litchman**. 2007. A novel approach to modeling plankton seasonal succession. Ecological Society of America Annual Meeting. San Jose, CA.
- Litchman, E** and CA Klausmeier. 2007. The role of the limiting nutrient identity and physiological allometries in size selection in phytoplankton. Ecological Society of America Annual Meeting. San Jose, CA.
- Yoshiyama*, K, J Mellard*, CA Klausmeier and **E Litchman**. 2007. Competition for nutrients and light in a coupled well-mixed and poorly-mixed water column. Society for Mathematical Biology Annual Meeting, San Jose, CA.
- Litchman, E** and CA Klausmeier. 2007. The role of the limiting nutrient identity and physiological allometries in size selection in phytoplankton. ASLO Aquatic Sciences Meeting, Santa Fe, NM.

National and International Service

Advisory Boards

- 2017- Advisory Board, PISTON, NERC Research Project "Does developmental plasticity influence speciation?"
- 2017- Advisory Board, AQUACOSM, European Network of Mesocosm Facilities
- 2012-pres Science Advisory Board, WasserCluster Lunz, Austria
- 2011-2016 Advisory Board, Danish Center of Excellence "Life in a changing ocean", Denmark
- 2010-2014 Science Advisory Board, National Center for Ecological Analysis and Synthesis (NCEAS), CA

Editorial Boards

2010-pres *Journal of Plankton Research*

2010-2014 *Oecologia*

- 2017 Session co-organizer (w/E. Miller): "Community Ecology of Host-Associated Microbiomes: Using Ecological Theory to Advance Microbiology", ESA Annual Meeting, Portland, OR
- 2015 Symposium co-organizer (w/L. Roselli): "Phytoplankton Traits", 13th Congress of the European Ecological Federation, Rome, Italy.
- 2015 Session co-organizer (w/A. Martiny, J. Bonachela, S. Levin and C. Klausmeier) at ASLO Aquatic Sciences Meeting, Granada, Spain: "Impacts of Microbial Biodiversity on Aquatic Ecosystem Functioning and Biogeochemistry".

- 2015 Workshop co-organizer (w/P. Frost and C. Meunier): "Stoichiometry and Trait-based Ecology", Conference on Ecological Stoichiometry, Trent University, Canada
- 2014 NSF DEB Panel
- 2013 NSF Biological Oceanography panel
- 2012 Session co-organizer (w/A. Barton and A. Pershing) at ASLO meeting, Salt Lake City, UT: "Understanding Plankton Biogeography by Putting Functional Traits on the Map."
Session co-organizer (w/K. Yoshiyama and C. Klausmeier) at ASLO summer meeting, L. Biwa, Japan: "Vertical structure of aquatic ecosystems: observations, experiments, and theories."
- 2011 External search committee member for the position of associate lecturer in ecological stoichiometry, Umeå University, Sweden
- 2009 NSF Ecology Panel
Session co-organizer (w/C. Klausmeier and J. Huisman) at ASLO Aquatic Sciences Meeting, Nice, France: "Trait-based approaches to plankton ecology."
- 2007 Session co-organizer (w/A. Kustka) at ASLO Aquatic Sciences Meeting, Santa Fe, NM: "Phytoplankton nutrient uptake and requirements: from molecular mechanisms to ecosystem impacts."
- 2005 Session co-organizer (w/C. Klausmeier) at ASLO Summer Meeting, Santiago de Compostela, Spain: "Advances at the interface of theoretical and empirical plankton ecology."
- 2003 Session co-organizer (w/A. Quigg) at ASLO Aquatic Sciences Meeting, Salt Lake City, UT: "The evolution, ecology and biogeochemical impacts of plankton from the Paleozoic to the present."
- 2002 Co-organizer of the Princeton University and Rutgers University Biocomplexity² Meeting, Princeton University, NJ
- 1999 Chair, Marine Ecology Session, Ecological Society of America Annual Meeting, Spokane, WA
- 1999 Co-coordinator (w/P. Neale) of the 1999 meeting of the SIL Group for Aquatic Primary Productivity (UV effects group), Zürich, Switzerland

Reviewer for NSF (Ecology, Biocomplexity in the Environment, Biological Oceanography), FWF (Austrian National Science Foundation), The Netherlands Science Foundation (NWO), MSU Center for Water Sciences, NSERC, *American Naturalist*, *Aquatic Sciences*, *Archiv für Hydrobiologie*, *Arctic*, *Antarctic and Alpine Research*, *Biological Reviews*, *Ecography*, *Ecological Modelling*, *Ecological Research*, *Ecology*, *Ecology Letters*, *Environmental Science and Technology*, *European Journal of Phycology*, *Evolutionary Applications*, *Fundamental and Applied Limnology*, *Hydrobiologia*, *ISME Journal*, *Journal of Marine Research*, *Journal of Natural Resources and Life Sciences Education*, *Journal of Phycology*, *Journal of Plankton Research*, *Limnology and Oceanography*, *Marine and Freshwater Research*, *Marine Ecology Progress Series*, *New Phytologist*, *Oecologia*, *Oikos*, *Photochemistry and Photobiology*, *Proceedings of the National Academy of Sciences*, *Proceedings of the Royal Society B*.

University Service

- 2016- Faculty Advisory Committee, Department of Integrative Biology, MSU
- 2016- KBS Seminar Committee, Chair
- 2015- Graduate Advisory Committee, Department of Integrative Biology, MSU

- 2015 Guest panelist in the Professional Success Series for graduate students and postdocs, MSU (x2)
- 2014 Guest panelist in the “Visiting funding agencies” discussion, MSU
- 2014-pres Mentoring committee of assistant professor Elise Zipkin, Integrative Biology
- 2014-2016 Space Use Committee, KBS
- 2013-pres College of Natural Sciences Faculty Advisory Council
- 2013 Zoology Chairperson Selection and Review Committee
- 2012-2016 KBS Graduate Affairs Committee Chair
- 2011-2014 EEBB Curriculum Committee
- 2010-2012 Blue Ribbon Blue Panel, MSU Strategic Initiative in Water Sciences
- 2010-2013 Faculty Advisory Committee, KBS
- 2009 MSU Representative at the Coalition for National Science Funding 15th Annual Exhibition on Capitol Hill, Washington, DC
- 2008-2009 College-wide Initiative on Water and Sustainability in the Great Lakes Region, Steering Committee
- 2007-2008 Committee Member, Plant Functional Ecologist Search, PLB, MSU
- 2006-2009 Graduate Recruitment Committee, KBS
- 2006-2011 Space Use Committee, KBS
- 2006-2008 MSU Plant Sciences Graduate Fellowships Committee
- 2005-2006 Graduate Recruitment Committee, KBS
Education and Outreach Assistant Director Search Committee, KBS
KBS Academic Planning Committee, KBS, MSU
- 1998–1999 Member, Seminar Series Committee, Smithsonian Environmental Research Center
- 1996–1997 Student Member, Limnology Faculty Search Committee, Department of Ecology, Evolution and Behavior, University of Minnesota

Outreach

- 2017 Talk to MSU Foundation’s Board of Directors
- 2016 Talk to Russian environmental managers through *Colleagues International*, Kalamazoo, MI
- 2015 Invited talk to local residents, Pierce Cedar Creek Institute, MI
- 2014 Host to high school teachers Connie High and Jodie McManus and a middle school teacher Becky Drayton (summer)
Invited talk at the Gull Lake Watershed Association meeting
Talk to local residents. Spring “Dessert with Discussion” Program, KBS
- 2013 Invited talk to MSU Alumni “Microalgae in lakes and oceans: the good, the bad and the ugly”
Invited plenary talk to local teachers, GK-12 Symposium, KBS
Talk to Wellesley College students at Lake Baikal, Russia

- 2010, 2011 Host to a high school teacher Connie High (Delton High School) in the summer
- 2010 Talk on “Water quality and harmful algal blooms in the changing climate” to local residents. KBS, “Dessert with Discussion” program
- 2009 Talk on “Water quality and harmful algal blooms in the changing climate” to K-12 teachers and GK-12 graduate fellows
- 2008 Tour of Pine Lake, MI for Four Township Association and local residents
- 2007 Invited talk on harmful algal blooms at the MI chapter of NALMS (North American Lake Management Society)
- 2007 Invited talk on harmful algal blooms at the MI Department of Environmental Quality (DEQ) meeting
- 2007 Gull Lake Community Schools Science Fair judge
- 2006 Provided job shadowing opportunity for a minority high school student, Tanisha McKoy, through Kalamazoo Regional Educational Service Agency

My lab regularly answers questions from local residents on water quality and algal blooms.

Selected Media Coverage of Research

1. *Nature 2004 paper*: Nature highlights: “Oceans 16” Nature May 13, 2004.
2. *PNAS 2009 paper*: “Mighty diatoms: global climate feedback from microscopic algae”, MSU News <http://news.msu.edu/story/6074/>, March 16, 2009.
The story was covered by national and international online media: NSF’s News from the Field, NASA’s Earth Observatory, sciencedaily.com, innovations-report.de, EurekAlert.org and others.
3. 2009: “Michigan State Collaboration Spawns Robotic Fish to Monitor Water Quality,” MSU News, <http://news.msu.edu/story/7057/>, November 2, 2009
Related coverage:
“MSU Receives Grant to Develop Robot Fish,” the State News, November 3, 2009
“NEMO’s New Mission: Find Toxic Algae Blooms,” Capital News Service, MSU School of Journalism, November 6, 2009
“Robotic Fish a Step Forward for Zoologists: MSU-developed Tool Monitors Oxygen, Temperature in Water,” Lansing State Journal, December 26, 2009
The story was covered by national and international media: US News and World Report, Scientific American, Science Daily, Great Lakes IT Report, Great Lakes Echo, Science 360 News Service, Engadget, Swedish Public Radio and many others.
4. *Ecology Letters 2010 paper*: “Invisible invasive species”, MSU News, UPI, Sciencedaily, Science360.gov, NSF.gov, Conservation Magazine, innovations-report.com, MI Public Radio, MSN.com and many others.
5. *2012 Science paper*: Nature highlights: “Plankton diversity loss looms”; New Scientist: “Tropical plankton exodus by 2100”; NSF, ClimateCentral and many others.

Professional Affiliations

American Society of Limnology and Oceanography (ASLO), Ecological Society of America (ESA), Global Lake Ecological Observatory Network (GLEON), International Society for Microbial Ecology (ISME), American Society for Microbiology (ASM)