

DR. LILY KHADEMPOUR – CURRICULUM VITAE

Lily.Khadempour@rutgers.edu

Professional Appointments

Assistant Professor

January 2021-Present

Rutgers University-Newark

Department of Earth and Environmental Sciences

Postdoctoral Researcher

2018-2020

California State University, Northridge

Department of Biology, Advisor: Prof. Casey terHorst

Education

PhD in Integrated Biology

2011-2018

University of Wisconsin-Madison

Advisor: Prof. Cameron Currie

MSc in Forestry

2008-2011

University of British Columbia

Advisor: Prof. Colette Breuil

BSc in Ecology and Environmental Biology

2002-2007

University of British Columbia

Spent two semesters at the University of Otago, NZ

Peer-Reviewed Publications

Underlined indicates mentees, † indicates corresponding author

Cheng, SJ, Gaynor, KM, Moore, AC, Darragh, K, Estien, CO, Hammond, JW, Lawrence, C, Mills, KL, Baiz, MD, Ignace, D, **Khadempour, L**, McCary, MA, Rice, MM, Tumber-Dávila, SJ, Smith, JA (2023) Championing inclusive terminology in ecology and evolution. *Trends in Ecology and Evolution* 38(5): 381-384; DOI: 10.1016/j.tree.2022.12.011

Sawh, I., Bae, E., Camilo, L., Lanan, M., Lucky, A., Morais Menezes, H., Fiorentino, G., Sosiak, C., **Khadempour, L.** †, Barden, P. † (2023) The first fossil replete ant worker establishes living food storage in the Eocene. *Myrmecological News* 33 139-147; DOI: 10.25849/myrmecol.news_033:139.

Gotting, K., May, D.S., Sosa-Calvo, J., **Khadempour, L.**, Francoeur, C.B., Berasategui, A., Thairu, M.W., Sandstrom, S., Carlson, C.M., Chevrette, M.G., Pupo, M.T., Bugni, T.S., Schultz, T.R., Johnston, J.S., Gerardo, N.M., Currie, C.R. (2022) Genomic diversification of the specialized parasite of the fungus-growing ant symbiosis. *Proceedings of the National Academy of Sciences* 119 (51) e2213096119; 10.1073/pnas.2213096119.

Khadempour, L. †, Rivas Quijano, L., terHorst, C.P. (2022) Prey identity affects fitness of a generalist consumer in a brown food web. *Ecology and Evolution* 12:e9207; DOI: 10.1002/ece3.9207

Khadempour, L., Kyle, J., Monroe, M., Smith, R., Lipton, M., Currie, C.R., Baker, E., Burnum-Johnson, K. (2021) From plants to ants: Fungal modification of leaf lipids for nutrition and

communication in the leaf-cutter ant fungal garden ecosystem. *mSystems* 6(2): e01307-20; DOI: 10.1128/mSystems.01307-20.

Khadempour, L., Fan, H., Keefover-Ring, K., Nagamoto, N., Carlos-Shanley, C., Dam, M., Tallarico Pupo, M., Currie, C.R. (2020) Metagenomics reveals diet-specific specialization of bacterial communities in fungus gardens of grass- and dicot-cutter ants. *Frontiers in Microbiology* 11: 2227; DOI: 10.3389/fmicb.2020.570770.

Francoeur, C.B., **Khadempour, L.**, Gotting, K., Moreira-Soto, R.D., Book, A.J., Pinto-Tomás, A.A., Keefover-Ring, K., Currie, C.R. (2020) Bacterial mediation of plant secondary compound degradation in the leaf-cutter ant system. *MBio*. 11(5): e02146-20; DOI:10.1128/mBio.02146-20.

Paludo, C.R., Menezes, C., Silva-Junior, E.A., Vollet-Neto, A., Andrade-Dominguez, A., Pishchany, G., **Khadempour, L.**, do Nascimento, F.S., Currie, C.R., Kolter, R., Clardy, J., Pupo, M.T. (2018) Stingless bee larvae obtain steroids from a fungal source. *Scientific Reports* 8:1122.

Khadempour, L., Burnum-Johnson, K., Baker, E., Nicora, C., Webb-Robertson, B., Monroe, M., Huang, E., Smith, R., Currie, C. (2016) The fungal cultivar of leaf-cutter ants produces specific enzymes in response to different plant substrates. *Molecular Ecology* 25: 5795-5805.

Aylward, F.O., **Khadempour, L.**, Tremmel, D.M., McDonald B.R., Nicora C.D., Wu, S., Moore, R.J., Orton, D.J., Monroe, M.E., Piehowski, P.D., Purvine, S.O., Smith, R.D., Lipton, M.S., Burnum-Johnson, K.E. and Currie, C.R. (2015) Enrichment and Broad Representation of Plant Biomass-degrading Enzymes in the Specialized Hyphal Swellings of *Leucoagaricus gongylophorus*, the Fungal Symbiont of Leaf-Cutter Ants. *PLoS ONE* 10(8), e0134752

Khadempour, L., LeMay, V., Jack, D., Bohlmann, J. and Breuil, C. (2012) The relative abundance of mountain pine beetle fungal associates through the beetle life cycle in pine trees. *Microbial Ecology* 64: 909-917.

Khadempour, L., Massoumi Alamouti, S., Hamelin, R., Bohlmann, J. and Breuil, C. (2010) Target-specific PCR primers can detect and differentiate ophiostomatoid fungi from microbial communities associated with the mountain pine beetle *Dendroctonus ponderosae*. *Fungal Biology* 114: 825-33.

Tsui, C.K.M., Wang, B., **Khadempour, L.**, Massoumi Alamouti, S., Bohlmann, J., Murray, B.W. and Hamelin R.C. (2010) Rapid identification and detection of pine pathogenic fungi associated with mountain pine beetles by padlock probes. *Journal of Microbiological Methods* 83: 26-33.

Tsui, C.K.M., Feau, N., Ritland, C.E., Massoumi Alamouti, S., Diguistini, S., **Khadempour, L.**, Bohlmann, J., Breuil, C. and Hamelin, R.C. (2009) Characterization of microsatellite loci in the fungus, *Grosmannia clavigera*, a pine pathogen associated with the mountain pine beetle. *Molecular Ecology Resources* 9: 1500–1503.

Other Publications

Khadempour, L., Lim Y.W., Massoumi Alamouti, S. and Breuil, C. DNA-based tools for monitoring ophiostomatoid fungi. Proceeding for The 41st Annual Meeting of the International Research Group on Wood Protection, May 9-14, 2010, Biarritz, France.

Uzunovic, A. and **Khadempour, L.** (2007) Heat disinfestations of mountain pine beetle-affected wood. Mountain pine beetle initiative working paper 2007-14. Natural Resources Canada, Canadian Forest Service, Pacific Forestry Centre, 506 West Burnside Road, Victoria, BC.

Forthcoming Publications

Underlined indicates mentees.

Khadempour, L., Chevrette, M., Wang, Y.W., Francoeur, C., Sandstrom, S., Rodriguez, A., Tallarico Pupo, M., Currie, C. Leaf-cutter ant fungal cultivar genomes: evolutionary transitions to a novel substrate. (*In prep*)

Teaching Experience

Instructor of Record - Rutgers University, Newark

(Graduate) Symbiosis and Host-Associate Microbiomes

Spring 2023

(Undergraduate) General Microbiology

Fall 2022, 2023

(Graduate) Evolution

Spring 2021

Teaching Assistant

Fall 2011, 2012

Comparative Vertebrate Anatomy Laboratory – University of Wisconsin-Madison

Teaching Assistant

2008-2011

Wood Chemistry Laboratory – University of British Columbia

Guest Lectures

Symbiosis, New College of Florida

2021

Principles of Ecology, CSUN

2019

Biological Principles, CSUN

2018

Biology and Genetics of Filamentous Fungi, UW-Madison

2016

Diversity, Ecology and Evolution of Microorganisms, UW-Madison

2015 - 2018

Symbiosis Seminar for Biology Majors, Providence College, Rhode Island

2015

Wood Chemistry, University of British Columbia

2009 - 2011

Oral Presentations

Invited talks

Symbiosis in three dimensions: a new conceptual framework. Emory University, Population Biology, Ecology, and Evolution Program Seminar Series. February 23, 2024, Atlanta, GA, USA.

Ants, microbes and a new conceptual framework for symbiosis. EEB Track Hub Session, American Society of Microbiology Annual Meeting, June 13-17, 2023, Houston, TX, USA.

Ants, microbes and a new conceptual framework for symbiosis. Two hour session with lecture and Q&A. Molecular and Cell Biology of Symbiosis Advanced Research and Training Course at the Marine Biological Laboratory, May 13, 2023, Woods Hole, MA, USA.

Ants, microbes and a new conceptual framework for symbiosis. Colby College. Biology Department Seminar Series. April 21, 2023, Waterville, ME, USA.

Leaf-cutter ants and a general conceptual framework for symbiosis. International Conference on Model Hosts. October 1-6, 2022, Rhodes, Greece.

Ecology and evolution of insect-microbial symbioses. Department of Microbiology and Immunology, Dartmouth College. Department Seminar Series. June 23, 2022, Hanover, NH, USA.

Ants, Microbes and Symbiosis. Social Insects in the Northeast Regions Conference. June 4, 2022, Newark, NJ, USA.

Ecology and evolution of insect-microbial symbioses. Microbiology and Molecular Pathogenesis Program, Dartmouth College. Department Seminar Series. June 23, 2022, Hanover, NH, USA.

Ants, Microbes and Symbiosis. Rutgers Microbiology Symposium. May 5, 2022, New Brunswick, NJ, USA.

Ecology and evolution of insect-microbial symbioses. Department of Biology at Texas State University, San Marcos. Department Seminar Series. April 15, 2022, San Marcos, TX, USA.

Ecology and evolution of insect-microbial symbioses. Rutgers University, New Brunswick. Department of Biochemistry and Microbiology, Department Seminar Series. March 23, 2022, New Brunswick, NJ, USA.

Ecology and evolution of insect-microbial symbioses. Rutgers University, New Brunswick. Department of Ecology and Evolution, Department Seminar Series. March 3, 2022, New Brunswick, NJ, USA.

Ecology and evolution of insect-microbial symbioses. American Museum of Natural History. Richard Gilder Graduate School, Museum Seminar Series. February 14, 2022, New York, NY, USA.

Ecology and evolution of insect-microbial symbioses. Rutgers University, Department of Earth and Environmental Sciences. December 1, 2021, Newark, NJ, USA.

Leaf-cutter ants and pitcher plants: what microbiomes can tell us about ecology and evolution. Humboldt State University. May 8, 2020, Arcata, CA, USA. (Canceled due to COVID-19)

Leaf-cutter ants and pitcher plants: what microbiomes can tell us about ecology and evolution. Florida State University. April 10, 2020, Tallahassee, FL, USA. (Canceled due to COVID-19)

Using microbiomes to understand ecological and evolutionary interactions. Rutgers University, Newark. February 12, 2020, Newark, NJ, USA.

Ant farmers and their fungal crop: coevolution in an ancient agricultural system. Spotlight session: Origins, stability, and benefits of interspecific cooperation in a changing world. Evolution Annual Meeting. June 21-25, 2019, Providence, RI, USA.

Microbial mediation of herbivory in leaf-cutter ant fungus gardens. California State University, Northridge. September 21, 2018 Los Angeles, CA, USA.

Microbial mediation of herbivory in leaf-cutter ant fungus gardens. University of Connecticut. September 5, 2018. Storrs, CT, USA.

Microbial mediation of herbivory in leaf-cutter ant fungus gardens. University of Texas-Austin. April 25, 2018, Austin, TX, USA.

Microbial mediation of herbivory in leaf-cutter ant fungus gardens. University of Würzburg. February 20, 2018, Würzburg, Germany.

Microbial mediation of herbivory in leaf-cutter ant fungus gardens. University of Copenhagen. February 16, 2018, Copenhagen, Denmark.

Contributed talks

A conceptual framework for host-microbial symbioses in three dimensions. Ecological Society of America (ESA), August 6-11, 2023, Portland, OR, USA.

A visual conceptualization of symbiosis in three dimensions. Conference of the American Society of Naturalists, January 6-10, 2023, Pacific Grove, CA, USA.

A summary of the WOC in EEB mentorship programs, WOCinEEB and the importance of affinity groups in ecology, Special Session, Ecological Society of American and the Canadian Society for Ecology and Evolution Meeting, August 14-19, 2022, Montreal, QC, Canada.

The power of mentorship for WOC in EEB, part of the special session: Vital connections for women and non-binary BIPOC in ecology. Ecological Society of America (ESA) Annual Meeting, August 2-6, 2021, Virtual.

Microbial mediation of a transition to novel substrate utilization by *Atta* leaf-cutter ants. Ecological Society of America (ESA) Annual Meeting. August 6-11, 2017, Portland, OR, USA.

Metaproteomic analysis reveals a substrate-specific response of leaf-cutter ants' fungal cultivar. International Society for Microbial Ecology (ISME16), August 21-26, 2016, Montréal, QC, Canada.

Substrate-specific enzyme response in the microbial community of leaf-cutter ant fungus gardens. Symbiosis Symposium in the Department of Bacteriology, UW-Madison. August 1, 2014, Madison, WI, USA.

Changes in abundance of mountain pine beetle associated fungi. The 60th Annual Meeting of the Entomological Society of America, November 12-14, 2012, Knoxville, TN, USA.

DNA-based tools for monitoring ophiostomatoid fungi. The 41st Annual Meeting of the International Research Group on Wood Protection, May 9-14, 2010, Biarritz, France.

Species-specific primers and quantitative PCR for monitoring mountain pine beetle fungal associates. Joint Annual Meeting of the Entomological Society of Canada and the Entomological Society of British Columbia, October 31-November 3, 2010, Vancouver, BC, Canada.

Poster Presentations

Microbial mediation of herbivory in leaf-cutter ant fungus gardens. 7th Conference on Beneficial Microbes, July 8-11, 2018, Madison, WI.

Bacterial community metagenomics in fungus gardens of leaf-cutter ants. 12th Annual DOE Joint Genome Institute Genomics of Energy & Environment Meeting, March 20-23, 2017, Walnut Creek, CA.

Substrate-specific enzyme production from a herbivore-associated microbe. Great Lakes Bioenergy Research Centre Annual Science Meeting, May 17-19, 2016, Lake Geneva, WI.

The fungal cultivar of leaf-cutter ants: a substrate-specific response to a diverse diet. Gordon Research Conference on Animal-Microbe Symbioses, June 21-26, 2015, Waterville Valley, NH.

Substrate-specific enzyme production from leaf-cutter ant fungal cultivar. Great Lakes Bioenergy Research Centre 8th Annual Science Retreat, May 20-22, 2015, South Bend, IN.

Substrate-specific protein expression of biomass degrading enzymes in a natural symbiotic microbial community. Raper Symposium, Department of Bacteriology, UW-Madison, August 30, 2014. Madison, WI.

Substrate-specific protein expression of biomass degrading enzymes in a natural symbiotic microbial community. Great Lakes Bioenergy Research Centre 7th Annual Science Retreat, May 19-21, 2015, South Bend, IN.

Teacher Training

Mentoring Matters Workshop Badge 2023-2024

P3 Collaboratory Rutgers University-Newark

- Learned about mentorship best practices through a workshop series

Active Learning 101 2019

Faculty Development at CSUN

- Learned about various teaching strategies to engage students in deep learning

Group ACTIVETies Inside and Outside the Classroom 2019

Faculty Development at CSUN

- Discussed/learned about best practices for encouraging effective group work in classrooms

UW-Madison Teaching and Learning Symposium 2017

- Participated in sessions on active learning, improving pedagogy through empirical evidence and identifying and acknowledging our implicit biases.

Instructional Skills Workshop 2009

UBC Centre for Teaching, Learning and Technology

- Learned teaching techniques and how to write lesson plans
- Created, practiced and received feedback on lessons
- Learned techniques for laboratory, discussion group and lecture teaching

GRANTS AND AWARDS

Cultural Programming Grant: Building a Love of Place through Natural Beauty & Engagement. Rutgers Internal Grant, Role: PI, Amount \$3500

BRC-BIO: Establishing a new model system to study the relationship between gut microbiome and host niche specialization.

NSF (DBI 2312984) Start Date: 09/15/2023 End Date: 08/31/2026 Role: PI Amount: \$497,916

Conference: Networks of success to broaden participation in the environmental sciences.

NSF (DEB 2317203) Start Date: 06/15/2023 End Date: 05/31/2024 Role: Co-PI Amount: \$99,995

The Ant Room - Marine Biological Laboratory Alumni Regional Outreach and Communication in STEM Award

Award duration: 2022 Amount: \$2300

Rutgers Global International Collaborative Research Grant - Establishing the International Consortium for Honey-pot Ant Research
Award duration: 2021-2023 Amount \$5000

GRANTS AND AWARDS - PRIOR TO FACULTY POSITION

USDA-Hatch Grant (lead PI-Currie, with Khadempour as lead author) The role of microbial symbionts in substrate specialization in leaf-cutter ants	2014-2018
UW-Madison Graduate School Student Research Travel Grant to travel to the ESA meeting in Portland, OR.	2017
John Jefferson Davis award for travel to the ESA meeting in Portland, OR.	2017
Department of Bacteriology award for travel to the ISME meeting in Montreal, Canada.	2016
John Jefferson Davis award for travel to the ISME meeting in Montreal, Canada.	2016
UW-Madison Department of Zoology Graduate Research Grant for fieldwork in São Paulo, Brazil.	2014
John Jefferson Davis award for travel to Entomological Society of America meeting in Knoxville, TN.	2012
Ron Cockcroft Award for travel to the The 41 st Annual Meeting of the International Research Group on Wood Protection, Biarritz, France.	2010

SERVICE AND OUTREACH

NSF Panel Reviewer	2023
Dept. of Earth and Environmental Sciences Faculty Search Committee	2022
NSF Panel Reviewer	2022
Dept. of Earth and Environmental Sciences Graduate Student Admissions Committee	2021-Present
American Society of Naturalists, Diversity Committee Officer	2022-Present
Ecological Society of America, Microbial Ecology Section Officer, Chair	2024
Ecological Society of America, Microbial Ecology Section Officer, Vice Chair	2023
Ecological Society of America, Microbial Ecology Section Officer, Secretary	2022
Ad Hoc reviewer for peer-reviewed journals: Molecular Ecology, mSystems, mSphere, FEMS Microbiology Ecology, Biology Letters, Insects, Fungi, Oecologia, Journal of Animal Ecology, PeerJ, Frontiers in Microbiology	
Rutgers University Microbiome Program Seminar Series Committee Member	2021-Present
Director of WOC in EEB international 1-on-1 mentoring program and member of the WOC in EEB Advisory Board	2020-Present
Organized a seven-part professional development workshop series for all Los Angeles area postdocs	2019
Created website, ScienceQnA.org for science outreach	2019

Founding President of the CSUN Postdoc Association	2019 - 2020
Reviewer for SACNAS student travel scholarship and presentation abstracts	2019-present
Judge for student poster presentations at the CSUN Annual Student Research and Creative Works Symposium	2019
Participated in Skype a Scientist with three classrooms	2018
Participated in Currie Lab science outreach booths multiple times per year	2011-2018
In collaboration with PBS, created “PBS Learning Media: Leaf-cutter Ants, A Farming Super-Organism” educational tool (website here)	2015