

# JULIAN DAMASHEK, PHD

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## EDUCATION

### University of Georgia

Postdoctoral research associate, September 2016 to present  
Advisor: Tim Hollibaugh

### Stanford University

Ph.D. in Earth System Science, September 2016  
Advisor: Christopher Francis

### Amherst College

B.A. (*Summa Cum Laude* with distinction) in Biology, May 2009  
Thesis advisor: Rachel Levin

## RESEARCH OVERVIEW: MOTIVATING QUESTIONS

- What is the ecology and physiology of archaea in aquatic ecosystems?
- How do aquatic microbes compete for nitrogen?
- How do microbial diversity and activity affect aquatic nitrogen cycling rates?

I use techniques from microbial ecology, 'omics, bioinformatics, cultivation-based microbiology, and isotope geochemistry to explore these questions.

## PUBLICATIONS

(† indicates undergraduate mentee)

- 8) **Damashek J.**, B.B. Tolar, Q. Liu, A.O. Okotie-Oyekan†, N.J. Wallsgrove, B.N. Popp, and J.T. Hollibaugh. (2018) Microbial oxidation of nitrogen supplied as selected organic nitrogen compounds in the South Atlantic Bight. *Limnology and Oceanography*. [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. Pettie†, 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)

## GRANTS, FELLOWSHIPS, AND AWARDS

### **Early Career Travel Award**

CERF Biennial Conference (2017; \$300)

### **Stanford-USGS Graduate Fellowship**

Stanford University (2014-2015 academic year; tuition, stipend, professional expenses)

### **Outstanding Student Oral Presentation Award**

ASLO Aquatic Sciences Meeting (2015)

### **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**

Amherst College Department of Biology (2009)

### **Oscar E. Schotte Scholarship Prize**

Amherst College Department of Biology (2009)

### **Oral Presentation Award**

Northeast Undergraduate Research and Development Symposium (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)

## RESEARCH EXPERIENCE

### Postdoctoral Research

*Hollibaugh Lab, University of Georgia Department of Marine Sciences (Fall 2016 to present)*

Cycling of organic nitrogen by marine *Thaumarchaeota* in culture and in the coastal ocean.

Metagenomic and metatranscriptomic analyses of marine and freshwater archaea. Targeted study of ammonium-cycling genes/transcripts in 'omics datasets. Cultivation and basic physiology and genomics of two novel strains of marine ammonia-oxidizing archaea (*Thaumarchaeota*) and one novel marine nitrite-oxidizing bacterium.

### Doctoral Research

*Francis Lab, Stanford University Department of Earth System Science (Summer 2010 to Summer 2016)*

Microbial ecology and biogeochemistry of nitrification (microbial oxidation of ammonia to nitrite and nitrate) in estuaries.

### Research Assistant

*Martini Lab, Amherst College Department of Geology (Summer 2009 to Summer 2010)*

Microbial ecology (16S rRNA gene diversity) of gas wells in the New Albany Shale.

### Undergraduate Honors Thesis

*Miller/Levin Lab, Amherst College Department of Biology (Summer 2008 to Spring 2009)*

Molecular evolution and phylogenetics of Chinese *Lycium* plants by sequencing multiple nuclear and chloroplast genes.

### Research Assistant

*Atema Lab, Woods Hole Marine Biological Laboratory (Summer 2007)*

Function of the lateral line in smooth dogfish sharks (REU intern at the MBL).

### Research Assistant

*Clotfelter Lab, Amherst College Department of Biology (Summer 2006 to Spring 2008)*

As a Howard Hughes Medical Institute Fellow (Summer 2006), developed non-invasive method to sample fish hormones and studied effects of endocrine-disrupting chemicals on fish reproductive health; continued part-time work throughout the 2006-2007 and 2007-2008 academic years.

## GUEST TEACHING

### Field Study in Oceanography and Marine Methods

*University of Georgia Marine Institute (Summer 2018)*

Modified a module on coastal biogeochemistry in which students measured nitrogen-cycling rates in oyster beds; lectured on coastal nitrogen cycling processes and associated microorganisms.

### Marine Biology

*University of Georgia Department of Marine Sciences (Fall 2017)*

Taught two units: (1) estuaries and salt marshes; (2) marine biodiversity.

## **Geomicrobiology**

*Stanford University Department of Earth System Science (Winter 2015)*

Taught unit on sulfur-cycling microbes (metabolism, physiology, and ecology).

## **Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay**

*Stanford University Department of Earth System Science (Spring 2012, 2014)*

Taught two units: (1) invasive species in estuaries; (2) ammonia pollution in the Sacramento/San Joaquin River Delta, including relevant scientific research and the policy implications of wastewater treatment plant upgrades and water diversions.

## **TEACHING ASSISTANT**

*(\*indicates significant contribution to course design)*

### **Hopkins Microbiology Course\***

*Stanford University Hopkins Marine Station (Summer 2012, 2015)*

Assisted in setup and organization of research and computer labs; designed and developed laboratory and field experiments; lectured on experimental backgrounds and methods; coordinated laboratory and field activities; developed data analysis tutorials.

### **Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay\***

*Stanford University Department of Earth System Science (Spring 2012, 2014)*

Assisted in design of syllabus and assignments; led student discussions of primary literature; organized field trips; graded assignments.

### **Measurements in Earth Systems\***

*Stanford University Department of Earth System Science (Winter 2012, 2013)*

Developed curriculum for aquatic field methods portion (including field and laboratory work); chartered research vessel for field work; developed field and laboratory protocols; revised syllabus and experiments for second year.

### **Exploring the Critical Interface Between the Land and Monterey Bay: Elkhorn Slough**

*Stanford University Department of Earth System Science (Spring 2011, 2013)*

Led student discussions of primary literature; facilitated field trips; graded assignments.

## **Geomicrobiology**

*Stanford University Department of Earth System Science (Winter 2013)*

Facilitated student-led discussions of primary literature; assisted with writing and grading of final exam.

## **UNDERGRADUATE MENTORSHIP**

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

Analysis of *Thaumarchaeota* in freshwater metagenomes.

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

Grazing rates of *Thaumarchaeota* and abundance of Marine Group II *Euryarchaeota* in coastal Georgia waters. Co-author on a manuscript in revision at *Limnology and Oceanography*.

• 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; co-author on additional presentations; completed honors thesis (2017) studying ammonia oxidizers in the Sacramento River.

- Currently: M.S. student, Stanford University Biomedical Informatics Program.

**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: Ph.D. student, Vanderbilt University Department of Environmental Engineering.

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

Microbial ecology of ammonia oxidizers in San Francisco Bay sediments.

- Currently: program officer at Global Water 2020.

**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; co-author on oral presentation, 2010 Goldschmidt Conference.

- Currently: Ph.D. student, University of Chicago Department of Geophysical Sciences.

### 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.

### PROFESSIONAL AND INSTITUTIONAL SERVICE

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

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

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)*

Solicited and organized judges for student presentations (poster and oral) 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)*

Assisted with organization of seminar series and student-candidate lunches and dinners. Met with candidates during interviews, solicited and presented student feedback on candidates to faculty search committee members.

### **Peer Reviewer**

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

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

### **INVITED SEMINARS**

"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

(<sup>†</sup>designates undergraduate mentee)

- Damashek J.**, A.O. Okotie-Oyekan<sup>†</sup>, N.J. Wallsgrove, B. Bayer, G.J. Herndl, B.N. Popp, and J.T. Hollibaugh. (Abstract submitted) “Field rates and physiological mechanisms of polyamine-N oxidation by marine *Thaumarchaeota*.” *2019 Aquatic Sciences Meeting, 2/23/19* (San Juan, Puerto Rico).
- Damashek J.**, B.M. Satinsky, H.V. Goldberg<sup>†</sup>, 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<sup>†</sup>, 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

(<sup>†</sup>designates undergraduate mentee)

**Damashek J.**, N.J. Wallsgrave, 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. Wallsgrave, 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<sup>†</sup>, 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<sup>†</sup>, 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<sup>†</sup>, 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)

### **COMMUNITY SERVICE**

#### **Mentor**

*Mountain View (CA) High School Science Olympiad Team (Autumn 2013 to Spring 2014)*

Coached two groups of high school students (Water Quality and Disease Detectives events).

#### **Volunteer Teacher**

*GeoKids, Stanford University (Winter 2011 to Spring 2013)*

Led workshops for local elementary school students on geology, including minerals, fossils, and soil.

Last updated: 10/4/18

Squid cartoon by Melissa Weintraub