

# MALLORY CHOUDOIR, PHD

*Assistant Professor & Extension Specialist*  
North Carolina State University  
Department of Plant & Microbial Biology  
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**Research Interests:** microbial ecology & evolution, soil ecology, plant-soil-microbe interactions, agroecosystems, global change biology, biogeography, genomics, environmental & social justice

## EDUCATION

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**2016** PhD Microbiology, Cornell University (minors in ecology and genomics)  
**2008** BSc Microbiology, University of Wisconsin-Madison

## RESEARCH APPOINTMENTS

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**Assistant Professor**, North Carolina State University **9/2022**  
Department of Plant and Microbial Biology *Raleigh, NC*  
Extension Specialist in Agricultural Soil Microbiomes

**Postdoctoral Research Associate**, University of Massachusetts Amherst **7/2020-7/2022**  
Department of Microbiology; *Advisor: Kristen DeAngelis* *Amherst, MA*

**Scientist II**, Indigo Ag **8/2018-2/2020**  
Research and Scientific Insights (RSI) *Boston, MA*

**Postdoctoral Associate**, University of Colorado Boulder **8/2016-8/2018**  
Cooperative Inst for Research in Environ Studies (CIRES); *Advisor: Noah Fierer* *Boulder, CO*

**Graduate Research Fellow**, Cornell University **8/2010-5/2016**  
School of Integrative Plant Sciences (SIPS); *Advisor: Daniel Buckley* *Ithaca, NY*  
Dissertation (May 2016): Population-level approaches to elucidating the evolutionary forces driving *Streptomyces* biogeography

**Teaching Fellow**, Marine Biological Laboratory **2012-2013**  
Microbial Diversity Course; *Instructors: Daniel Buckley and Steve Zinder* *Woods Hole, MA*

**ORISE Research Fellow**, Centers for Disease Control and Prevention (CDC) **2008-2010**  
National Botulism Laboratory and Preparedness Team (NBLPT) *Atlanta, GA*

**Research Assistant**, University of Wisconsin-Madison **2006-2008**  
Department of Horticulture; *Mentor: Lara Colton Kramer* *Madison, WI*

## PUBLICATIONS

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### *Under Review & Preprints*

Schaal H, **Choudoir MJ**, Diwanji V, John Stoffolano, DeAngelis KM. (2022) Chitosan diet alters the microbiome of adult house flies. (*Under review*)

**Choudoir MJ**, Järvenpää MJ, Marttinen P, Buckley DH. (2021) A non-adaptive mechanism for genome expansion in *Streptomyces*. *bioRxiv* doi:10.1101/2021.01.09.426074

**Peer-reviewed**

**2022**

**Choudoir MJ**, Eggleston EM. (2022) Reciprocal inclusion of microbiomes and environmental justice contributes solutions to global environmental health challenges. *mSystems* (e01462-21).

**Choudoir MJ**, DeAngelis KM. (2021) A framework for integrating microbial dispersal modes into soil ecosystem ecology. *iScience* 25(13):103887.

Hariharan J, **Choudoir MJ**, Diebold P, Panke-Buisse K, Buckley DH. (2022) *Streptomyces apricus* sp. nov., isolated from soil. *International Journal of Systematic and Evolutionary Microbiology* 72(1):005178.

**2021**

Ishaq SL, Parada FJ, Wolf PG, Bonilla CY, Carney MA, Benezra A, Wissel E, Friedman M, DeAngelis KM, Robinson JM, Fahimipour AK, Manus MB, Grieneisen L, Dietz LG, Pathak A, Chauhan A, Kuthyar S, Stewart JD, Dasari MR, Nonnamaker E, **Choudoir M**, Horve PF, Zimmerman NB, Kozik AJ, Darling KW, RomeroOlivares AL, Hariharan J, Farmer N, Maki KA, Collier JL, O'Doherty KC, Letourneau J, Kline J, Moses PL, Morar N. (2021) Introducing the Microbes and Social Equity Working Group: considering the microbial components of social, environmental, and health justice. *mSystems* 6:e00471-21.

**2020**

McBride SG, **Choudoir MJ**, Fierer N, Strickland M. (2020) Volatile organic compounds released during leaf litter decomposition alter microbial communities and carbon dynamics in soil. *Ecology* 10.1002/ecy.3130.

**2019**

**Choudoir MJ**, Rossabi S, Gebert M, Fierer N. (2019) A phylogenetic and functional perspective on volatile organic compounds production by *Actinobacteria*. *mSystems* 4:e00298-18.

**2018**

**Choudoir MJ**, Buckley DH. (2018) Phylogenetic conservation of thermal traits explains dispersal limitation and genomic differentiation of *Streptomyces* sister-taxa. *ISME J* 12:2176-2186.

Rossabi S, **Choudoir MJ**, Helmig D, Hueber J, Fierer N. (2018) Volatile organic compound emissions from soil following wetting events. *J Geophys Res Biogeosci* 123:1988-2001.

**Choudoir MJ**, Pepe-Ranney C, Buckley DH. (2018) Diversification of secondary metabolite biosynthetic gene clusters coincides with lineage divergence in *Streptomyces*. *Antibiotics* 7:12.

**2017**

**Choudoir MJ**, Barberán A, Menninger, HL, Dunn RR, Fierer N. (2017) Variation in range size and dispersal capabilities of microbial taxa. *Ecology* 99:322-334.

**Choudoir MJ**, Panke-Buisse K, Andam CP, Buckley DH. (2017) Genome surfing as driver of microbial genomic diversity. *Trends Microbiol* 25:624-636.

**2016**

**Choudoir MJ**, Doroghazi JR, Buckley DH. (2016) Latitude delineates patterns of biogeography in terrestrial *Streptomyces*. *Environ Microbiol* 18:4931-4945.

Andam CP, Doroghazi JR, Campbell AN, Kelly PJ, **Choudoir MJ**, Buckley DH. (2016) A latitudinal diversity gradient in terrestrial bacteria of the genus *Streptomyces*. *mBio* 7: e02200-15.

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Andam CP, **Choudoir MJ**, Nguyen AVH, Park HS, Buckley DH. (2016) Contributions of ancestral inter-species recombination to the genetic diversity of extant *Streptomyces* lineages. *ISME J* 10:1731-1741.

2009-2012

**Choudoir MJ**, Campbell AN, Buckley DH. (2012) Grappling with Proteus: population level approaches to understanding microbial diversity. *Front Microbiol* 3:336.

Raphael BH, **Choudoir MJ**, Lúquez C, Fernández R, Maslanka SE. (2010) Sequence diversity of genes encoding botulinum neurotoxin type F. *Appl Environ Microbiol* 76:4805-4812.

Kramer LC, **Choudoir MJ**, Wielgus SM, Bhaskar PB, Jiang J. (2009) Correlation between transcript abundance of the RB gene and the level of the RB-mediated late blight resistance in potato. *Mol Plant Microbe Interact* 22:447-55.

### **Blog posts**

Fierer N, Brewer T, **Choudoir MJ**. Lumping versus splitting - is it time for microbial ecologists to abandon OTUs? Fierer Lab Blog (online March 2017).

### **PRESENTATIONS**

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#### **Invited Research Seminars**

- 03/2022** Genes to Ecosystems, Eco-Evolutionary Dynamics of Soil Microbiomes. Microbiology Seminar; University of Massachusetts Amherst, Amherst MA; March 29, 2022
- 11/2021** Evolution of adaptive microbial traits in a warming world. Microbiome Centers Consortium (MCC) Seminar Series Fall 2021; Virtual seminar; November 18, 2021
- 03/2021** Patterns and processes in soil microbiology. Biology Seminar Series; SUNY New Paltz, New Paltz, NY. Virtual seminar; March 31, 2021
- 03/2021** Connecting environmental microbiomes to social (in)equity across temporal and ecological scales. The Microbial Link Between Human Health and Social Equity speaker series; University of Maine Institute of Medicine, ME. Virtual seminar; March 3, 2021
- 10/2017** Listening in on Microbial Small Talk. AgBiome; Durham, NC
- 10/2017** Biogeography of *Streptomyces*: Patterns and Processes. Biological Sciences Seminar Series; Humboldt State University, Arcata, CA

#### **Panels & Workshops**

- 07/2022** Developing transformative research skills (Session 3): Transforming your research for policy engagement (session leader). Microbes & Social Equity 2022 virtual symposium; July 20, 2022
- 04/2022** Do I belong here? Office of Professional Development and Office of Inclusion & Engagement. University of Massachusetts Amherst, Amherst MA; April 13, 2022
- 04/2022** Postdoc panel. Department of Environmental Conservation Graduate Student Symposium (ECoGSS); University of Massachusetts Amherst, Amherst MA; April 1, 2022
- 06/2019** Enabling the next generation of computational biologists. iEvoBio Conference; Providence, RI; June 26, 2022

***Intra-institutional Seminars***

- 2016** Historical demography shapes biogeography of terrestrial *Streptomyces*. EBIO Brown Bag Seminar; University of Colorado Boulder
- 2016** Population-level approaches to elucidating the evolutionary forces driving *Streptomyces* biogeography. Ph.D. *Dissertation Seminar*; Cornell
- 2014** Comparative population genomics reveals patterns of diversification and biogeography driven by phylogenetic niche conservatism between recently diverged *Streptomyces griseus* clusters. Microbiology Graduate Seminar; Cornell
- 2013** *Streptomyces* biogeography reveals patterns of diversification and nascent speciation. Microbiology Graduate Seminar; Cornell
- 2013** *Streptomyces* biogeography reveals patterns of post-glacial expansion and diversification. Microbiology Graduate Seminar; Cornell
- 2012** Long Distance Relationships: Biogeography of *Streptomyces*. Evo-Group; Cornell
- 2012** Causes and Consequences of Population Structure in *Streptomyces*. Microbiology Graduate Seminar; Cornell

***Conference Abstracts***

**Choudoir MJ**, Liu XJA, DeAngelis KM. (2022) (PS35-171): Evolution of microbial genomic traits associated with adaptation to long-term soil warming. ESA General Meeting; Montreal, QC CA

**Choudoir M**, Zimmerman N (organizers), Hariharan J, Jech S, Ishaq S (co-organizers). (2022) (SS1): Adding social contexts to environmental microbiomes. ESA General Meeting; Montreal, QC CA

Abs E, Hough M, Romero-Olivares A (organizers), Albright M, Bagby S, **Choudoir M**, Frey S, Marschmann G, Oliverio A, terHorst C, Zhou J (speakers). (2022) Green thumbs up for microbial culture collections, comparative genomics, and adaptive traits. (INS):Microbial adaptation is gonna change our understanding of soil carbon-climate feedback. ESA General Meeting; Montreal, QC CA

Shinfuku M, Domeignoz-Horta LA, **Choudoir MJ**, DeAngelis KM. (2022) (COS233-2): Long-term warming disturbs the positive relationship between ecosystem function and microbial diversity. ESA General Meeting; Montreal, QC CA

DeAngelis KM, Narayanan A, Eng A, **Choudoir M**. (2022) Soil Bacteria Adapt to a Warming World. (EEB05): Interacting Stressor Effects on Microbial-Climate Change Feedbacks. ASM Microbe; Washington DC

Shinfuku M, Domeignoz-Horta LA, **Choudoir MJ**, DeAngelis KM. (2022) Effects of warming on ecosystem function-microbial diversity relationship are season dependent. ECoGSS; Amherst, MA

**Choudoir MJ**, Narayanan A, Rodriguez-Ramos D, Liu XJA, Efroni A, Simoes R, DeAngelis KM. (2022) Metapangenomes reveal genomic signatures of microbial evolution to long-term soil warming. Pioneer Valley Microbiology Symposium 2022; Amherst, MA

DeAngelis KM, **Choudoir MJ**, Narayanan A, Eng A, Maureen M. (2022) Bioinformatics Lab Course for Microbiologists: Improving students' comfort and familiarity with asking and answering questions using programming and sequence analysis. Pioneer Valley Microbiology Symposium; Amherst, MA

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Shinfuku M, Domeignoz-Horta LA, **Choudoir MJ**, DeAngelis KM. (2022) Season influences long-term warming's impact on ecosystem multifunctionality and microbial diversity. Pioneer Valley Microbiology Symposium 2022; Amherst, MA

DeAngelis KM, **Choudoir MJ**, Domeignoz-Horta LA, Eng A, Narayanan A. (2021) Microbial traits under selection in a warming world. (INS 3): Connecting Evolutionary and Ecological Perspectives to Find What Matters in Microbial Responses to Change. Ecological Society of America Annual Meeting; Virtual Conference

**Choudoir MJ**, Narayanan A, Rodriguez-Ramos D, DeAngelis KM. (2021) Evolution of adaptive microbial traits in response to long-term soil warming. World Microbe Forum, ASM and FEMS; Virtual Conference

**Choudoir MJ**, Barberán A, Menninger, HL, Dunn RR, Fierer N. (2017) Variation in range size and dispersal capabilities of microbial taxa. ESA General Meeting; Portland, OR

**Choudoir MJ**, Charles PR, and Buckley DH. (2016) Gene content and diversification of secondary metabolite biosynthetic gene clusters coincides with divergence of terrestrial *Streptomyces* populations. ISME; Montreal, QC CA \*\*\**Student poster award recipient*\*\*\*

**Choudoir MJ** and Buckley DH. (2015) Comparative population genomics reveals genome wide patterns of diversification between *Streptomyces griseus* clades consistent with post-glacial expansion historical demography. Microbial Population Biology Gordon Research Conference; Proctor Academy, Andover, NH

**Choudoir MJ** and Buckley DH. (2015) Comparative population genomics reveals genome wide patterns of diversification between *Streptomyces griseus* clades consistent with post-glacial expansion historical demography. ASM General Meeting; New Orleans, LA

**Choudoir MJ**, Andam CP, Buckley DH. (2014) Phylogenetic niche conservatism explains a latitudinal gradient of diversity in the *Streptomyces griseus* clade. ASM General Meeting; Boston, MA

**Choudoir MJ**, Doroghazi JR, Campbell AN, Kelly PJ, Buckley DH. (2013) *Streptomyces* population structure at an intra-continental scale reveals patterns of biogeographical diversification. ASM General Meeting; Denver, CO

### TEACHING & MENTORING

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**2012-2013** Teaching Assistant; MBL Microbial Diversity Course (Woods Hole, MA)

#### **Academic Courses**

**Fall 2022** Course Development; Cultivating the Microbiologist in You (MICROBIO, UMass Amherst)

**Fall 2021** Course Development; Microbial Genomics CURE (MICROBIO 590B, UMass Amherst)

**Spring 202** Instructor; Microbial Biotechnology Lab (MICROBIO 497A, UMass Amherst)

**2018-2020** Guest Lecturer; Molecular Microbial Ecology (BIOL 365, Middlebury, VT)

**2017-2018** Instructor; Diversity and Inclusion in STEM (EBIO 6300-003, CO-Boulder)

**2017** Guest Lecturer; Population Genetics (EBIO 4270/5270, CO-Boulder)

**2016** Guest Lecturer; Methods in Microbial Ecology (EBIO 4800, CO-Boulder)

**2011-2014** Small Group Discussion Leader; General Microbiology (BIOMI 2900, Cornell)

**2013** TA; Soil Science (CSS 2600, Cornell)

**2011** TA; General Microbiology Lecture and Lab (BIOMI 2900/2911, Cornell)

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### **Research Mentorship**

<b>1/2021-7/2022</b>	Rachel Simoes; Undergraduate researcher (UMass Amherst)
<b>8/2020-5/2022</b>	Alon Efroni; Undergraduate researcher (UMass Amherst)
<b>9/2021-1/2022</b>	Theresa Caso-McHugh (MIT); Undergraduate researcher (UMass Amherst)
<b>Summer 2021</b>	Alondra Gabriel Correa & Theresa Caso-McHugh; Harvard Forest Summer Research Program in Ecology (Harvard University)
<b>2020</b>	Colter Brainard; Northeastern University co-op program (Indigo Ag)
<b>2019</b>	Angela Oliverio; Graduate student NSF INTERN program (Indigo Ag)
<b>2019</b>	Oscar Jimenez; BioBuilder internship program (Indigo Ag)
<b>2019</b>	Susana Donkor; BioBuilder internship program (Indigo Ag)
<b>2018</b>	Cora Rutledge; Research Experience for Community College Students (CO-Boulder)
<b>2017</b>	Gateway to Space; The Wilderness Explorers (ASEM 1400, CO-Boulder)
<b>2014</b>	Mo Sabbagh; undergraduate researcher (Cornell)
<b>2011-2014</b>	Vinh Nguyen; undergraduate researcher (Cornell)

### **SERVICE**

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#### **Professional**

<b>2022-Present</b>	Academy Scientific Advisory Taskforce (ASAT) on Climate Change & Microbes, American Academy of Microbiology
<b>2022-Present</b>	ASM Microbe Guest Track: Climate Change & Microbes Track Member

#### **Diversity, Inclusion, Equity & Justice**

<b>2021-Present</b>	Microbes & Social Equity working group (University of Maine)
<b>9/2020-5/2022</b>	Microbiology Department Climate Advisory Committee (UMass Amherst)
<b>12/2021-8/2022</b>	Allied Staff and Faculty, Out @ UMass (Umass Amherst)
<b>2022</b>	Search Committee Member for CALS Director of Graduate Student and Postdoc Success and Diversity; (UMass Amherst) January-February 2022
<b>2021-2022</b>	Howard Hughes Medical Institute (HHMI) Inclusive Excellence Fellow (UMass Amherst)
<b>11/2020</b>	Improving workplace climate: empowering individuals to become active bystanders (ADVANCEGeo LTER virtual workshop)
<b>10/2020</b>	Learning Community on Inclusive Teaching (UMass Amherst); Inclusive Teaching: Supporting All Students in the College Classroom MOOC (Columbia University)
<b>2017-2018</b>	Diversity and Inclusion Training for Introductory Biology Undergraduate Teaching Assistants Workshop (CO-Boulder) ***Recipient of IMPART Grant***
<b>11/2017</b>	LGBTQ+ & EMAC Symposium (CO-Denver)
<b>8/2017</b>	Evolution Outreach Committee, Teaching Controversial Topics (CO-Boulder); Presented workshop 'Beyond binaries: Inclusive teaching of evolution to students of diverse sexualities and gender identities'

#### **K-12 Outreach & Science Communication**

<b>2022</b>	Microbial Culture Collections and the Soil Microbiome, ASM's Meet the Microbiologist
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- podcast ([link](#)); April 18, 2022
- 2021** Climate Change Goes Underground, Harvard Forest LTER Research Program ([video](#))
- 2019-2021** Skype a Scientist (skypeascientist.com)
- 2018-2020** Letters to a Pre-scientist (prescientist.org)
- 2017-Present** Co-founder and contributor to an online community promoting the empowerment of women in science (feminasci.com)
- 2017** Welby Community (PK-6) School Science Fair judge (Denver, CO)
- 2016** Climate Resiliency and Education Mentor Program (Denver, CO)
- 2015** Grasshoppr (Graduate Student School Outreach Program) (Cornell)
- 2011& 2014** Expanding Your Horizons (EYH) (Cornell); Science workshops for middle school girls; 'Living Soil' workshop (2011) and mentor buddy (2014)

**Reviewer** for Applied and Environmental Microbiology, BMC Microbiology, Ecological Applications, Ecosphere, Frontiers in Microbiology, ISME Journal, mBio, Microbial Ecology, Molecular Ecology, Natural Environmental Research Council (NERC)\*, and Science Advances

\*grant proposal reviewer

### FELLOWSHIPS, GRANTS & AWARDS

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#### **Grants awarded**

- 2021** JGI CSP FY22, *Using genomics to understand microbial adaptation to soil warming*; Role: Co-PI (Lead PI: Kristen DeAngelis, UMass Amherst; Co-PI: Serita Frey, UNH)
- 2021** Howard Hughes Medical Institute (HHMI) Inclusive Excellence Fellowship; UMass Amherst (\$500)
- 2017-2018** IMPART (Implementation of Multicultural Perspectives and Approaches in Research and Teaching) Award; CO-Boulder (\$4000)

#### **Grants (written but not funded)**

- 2021** JGI CSP New Investigator, *Quantifying genomic evolution in spore-forming bacteria isolated from an archived soil chronosequence spanning a multi-decade warming experiment*; Role: Lead PI
- 2017** NSF Proposals Related to Hurricane Harvey, *Linking indoor microbial communities to their volatile organic compound emission in Houston homes flooded during Hurricane Harvey*; Role: Co-PI (Lead PI: Noah Fierer)
- 2017** Foundation for Food and Agricultural Research (FFAR), *Using naturally-occurring soil bacteria to minimize post-harvest crop loss*; Role: Co-PI (Lead PI: Noah Fierer)

#### **Fellowships & Awards**

- 2013-2015** Graduate Student Conference Travel Grant (\$260-515)
- 2011-2016** Graduate Research Assistantship (GRA); School of Integrative Plant Science, Soil and Crop Sciences; Cornell (~\$42,400 annual)
- 2010-2011** Wilde, William and Mary Fellowship; Cornell (\$37,300)
- 2008-2010** Oak Ridge Institute for Science and Education (ORISE) Research Participation Program Fellowship; CDC (~\$45,000 annual)