Shan A. Kothari (he/him)

Contact Information

E-mail: shan.kothari@umontreal.ca
Website: shankothari.github.io

Research Interests

Plant physiological ecology, remote sensing, phenology, nutrient economics, community assembly

Professional Appointments

University of Alberta, Edmonton, Alberta — starting fall 2024
Assistant Professor
Department of Renewable Resources

Université du Québec à Montréal, Montréal, QC — 2022—present
Postdoctoral researcher
Centre d'étude de la forêt
Supervisors: Alain Paquette and Eric Searle

Université de Montréal, Montréal, QC — 2020—2022
Postdoctoral researcher
Institut de recherche en biologie végétale
Supervisor: Etienne Laliberté

Education

University of Minnesota—Twin Cities, Falcon Heights, MN — 2014—2020
Ph.D., Plant and Microbial Biology
Blinded by the Light: The Functional Ecology of Plant-Light Interactions
Committee: Jeannine Cavender-Bares (advisor), Daniel Stanton, Rebecca Montgomery, Yaniv Brandvain, Phil Townsend (UW-Madison)

Michigan State University, East Lansing, MI — 2010—2014
B.S., Zoology, Spec. in Ecology, Evolution, and Organismal Biology
B.S., Anthropology
Minor, Mathematics
3.97/4.0 overall GPA, Honors College

Teaching

Instructor — Spring 2023
R Workshop Series
Quebec Center for Biodiversity Science
Generalized linear models
General and generalized linear mixed-effects models

Teaching Assistant — Spring 2019
PMB 3005W: Plant Function Lab
University of Minnesota
Lead instructor: David Marks

Volunteer Teaching Assistant — Spring 2016
EEB 4068/5068: Plant Physiological Ecology
University of Minnesota

Lead instructor: Jeannine Cavender-Bares

Publications

J. Cavender-Bares, D. White (**S. Kothari** among 25+ alphabetical authors). Next-generation specimen digitization: capturing reflectance spectra from the world's herbaria for modeling plant biology across time, space, and taxa. *EcoEvoRxiv* DOI: 10.32942/X2V927 (accepted at *New Phytologist*)

D. White, J. Cavender-Bares, C. C. Davis, J. A. Guzmán, **S. Kothari**, J. M. Robles, J. E. Meireles. Seeing herbaria in a new light: leaf reflectance spectroscopy unlocks predictive trait and classification modeling in plant biodiversity collections. *EcoEvoRxiv* DOI: 10.32942/X29P8B (accepted at *New Phytologist*)

S. Kothari, J. Urgoiti, C. Messier, W. Keeton, and A. Paquette. Self-pruning in tree crowns is influenced by functional strategies and neighbourhood interactions. *Functional Ecology* 39 (2025): 2234-2250.

C. Wallis, A. L. Crofts, R. Jackisch, **S. Kothari**, G. Tougas, D. Inamdar, J. P. Arroyo-Mora, M. Kalacska, N. Coops, E. Laliberté, and M. Vellend. Methodological considerations for studying spectral-plant diversity relationships. *Remote Sensing of Environment* 328 (2025): 114907.

E. Gould, H. S. Fraser, T. H. Parker, S. Nakagawa, S. Griffith, P. Vesk, F. Fidler (**S. Kothari** among 200+ remaining alphabetical authors). Same data, different analysts: variation in effect sizes due to analytical decisions in ecology and evolutionary biology. *BMC Biology* 23 (2025): 35.

J. Cavender-Bares, J. Grossman, J. A. Guzmán, S. E. Hobbie, M. Kaproth, **S. Kothari**, C. Lapadat, R. A. Montgomery, and M. Park. Forests and Biodiversity 2: a low density tree diversity experiment to understand the consequences of multiple dimensions of diversity and composition for long-term ecosystem function and resilience. *Methods in Ecology and Evolution* 15 (2024): 2400-2414.

R. L. Bryant*, **S. Kothari***, J. Cavender-Bares, S. J. Curran, J. J. Grossman, S. E. Hobbie, C. Nash, G. C. Neumiller, and C. R. See*. Drivers of aboveground woody and soil carbon sequestration after six years of afforestation in a tree biodiversity experiment. *Ecological Applications* 34 (2024): e3042. (*equal contributors)

S. Kothari, S. E. Hobbie and J. Cavender-Bares. Rapid estimates of leaf litter chemistry using reflectance spectroscopy. *Canadian Journal of Forest Research* 54 (2024): 978-991.

C. Wallis, **S. Kothari**, J. Jantzen, A. L. Crofts, S. St-Jean, D. Inamdar, M. Kalacska, A. Bruneau, N. Coops, E. Laliberté, and M. Vellend. Exploring the spectral variation hypothesis for α- and β-diversity: A comparison of open vegetation and forests. *Environmental Research Letters* 19 (2024): 064005.

S. Kothari, R. Beauchamp-Rioux, F. Blanchard, A. Crofts, A. Girard, X. Guilbeault-Mayers, P. Hacker, J. Pardo, A. K. Schweiger, S. Demers-Thibeault, A. Bruneau, N. Coops, M. Kalacska, M. Vellend and E. Laliberté. Predicting leaf traits across functional groups using reflectance spectroscopy. *New Phytologist* 238 (2023): 549-566.

S. Kothari, R. Beauchamp-Rioux, E. Laliberté and J. Cavender-Bares. Reflectance spectroscopy allows rapid, accurate, and non-destructive estimates of functional traits from pressed leaves. *Methods in Ecology and Evolution* 14 (2023): 385-401.

S. Kothari* and A. K. Schweiger*. Plant spectra as integrative measures of plant phenotypes. *Journal of Ecology* 110 (2022): 2536-2554. (*equal contributors)

A. K. Schweiger, J. Cavender-Bares, **S. Kothari**, P. A. Townsend, M. D. Madritch, J. J. Grossman, H. Gholizadeh, R. Wang and J. A. Gamon. Coupling spectral and resource-use complementarity in experimental grassland and forest communities. *Proceedings of the Royal Society B* 288 (2021): 20211290.

P. L. Zarnetske*, J. Gurevitch*, J. Franklin, P. Groffman, C. Harrison, J. Hellmann, F. M. Hoffman, **S. Kothari**, A. Robock, S. Tilmes, D. Visioni, J. Wu, L. Xia and C.-E. Yang. Potential ecological impacts of climate intervention by reflecting sunlight to cool Earth. *PNAS* 118 (2021): e1921854118. (*equal contributors)

S. Kothari, R. A. Montgomery and J. Cavender-Bares. Physiological responses to light explain facilitation and competition in a tree diversity experiment. *Journal of Ecology* 109 (2021): 2000-2018.

R. D. Briscoe Runquist*, A. Gorton*, J. B. Yoder*, N. J. Deacon, J. J. Grossman, **S. Kothari**, M. Lyons, S. Sheth, P. Tiffin and D. A. Moeller. Context dependence of local adaptation to abiotic and biotic environments: a quantitative and qualitative synthesis. *The American Naturalist* 195 (2020): 412-431. (*equal contributors)

C. Halpern, J. Antos, **S. Kothari**, and A. Olson. Past tree influence and prescribed fire exert strong controls on reassembly of mountain grasslands after tree removal. *Ecological Applications* 29 (2019): e01860.

J. Cavender-Bares, **S. Kothari** and W. Pearse. Evolutionary Ecology of Communities. *Oxford Bibliographies in Evolutionary Biology* (2018).

J. Cavender-Bares, **S. Kothari**, J. E. Meireles, A. Hipp, M. Kaproth and P. Manos. The role of diversification in the continental scale community assembly of the American oaks (*Quercus*). *American Journal of Botany* 105 (2018): 565-586.

R. Wang, J. A. Gamon, A. K. Schweiger, J. Cavender-Bares, P. A. Townsend, A. I. Zygielbaum and **S. Kothari**. Influence of species richness, evenness, and

composition on spectral diversity: a simulation study. *Remote Sensing of Environment* 211 (2018): 218–228.

S. Kothari, J. Cavender-Bares, K. Bitan, A. Verhoeven, R. Wang, R. A. Montgomery and J. A. Gamon. Community-wide consequences of variation in photoprotective physiology among prairie plants. *Photosynthetica* 56 (2018): 455–467.

Manuscripts in Review or Revision

R. Esteban, B. Demmig-Adams, W. Adams III, and **S. Kothari**. Forests in Sunlight: How Energy Flows into and Is Used Within the Plant. (resubmitted to the edited volume *Following Photons Through Forests: A Radiation Ecology*)

R. Brooker, A. Hector, V. Temperton, A. Wright, B. Aguirre, K. Balazs, K. Barry, B. Butterfield, C. Lortie, G. Losapio, **S. Kothari**, B. Schmid, C. Schöb, L. Stefan, R. Callaway. Unpacking net interactions in plant communities: another road to generalization? (submitted to *American Naturalist*)

S. Kothari. When and how does photoinhibition matter for plant fitness? *EcoEvoRxiv* DOI: 10.32942/osf.io/zcv2r (in revision at *American Journal of Botany*)

J. Lamour, S. Serbin, A. Rogers (**S. Kothari** among 80+ alphabetical authors). The Global Spectra-Trait Initiative: A database of paired leaf spectroscopy and functional traits associated with leaf photosynthetic capacity. *Earth System Science Data Discussions* DOI: 10.5194/essd-2025-213 (resubmitted to *Earth System Science Data*)

Manuscripts in Preparation

S. Kothari, F. Blanchard, S. Demers-Thibeault, and E. Laliberté. Edaphic control of leaf senescence in winter-deciduous trees.

R. Ranjan* and **S. Kothari***. How the Type IV functional response got its hump—and why it matters. (*equal contributors)

A. J. Wright, **S. Kothari**, R. Brooker, A. Hector, G. Losapio, B. Schmid, V. Temperton, B. Aguirre, K. Balazs, B. Butterfield, C. Schöb, L. Stefan, and K. Barry. Facilitation of low yielding species is ubiquitous and drives many biodiversity-ecosystem functioning relationships.

L. Stefan, B. Butterfield, B. A. Aguirre, K. R. Balazs, K. E. Barry, R. Brooker, A. Hector, **S. Kothari**, G. Losapio, B. Schmid, V. M. Temperton, A. J. Wright, C. Schöb. Facilitation is as strong a driver of complementarity effects in polycultures as is competition alleviation.

Invited Research Presentations

S. Kothari. *Pushing the boundaries in estimating traits from pressed-leaf spectra*. International Herbarium Spectral Scanning Working Group Symposium, Harvard University. Lightning talk. May 2025.

S. Kothari. *A spectrum of spectra? Challenges and opportunities of using hyperspectral data in plant functional ecology.* iDiv. Invited seminar. May 2024.

S. Kothari. *Better living through physiology: How knowledge of plant function can improve forest management.* University of Alberta. Invited seminar. April 2024.

S. Kothari. *La physiologie des interactions interspécifiques dans les forêts tempérées.* Université Laval. Invited seminar. March 2024.

S. Kothari. *The physiology of species interactions in temperate forests.* University of British Columbia. Invited seminar. February 2024.

S. Kothari. *Better living through physiology: Using knowledge of plant function to improve temperate forest restoration.* Missouri Botanical Garden. Invited seminar. January 2024.

S. Kothari. *Can we improve trait estimates from spectra?* Carbon Club, Jet Propulsion Laboratory. Invited seminar. July 2023.

S. Kothari. *Blinded by the light: How physiological responses to light influence forest ecosystem function.* University of Calgary. Invited seminar. February 2023.

S. Kothari, R. Beauchamp-Rioux, E. Laliberté and J. Cavender-Bares. *Reflectance spectroscopy allows rapid, accurate, and non-destructive estimates of functional traits from pressed leaves.* Leveraging natural history collections to understand global change, Natural History Museum, London. Talk. February 2023.

S. Kothari. *Blinded by the light: Putting photoinhibition in an ecological context.* University of Kansas. Invited seminar. January 2023.

S. Kothari. *Too much of a good thing? Light stress, plant economics, and carbon storage in tree communities.* Ohio State University. Invited seminar. January 2023.

S. Kothari. *Blinded by the light: Putting photoinhibition in an ecological context.* Duke University. Invited seminar. December 2022.

S. Kothari. *A spectrum of spectra? Describing the major dimensions of plant hyperspectral variation.* Ecological Society of America/Canadian Society of Ecology and Evolution. Inspire talk. August 2022.

S. Kothari. *Have we reached a limit to accuracy in estimating traits from leaf spectra?* Remote Sensing Laboratories, University of Zurich. Invited seminar. May 2022.

S. Kothari, R. Beauchamp-Rioux, E. Laliberté and J. Cavender-Bares. *Reflectance spectroscopy allows rapid, accurate, and non-destructive estimates of functional*

traits from pressed leaves. ASCEND Biological Integration Institute. Invited seminar. April 2021.

S. Kothari. *Plant Physiological Responses to Solar Geoengineering: Knowns and (Mostly) Unknowns.* Ecosystem Consequences of Solar Geoengineering Symposium, University of Minnesota. Talk. November 2019.

S. Kothari, R. A. Montgomery, S. E. Hobbie, P. Reich and J. Cavender-Bares. *The physiological underpinnings of facilitation in a tree diversity experiment.* Ecological Society of America 2018. Talk. August 2018.

S. Kothari (substitute for J. Cavender-Bares) *Linking remotely sensed spectral diversity to genetic, phylogenetic and functional diversity to predict ecosystem processes.* Ecological Society of America 2017. Ignite talk. August 2017.

Contributed Research Presentations

S. Kothari, E. Searle, W. Parker, M. Urli, and A. Paquette. *Acclimatation des caractéristiques stomatiques et de la surface foliaire sous irrigation dans une forêt expérimentale.* Colloque du Centre d'étude de la forêt 2024. Talk. May 2024.

S. Kothari, J. Urgoiti, C. Messier, W. Keeton, and A. Paquette. *Functional strategies and neighborhood interactions influence self-pruning in tree crowns.* Ecological Society of America 2023. Talk. August 2023.

S. Kothari, J. Urgoiti, C. Messier, W. Keeton, and A. Paquette. *Les stratégies économiques et la tolérance à l'ombre influencent l'auto-élagage des branches basses des arbres.* Congrès de l'Acfas. Poster. May 2023.

S. Kothari, F. Blanchard, S. Demers-Thibeault, and E. Laliberté. *Fine-scale edaphic control of leaf senescence in winter-deciduous trees.* Ecological Society of America/Canadian Society of Ecology and Evolution. Talk. August 2022.

S. Kothari and E. Laliberté. *Predicting leaf traits across functional groups using reflectance spectroscopy.* Quebec Centre for Biodiversity Science 2021. Long poster. December 2021.

S. Kothari, R. Beauchamp-Rioux, E. Laliberté and J. Cavender-Bares. *Reflectance spectroscopy allows rapid, accurate, and non-destructive estimates of functional traits from pressed leaves.* Botanical Society of America 2021. Talk. July 2021.

S. Kothari, S. E. Hobbie and J. Cavender-Bares. *Rapid estimates of leaf litter chemistry and decomposition using reflectance spectroscopy.* Ecological Society of America 2020. Talk. August 2020.

S. Kothari, R. Montgomery and J. Cavender-Bares. *Throwing shade: Light-mediated facilitation and competition in a tree diversity experiment.* Ecological Society of America 2019. Talk. August 2019.

S. Kothari, R. A. Montgomery, S. E. Hobbie, P. Reich and J. Cavender-Bares. *The physiological underpinnings of facilitation in a tree diversity experiment.* Long-Term Ecological Research All-Scientists Meeting 2018. Poster. October 2018.

S. Kothari, J. Cavender-Bares, K. Bitan, A. Verhoeven, R. Wang, R. A. Montgomery and J. Gamon. *Community-wide consequences of variation in photoprotective physiology among prairie plants.* Botanical Society of America 2018. Talk. July 2018.

S. Kothari, J. Cavender-Bares, A. K. Schweiger, P. A. Townsend, S. E. Hobbie and R. A. Montgomery. *Nitrogen uptake and crown-level allocation across an experimental tree diversity gradient.* Ecological Society of America 2017. Talk. August 2017.

S. Kothari, J. Cavender-Bares, A. Verhoeven, K. Bitan, R. Wang, R. A. Montgomery and J. Gamon. *Seasonal variation in xanthophyll cycle pigments among species with contrasting water use strategies.* Ecological Society of America 2016. Talk. August 2016.

Educational Presentations

S. Kothari. *Trait-based ecology in the age of robots.* International Functional Trait Course, Université Laval. Guest lecture. June 2025.

S. Kothari. *Light, soil, action! Drivers of carbon storage in the Forests and Biodiversity (FAB) experiment.* Lunch with a Scientist, Cedar Creek Ecosystem Science Reserve. Invited public lecture. March 2023.

S. Kothari. *Competition and Facilitation.* Dr. Jessica Savage's Plant Physiology class, University of Minnesota–Duluth. Guest lecture. February 2022.

S. Kothari. *Biodiversity and Ecosystem Function.* Dr. Jesús Pinto-Ledezma's Biodiversity Science class, University of Minnesota. Guest lecture. March 2020.

S. Kothari. *Spectral Properties of Leaves and Plants.* Dr. Jen Teshera-Levye's Plant Physiological Ecology class, University of Minnesota. Guest lecture. February 2020.

S. Kothari. *How Much Light Does a Plant Need?* Dr. Mary Heskel's Plant Ecophysiology class, Macalester College. Guest lecture. November 2019.

S. Kothari. *The Other Darwin.* Darwin Day, University of Minnesota. Invited public lecture. February 2018.

S. Kothari, C. Pearson, K. Mayfield, A. Zuchora and S. Smith. *Your Brain on Jane Austen.* Science Festival, Michigan State University. Demonstration / Seminar. April 2014.

Competitive Research Grants	sDiv Early Career Working Group ($33,000) *sPectra: the major dimensions of plant spectral variation* PI: Shan Kothari; co-PI: Teja Kattenborn	2023
	UMN International Thesis Research Travel Grant ($3300) *Leaf trait retrieval from reflectance spectroscopy: applications to herbarium specimens* PI: Shan Kothari	2019
	Alexander & Lydia Anderson Grant ($3000) *Estimating nutrient resorption efficiency using hyperspectral data* PI: Shan Kothari	2019
	Travel Mini-Grant, NSF Cross-Scale Biodiversity RCN ($2000) *Leaf trait retrieval from reflectance spectroscopy: applications to herbarium specimens* PI: Shan Kothari	2019
	Carolyn Crosby Research Grant ($3000) *Nitrogen uptake complementarity in a tree diversity experiment* PI: Shan Kothari	2016
Fellowships and Awards	Harvard Arnold Arboretum Putnam Fellowship ($106,000; declined)	2022
	UMN Hamm Award for Outstanding Plant Science Student ($2500)	2020
	Fulbright/Swiss Government Excellence Scholarship ($30,000; declined)	2019
	UMN Doctoral Dissertation Fellowship ($25,000)	2019
	UMN Plant Biological Sciences Travel Grants ($3760)	2015-9
	Cedar Creek Graduate Research Fellowships ($6000)	2016-8
	G. H. Lauff Tuition Scholarship, Kellogg Biological Station ($500)	2014
	National Science Foundation Graduate Research Fellowship ($138,000)	2014
	UMN College of Biological Sciences Excellence Fellowship ($45,000)	2014
	College of Arts and Letters Undergraduate Research Grant ($750)	2013
	MSU Professorial Assistantship ($4000)	2010
Mentoring	**Graduate supervision**	
	Rykkar Jackson, MSc student at University of British Columbia Co-supervisor (with primary supervisor Warren Cardinal-McTeague)	2023-
	Graduate committee membership	
	Tanjena Tuli, PhD student at Université du Québec à Montréal Supervisors: Morgane Urli and Eric Searle	2024-
	Jonathan Tales, MSc student at University of Alberta Supervisor: Charles Nock	2025
	Benjamin Strelkov, MSc student at University of Alberta Supervisor: Brad Pinno	2025

Undergraduate supervision

Cedar Creek interns: Britney Millman, Andrew Landsem, Daav Sannerud, Ingrid Holstrom, Jacob Becker, Valerie Gehn, Emily Geary, Ella Johnson

Service

- Member, ESA Bazzaz-Pickett Award Committee (2025-)
- Co-chair, Renewable Resources EDI Committee (2025-)
- Associate Editor, *AoB PLANTS* (2022-)
- Advisory Board, *New Phytologist* (2021-)
- Co-founder and lead organizer, UMN Physiological Ecology Group
- Representative, UMN College of Biological Sciences Graduate Student Board
- Representative, UMN Council of Graduate Students
- Representative, UMN College of Biological Sciences Diversity & Initiatives Committee
- Officer, Phytograds (UMN Plant Biology student association)
- Student Liaison, Physiological Ecology Section, Ecological Society of America
- Organizer, Jackson Middle School Eco-Extravaganza
- Reviewer for *New Phytologist* (8), *Global Ecology and Biogeography* (5), *Ecography* (3), *Annals of Botany* (2), *Biotropica* (2), *Oikos* (2), *Ecology and Evolution* (2), *Methods in Ecology and Evolution* (2), *Journal of Ecology* (2), *Ecology*, *American Naturalist*, *Functional Ecology*, *American Journal of Botany*, *Plant and Soil* , *Oecologia*, *Ecosphere*, *PeerJ*, *Canadian Journal of Forest Research*, *AoB PLANTS*, *Northwest Science*, *Applications in Plant Sciences*
- Market Science (2015-20)—created and led sessions on Plant Chemistry, Remote Sensing, the Biology of Sunscreen, and Counting Nature
- Judge at Minnesota State Science Fair (2015, 2017), Winchell Undergraduate Research Symposium (2015)