

# JULIAN DAMASHEK, PHD

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## Utica College

Assistant Professor of Biology, August 2019 to present

## EDUCATION

### University of Georgia

Postdoctoral research associate, September 2016 to July 2019

Advisors: Tim Hollibaugh (Marine Sciences), Liz Ottesen (Microbiology)

### Stanford University

Ph.D. in Earth System Science, September 2016

Advisor: Chris Francis

### Amherst College

B.A. (*Summa Cum Laude* with distinction) in Biology, May 2009

Thesis advisor: Rachel Levin

## RESEARCH OVERVIEW: MOTIVATING QUESTIONS

- What drives patterns in **nitrogen cycling** rates and associated **microbial communities** in aquatic ecosystems?
- What is the ecology of **novel aquatic archaea**?
- How does human activity affect **antibiotic resistance** in aquatic environments?

My group uses techniques from microbial ecology, 'omics, cultivation-based microbiology, and isotope geochemistry to explore these questions.

## PUBLICATIONS

(† indicates undergraduate mentee)

- 13) **Damashek J.**, J.R. Westrich, J.M. Bateman McDonald, M.E. Teachey, K.A. Capps, and E.A. Ottesen. (*In review*) Non-point human fecal contamination from aging wastewater infrastructure is a primary driver of antibiotic resistance in surface waters.
- 12) **Damashek J.**, B. Bayer, G.J. Herndl, N.J. Wallsgrove, T. Allen, B.N. Popp, and J.T. Hollibaugh. (*In review*) Limited accessibility of nitrogen supplied as amino acids, amides, and amines as energy sources for marine *Thaumarchaeota*. Preprint available: [doi.org/10.1101/2021.07.22.453390](https://doi.org/10.1101/2021.07.22.453390)
- 11) **Damashek J.**, A.O. Okotie-Oyekant†, S.M. Gifford, A. Vorobev, M.A. Moran, and J.T. Hollibaugh. (2021) Transcriptional activity differentiates families of Marine Group II *Euryarchaeota* in the coastal ocean. *ISME Communications* 1:5. [doi.org/10.1038/s43705-021-00002-6](https://doi.org/10.1038/s43705-021-00002-6)
- 10) Rasmussen A.N., **J. Damashek**, E.A. Eløe-Fadrosch, and C.A. Francis. (2021) In-depth spatiotemporal characterization of planktonic archaeal and bacterial communities in North and South San Francisco Bay. *Microbial Ecology*. 81(3):601-616. [doi.org/10.1007/s00248-020-01621-7](https://doi.org/10.1007/s00248-020-01621-7)

- 9) **Damashek J.**, C.F. Edwardson, B.B. Tolar, S.M. Gifford, M.A. Moran, and J.T. Hollibaugh. (2019) Coastal ocean metagenomes and curated metagenome-assembled genomes (MAGs) from Marsh Landing, Sapelo Island (Georgia, USA). *Microbiology Resource Announcements* 8:e00934-19. [doi.org/10.1128/MRA.00934-19](https://doi.org/10.1128/MRA.00934-19)
- 8) **Damashek J.**, B.B. Tolar, Q. Liu, A.O. Okotie-Oyekanṭ, N.J. Wallsgrove, B.N. Popp, and J.T. Hollibaugh. (2019) Microbial oxidation of nitrogen supplied as selected organic nitrogen compounds in the South Atlantic Bight. *Limnology and Oceanography* 64(3):982-995. [doi.org/10.1002/lno.11089](https://doi.org/10.1002/lno.11089)
- 7) **Damashek J.** and C.A. Francis. (2018) Microbial nitrogen cycling in estuaries: from genes to ecosystem processes. *Estuaries and Coasts* 41(3):626-660. [doi.org/10.1007/s12237-017-0306-2](https://doi.org/10.1007/s12237-017-0306-2)
- 6) **Damashek J.**, K.P. Pettieṭ, Z.W. Brown, M.M. Mills, K.R. Arrigo, and C.A. Francis. (2017) Regional patterns in ammonia-oxidizing communities throughout Chukchi Sea waters from the Bering Strait to the Beaufort Sea. *Aquatic Microbial Ecology* 79(3):273-286. [doi.org/10.3354/ame01834](https://doi.org/10.3354/ame01834)
- 5) **Damashek J.**, K.L. Casciotti, and C.A. Francis. (2016) Variable nitrification rates across environmental gradients in turbid, nutrient-rich estuary waters of San Francisco Bay. *Estuaries and Coasts* 39(4):1050-1071. [doi.org/10.1007/s12237-016-0071-7](https://doi.org/10.1007/s12237-016-0071-7)
- 4) Smith J.M., **J. Damashek**, F.P. Chavez, and C.A. Francis. (2016) Factors influencing nitrification rates and the abundance and transcriptional activity of ammonia oxidizing microorganisms in the dark realm of the northeast Pacific Ocean. *Limnology and Oceanography* 61(2):596-609. [doi.org/10.1002/lno.10235](https://doi.org/10.1002/lno.10235)
- 3) Ying S.C., **J. Damashek**, S. Fendorf, and C.A. Francis. (2015) Indigenous arsenic(V)-reducing microbial communities in redox-fluctuating near-surface sediments of the Mekong Delta. *Geobiology* 13(6):581-587. [doi.org/10.1111/gbi.12152](https://doi.org/10.1111/gbi.12152)
- 2) **Damashek J.**, J.M. Smith, A.C. Mosier, and C.A. Francis. (2015) Benthic ammonia oxidizers differ in community structure and biogeochemical potential across a riverine delta. *Frontiers in Microbiology* 5:743. [doi.org/10.3389/fmicb.2014.00743](https://doi.org/10.3389/fmicb.2014.00743)
- 1) Miller J.S., A. Kamath, **J. Damashek**, and R.A. Levin. (2011) Out of America to Africa or Asia: Inference of dispersal histories using nuclear and plastid DNA and the *S-RNase* self-incompatibility locus. *Molecular Biology and Evolution* 28(1):793-801. [doi.org/10.1093/molbev/msq253](https://doi.org/10.1093/molbev/msq253)

## FUNDING

“Understanding gut-microbiome interactions following mass deworming against soil-transmitted helminths (STHs) among young Ethiopian schoolchildren.” Co-PIs: Ken Belanger (Colgate University), Bineyam Taye (Colgate University), Zeleke Mekonnen (Jimma University, Ethiopia). Picker Interdisciplinary Science Institute at Colgate University, 2020-2023, \$149,000.

## TEACHING

**General Biology (including Lab)**

**Research Methods II**

**Principles of Ecology (including Lab)**

**Molecular Biology Lab**

**Bioinformatics** (Selected topics course)

**Antibiotic Resistance** (Selected topics course)

## UNDERGRADUATE MENTORSHIP

**Isabella Raux** *Utica College '23 (Fall 2021 to present)*

Dog-owner fecal microbiomes using 16S rRNA amplicon data.

**Briann Lohmann** *Utica College '23 (Summer 2021 to present)*

Nitrogen-cycling microbes in the Mohawk River and Oriskany Creek.

**Trinity Howell** *Hampton University '22 (Summer 2021)*

Fecal source tracking in estuary waters using 16S rRNA amplicon data. Stipend funded by the [National Summer Undergraduate Research Project \(NSURP\) 2021 program](#).

**Nikki Pickett** *Utica College '21 (Fall 2020 to Spring 2021)*

Metagenomic analysis of antibiotic resistance genes in San Francisco Bay.

**Matt Fedullo** *Utica College '20 (Spring 2020)*

Antibiotic resistance in the Mohawk River using PCR.

**Sammet Braun** *Utica College '20 (Spring 2020)*

Diversity and transcription of ammonium uptake genes using metatranscriptomic data.

**Arijana Dautovic** *Utica College '23 (Spring 2020)*

Ammonia-oxidizing microbes in the Mohawk River.

**Carrilynn Garrett** *Utica College '23 (Spring 2020)*

Nitrogen biogeochemistry in the Mohawk River.

**Hailey Goldberg** *University of Georgia '20 (Summer 2018)*

Analysis of *Thaumarchaeota* in freshwater metagenomes.

- Currently: M.S. student, New York University Biology Department (Recombinant DNA Technology track).

**Aimee Okotie-Oyekan** *University of Georgia '17 (Fall 2016 to Summer 2018)*

Abundance of Marine Group II *Euryarchaeota* in coastal Georgia waters and nitrifiers in coastal Antarctic waters. Co-author on a [manuscript published in \*Limnology and Oceanography\*](#) and another [published in \*ISME Communications\*](#).

- Currently: M.S. student, University of Oregon Environmental Studies Program.

**Tynan Challenor** *Stanford University '17 (Summer 2014 to Summer 2016)*

Biogeochemistry and microbial ecology of nitrification in Artesian Slough and the Sacramento River. First-author poster presentation, 2014 AGU Fall Meeting; completed honors thesis (2017) studying ammonia oxidizers in the Sacramento River.

- Currently: U.C. Berkeley Labor Center.

**Aubriana Menendez** *Stanford University '17 (Summer 2014)*

Microbial ecology of Artesian Slough (San José, CA). Co-author on poster presentation, 2014 AGU Fall Meeting.

- Currently: design specialist at Change Healthcare.

**Kade Pettie** *Amherst College '15 (Summer 2013, 2014)*

Microbial ecology of ammonia oxidizers in Arctic Sea waters. Co-author on manuscript [published in \*Aquatic Microbial Ecology\* \(2017\)](#).

- Currently: Ph.D. student, Stanford University Department of Biology.

**Kofi Christie** *Morehouse College '14 (Summer 2013)*

Biogeochemistry of nitrogen cycling in creeks and sloughs throughout the Baylands Nature Preserve (Palo Alto, CA).

- Currently: Presidential Postdoctoral Research Fellow, Princeton University.

**Yari Greaney** *Stanford University '15 (Fall 2012 to Spring 2013)*.

Microbial ecology of ammonia oxidizers in San Francisco Bay sediments.

- Currently: D.C. Office of the Deputy Mayor for Planning and Economic Development.

**Samuel Miller** *Amherst College '10 (Summer 2009 to Spring 2010)*

Bacterial diversity of natural gas well water in the New Albany Shale. First-author poster presentation, 2010 GSA Northeastern/Southeastern Joint Section Meeting.

- Currently: postdoctoral research, University of Chicago Department of Medicine.

#### GRADUATE MENTORSHIP

**Emily McIntyre** *University of Georgia, Microbiology PhD program (Fall 2016)*.

Microbial ecology of ammonia oxidizers in Narragansett Bay (rotation in the Hollibaugh Lab).

- Currently: Ph.D. student, University of Georgia Department of Microbiology.

#### FELLOWSHIPS AND AWARDS

**Harold T. Clark Summer Fellowship Award/Research Grant**

Utica College, Summer 2021 (\$2,300)

**Early Career Travel Award**

ASLO Aquatic Sciences Meeting (2019; \$500)

CERF Biennial Conference (2017; \$300)

**Stanford-USGS Graduate Fellowship**

Stanford University (2014-2015 academic year)

**Oral Presentation Award**

ASLO Aquatic Sciences Meeting (2015)

Northeast Undergraduate Research and Development Symposium (2009)

**McGee Research Grant**

Stanford University (2014, \$2,200; 2011, \$3,800)

**John Mason Clarke 1877 Fellowship in Paleontology and Geology**

Amherst College (2011-2012 academic year, \$3,300; 2010-2011 academic year, \$5,200)

**Oscar E. Schotte Award & Scholarship Prize**

Amherst College Department of Biology (2009)

### **Funded Summer Research Internship**

Five College Coastal and Marine Sciences Program (Summer 2007)

### **William C. Young Prize**

Amherst College Department of Biology (Summer 2007)

### **Howard Hughes Medical Institute Summer Fellow**

Amherst College (Summer 2006)

## **PROFESSIONAL AND INSTITUTIONAL SERVICE**

### **Utica College Committees and Task Forces**

- Curriculum Committee (8/2021 – present)
- Strategic Advisory Committee on DEI (11/2020 – present)
- Academic Planning Task Force on Academic Information Management (12/2019 – 3/2020)

### **Environmental Consortium Liaison** (11/2021 – present)

### **Social Media Team Lead (Communications Committee)**

*Coastal and Estuarine Research Federation (CERF; Fall 2017 to Fall 2019)*

Coordinate social media outreach, develop strategies and standard operating procedures for social media team and interactions with CERF headquarters and other committees.

### **Conference Attendee Experience Committee Member**

*2019, 2017 Coastal & Estuarine Research Federation (CERF) Biennial Conference (November 2019 and 2017)*

Co-leader of social media committee.

### **Conference Session Organizer**

*2017 Coastal & Estuarine Research Federation (CERF) Biennial Conference (November 2017)*

Organized session: “Microbial Communities and the Dynamics and Resilience of Ecosystem Function” (<https://cerf.confex.com/cerf/2017/webprogrampreliminary/Session1364.html>).

*2016 Ocean Sciences Meeting (February 2016)*

Organized session: “Nitrogen at the Interface: The N-Cycle across Physical and Disciplinary Boundaries” (<http://agu.confex.com/agu/os16/preliminaryview.cgi/Session9274>).

*2014 American Geophysical Union (AGU) Fall Meeting (December 2014)*

Organized judges for student presentations for the “Marine Microbial Genomics” session (<https://agu.confex.com/agu/fm14/webprogrampreliminary/Session3363.html>).

### **Graduate Student Consultant**

*Stanford University Center for Teaching and Learning (Autumn 2013 to Winter 2015)*

Provided teaching feedback to Stanford TAs. Ran small group evaluations, workshops, video consultations, and microteaching sessions. Developed a workshop on strategies for the first day of teaching, a short description of which can be seen in this blog post: <http://stanford.io/1Fwj9z> (scroll to “The First Day: Starting Off Right”).

**Geobiology Faculty Search Committee (Student Liaison)**

*Stanford University School of Earth, Energy, and Environmental Sciences (Autumn 2011 to Spring 2012)*

**Peer Reviewer**

Funding agencies: NSF OCE (Chemical Oceanography, ad hoc), Maryland Sea Grant (ad hoc).

Journals: *Applied & Environmental Microbiology*, *Aquatic Microbial Ecology*, *Aquatic Sciences*, *Biogeosciences*, *Environmental Microbiology*, *Estuaries and Coasts*, *Freshwater Science*, *Frontiers in Marine Science*, *Frontiers in Microbiology*, *ISME Journal*, *Journal of Geophysical Research: Biogeosciences*, *Limnology & Oceanography*, *Microbial Ecology*, *Microbiome*, *mSphere*, *PeerJ*, *Science of the Total Environment*, *Water Resources Research*.

**INVITED SEMINARS**

“Determining global patterns of freshwater thaumarchaeal diversity by mining hundreds of metagenomes.” *Archaea Power Hour*, 9/14/21.

“Using publicly-available ‘omics data to unravel the ecology of freshwater archaea, from the Amazon River to Central New York lakes.” *Asa Gray Seminar Series, Utica College*, 10/21/19.

“Understanding nitrogen uptake in the ocean using metatranscriptomics, or: How I learned to stop worrying and love the command line.” *Amherst College Department of Biology*, 3/5/18.

“Using microbial and biogeochemical techniques to investigate hotspots of aerobic nitrogen cycling in San Francisco Bay.” *University of Georgia Marine Sciences Seminar Series*, 11/7/16.

“Nitrification from the Pacific Ocean to the Sacramento River: Do distinct microbial communities affect biogeochemical nitrogen cycling in a large urban estuary?” *Stanford University Seminar in Prokaryotic Molecular Biology*, 11/16/15.

**CONFERENCE ORAL PRESENTATIONS**

(†designates undergraduate mentee)

**Damashek J.**, A.O. Okotie-Oyekan†, N.J. Wallsgrove, B. Bayer, G.J. Herndl, B.N. Popp, and J.T. Hollibaugh. “Field rates and physiological mechanisms of polyamine-N oxidation by marine *Thaumarchaeota*.” *2019 Aquatic Sciences Meeting*, 2/25/19 (San Juan, Puerto Rico). **Early Career Travel Award recipient.**

**Damashek J.**, B.M. Satinsky, H.V. Goldberg†, S. Sharma, J.P. Payet, B.C. Crump, J.T. Hollibaugh, and M.A. Moran. “Targeted analysis of ‘omics data reveals the prevalence of *Nitrosotenuis* spp. *Thaumarchaeota* in low-latitude freshwater ecosystems.” *2018 Southeastern Branch Annual Meeting, American Society for Microbiology (ASM)*, 12/1/2018 (Atlanta, GA).

**Damashek J.**, P.J. Kearns, J.L. Bowen, K.L. Casciotti, and C.A. Francis. “Relating ammonia oxidizer diversity to nitrification throughout the northern San Francisco Bay water column.” *2017 Coastal and Estuarine Research Federation (CERF) Biennial Conference*, 11/8/17 (Providence, RI). **Early Career Travel Award recipient.**

**Damashek J.**, K.L. Casciotti, and C.A. Francis. “Turbid bottom waters and ammonium-rich freshwaters as nitrification hotspots in a large urban estuary (San Francisco Bay, CA).” *2015 American Geophysical Union (AGU) Fall Meeting*, 12/18/15 (San Francisco, CA).

- Damashek J.**, K.L. Casciotti, and C.A. Francis. “Relating ammonia oxidizer communities and gene expression to nitrification across diverse San Francisco Bay waters.” *2015 Coastal and Estuarine Research Federation (CERF) Biennial Conference*, 11/11/15 (Portland, OR).
- Damashek J.**, K.L. Casciotti, and C.A. Francis. “Linking ammonia-oxidizing microbial communities to nitrification rates across the steep gradients of San Francisco Bay (CA, USA) waters.” *2015 Aquatic Sciences Meeting*, 2/24/15 (Granada, Spain). **Outstanding Student Presentation Award recipient.**
- Damashek J.**, K.L. Casciotti, and C.A. Francis. “Microbial ecology and biogeochemical impacts of ammonia-oxidizing microbes in San Francisco Bay waters.” *2014 California Estuarine Research Society Fall Conference*, 9/27/14 (Bodega Bay, CA).
- Damashek J.**, and C.A. Francis. “Population dynamics of ammonia-oxidizing archaea and bacteria during estuarine phytoplankton blooms: How fierce is the fight for ammonium?” *2014 Ocean Sciences Meeting*, 2/24/14 (Honolulu, HI).
- Damashek J.**, K.L. Casciotti, and C.A. Francis. “Nitrification and ammonia-oxidizing microbial communities in the turbid, nutrient-replete waters of San Francisco Bay (CA).” *2013 Coastal and Estuarine Research Federation (CERF) Biennial Conference*, 11/7/13 (San Diego, CA).
- Damashek J.**, S.E. Miller†, M.F. Kirk, A.M. Martini, S.T. Petsch, J.C. McIntosh, and M.E. Schlegel. “Microbial community structure and geochemistry of the New Albany Shale (Illinois Basin) and its potential to produce biogenic methane.” *2010 Goldschmidt Conference*, 6/17/10 (Knoxville, TN).
- Damashek J.**, J.S. Miller, and R.A. Levin. “Phylogenetics of Chinese *Lycium* (Solanaceae).” *2009 Northeast Undergraduate Research and Development Symposium*, 3/28/09 (Biddeford, ME). **Oral Presentation Award recipient.**

### CONFERENCE POSTER PRESENTATIONS

(† designates undergraduate mentee)

- Damashek J.** “Divining the ecology of freshwater *Thaumarchaeota* using hundreds of metagenomes collected across the globe.” *International Conference on Nitrification and Related Processes (ICoN7)*, 7/21/21 (virtual, hosted by Utah State University).
- Damashek J.** “Divining the ecology of freshwater *Thaumarchaeota* using hundreds of metagenomes collected across the globe.” *Bioinformatics Virtual Coordination Network 2021 Conference*, 6/11/21 (virtual, hosted by the University of Southern California). [See poster here!](#)
- Damashek J.**, A. Dautovic†, and C. Garrett†. “Relating microbial diversity to nitrogen cycling in the Mohawk River and diverse freshwater ecosystems.” *Mohawk Watershed Symposium 2020* (Schenectady, NY); *postponed due to COVID-19*.
- Damashek J.**, N.J. Wallsgrove, B. Bayer, G.J. Herndl, B.N. Popp, and J.T. Hollibaugh. “Oxidation of polyamine nitrogen by *Thaumarchaeota*-dominated mixed communities and *Thaumarchaeota* isolates from the coastal ocean.” *Fifth International Conference on Nitrification and Related Processes (ICoN5)*, 7/26/17 (Vienna, Austria).

- Damashek J.**, B. Bayer, G.J. Herndl, B.N. Popp, N.J. Wallsgrove, and J.T. Hollibaugh. “Oxidation of polyamine nitrogen by marine *Thaumarchaeota* in the coastal ocean and the laboratory.” *2017 Southeastern Biogeochemistry Symposium*, 4/1/17 (Athens, GA).
- Damashek J.**, T. Challenor†, K.L. Casciotti, and C.A. Francis. “Nitrification from the Pacific Ocean to the Sacramento River: Do distinct microbial communities affect biogeochemical nitrogen cycling in the waters of a large urban estuary?” *2016 Ocean Sciences Meeting*, 2/22/16 (New Orleans, LA).
- Damashek J.**, T. Challenor†, K.L. Casciotti, and C.A. Francis. “Factors influencing nitrification rates and ammonia-oxidizing microbes throughout the San Francisco Bay estuary.” *2015 Young Environmental Scholars Conference*, 12/2/15 (Stanford, CA).
- Damashek J.**, T. Challenor†, K.L. Casciotti, and C.A. Francis. “Biogeochemical effects of shifts in ammonia-oxidizing microbial community structure and gene expression in the waters of Suisun Bay and the Sacramento River.” *2015 State of the San Francisco Estuary Conference*, 9/17/15 (Oakland, CA).
- Damashek J.**, K.L. Casciotti, and C.A. Francis. “Partitioning nitrification between specific archaeal and bacterial clades in a large, nitrogen-rich estuary (San Francisco Bay, CA).” *2014 American Geophysical Union (AGU) Fall Meeting*, 12/16/14 (San Francisco, CA).
- Damashek J.**, K.L. Casciotti, and C.A. Francis. “Can San Francisco Bay ‘filter’ nitrogen between the land and the sea? The microbiology and biogeochemistry of nitrification in estuary waters.” *2014 Bay-Delta Science Conference*, 10/28/14 (Sacramento, CA).
- Damashek J.**, K.L. Casciotti, and C.A. Francis. “Does pelagic nitrification in estuaries ‘filter’ nitrogen between the land and the sea? Microbial and biogeochemical considerations from San Francisco Bay (CA).” *2014 Marine Microbes Gordon Research Conference*, 6/22/14 (Waltham, MA).
- Damashek J.**, and C.A. Francis. “Nitrogen cycling in the mud: Functional gene and biogeochemical analyses of nitrification in a large urban estuary.” *2013 Aquatic Sciences Meeting*, 2/21/13 (New Orleans, LA).
- Damashek J.**, and C.A. Francis. “Seasonal dynamics of microbial ammonia oxidation in San Francisco Bay.” *2012 American Society for Microbiology General Meeting*, 6/18/12 (San Francisco, CA).
- Damashek J.**, and C.A. Francis. “Aquatic microbial nitrogen cycling: Molecular evidence of planktonic ammonia oxidation in San Francisco Bay.” *2011 Beyond the Golden Gate Symposium*, 11/1/11 (San Francisco, CA).

### SOCIETY MEMBERSHIPS

American Society for Microbiology (ASM)  
 Association for the Sciences of Limnology and Oceanography (ASLO)  
 American Geophysical Union (AGU)  
 Coastal and Estuarine Research Federation (CERF)