John Christian Gaby
curriculum vitae

Website: https://chrisgaby.github.io/
Google Scholar: https://scholar.google.com/citations?user=bgdnUn8AAAAJ&hl=en

Education

2013	**Ph.D.** (Microbiology) Cornell University
2002	**B.S.** (Biology with emphasis in Microbiology) The University of Tennessee

Professional Experience

10/2020 - present	**Microbiologist Res. As.** (full-time, 40+ hours/week) Genomics and Bioinformatics Research Unit, USDA
02/2016 - 01/2020	**Postdoctoral Researcher** (full-time, 40+ hours/week) Department of Chemistry, Biotechnology, and Food Science, NMBU
04/2013 - 01/2016	**Postdoctoral Researcher** (full-time, 40+ hours/week) Biology Department, The Georgia Institute of Technology
09/2011 - 08/2012	**Fulbright US Student Fellow** Corporación Corpogen, Bogotá, Colombia
08/2006 - 09/2011	**Graduate Research Assistant** (full-time, 40+ hours/week) Department of Crop and Soil Sciences, Cornell University
08/2005 - 08/2006	**Graduate Teaching Assistant** Department of Microbiology, Cornell University
12/2002 - 02/2005	**Peace Corps Volunteer** United States Peace Corps, Ouallam, Niger
06/2002 - 11/2002	**Research Assistant** (part-time, ~35 hours/week) Department of Microbiology, The University of Tennessee
Summer 2001	**Howard Hughes Medical Institute Summer Research Fellow** The University of Pittsburgh
Summer 2000	**DOE Energy Research Undergraduate Laboratory Fellow** Biophysics Group, Life Sciences Division, Oak Ridge National Lab

Successful Applications

Trained immunity and nutritional programming for resilient salmon, Work Package Leader for "Meta-omics and the gut microbiome-host axis", **Norwegian Research Council: HAVBRUK2**, 10.7 million NOK total award (2019).
Fulbright U.S. Student **Fellowship** to Colombia (2011-2012)
Argentina CONICET **Postdoctoral Research Fellowship** (2012-2014, declined)
Cross-Scale Biogeochemistry and Climate **Small Grant** (2012)
Biogeochemistry and Environmental Biocomplexity **Small Grant** (2010)

Supervisory Experience

6 PhDs: Lina Valderrama (2013-2015), Luz Medina (2014-2015), Silvia Greses (2016-2017), Kristin Herstad (2016-2017), Kine Svensson (2018), and Leszek Michalak (2017-2018)
3 Master's: Marius Strand (2018), Isak Løfoll (2019), and Anna Meinhardt (2019)
7 Bachelor's: Kyle Sexton (2014), Patrick Steck (2013-2015), Leo Zheng (2014-2015), Gabriel Ezuma (2014), Michael Blejwas (2014), Garrett Graham (2011), and Albert Chen (2010)

Publications [853 total Google Scholar Citations as of May 12, 2021]
Peer reviewed articles: 6 first author, 9 co-author, 1 corresponding author
Book chapters: 1 first author
My name is in **bold**
Students that I trained and supervised are underlined
[the number of times a publication has been cited is provided in square brackets]

1. Medina-Cordoba, L.K., Aroon T. Chande, A.T., Rishishwar, L., Mayer, L.W., Valderrama-Aguirre, L.C., Valderrama-Aguirre, A., **Gaby, J.C.**, Kostka, J.E., and Jordan, I.K. Genomic characterization and computational phenotyping of nitrogen-fixing bacteria isolated from Colombian sugarcane fields. *Scientific Reports* 11 (1), 1-15. [0]
2. Michalak, L., **Gaby, J.C.**, Lagos, L., Leanti La Rosa, S., Hvidsten, T.R., Tétard-Jones, C., Willats, W.G.T., Terrapon, N., Lombard, V., Henrissat, B., Dröge, J., Arntzen, M., Hagen, L., Øverland, M., Pope, P., and Westereng, B. (2020) Microbiota-directed fibre activates both targeted and secondary metabolic shifts in the distal gut. *Nature Communications* 11 (1): 1-15. [6]
3. Nadeem, S., Bakken, L.R., Frostegård, Å., **Gaby, J.C.**, Dörsch, P. (2020) Contingent effects of liming on N_2O-emissions driven by autotrophic nitrification. *Frontiers in Environmental Science* 8: 598513. [2]
4. Lagos, L., Leanti La Rosa, S., Ø. Arntzen, M., Ånestad, R., Terrapon, N., **Gaby, J.C.**, Westereng, B. (2020) Isolation and Characterization of Extracellular Vesicles Secreted *In Vitro* by Porcine Microbiota. *Microorganisms* 8 (7): 983. [1]
5. Wahid, R., Mulat, D.G., **Gaby, J.C.**, Horn, S.J. (2019) Effects of H_2:CO_2 ratio and H_2 supply fluctuation on methane content and microbial community composition during *in-situ* biological biogas upgrading. *Biotechnol for Biofuels* 12: 104. [24]
6. Karthikeyan, S., Rodriguez-R, L.M., Heritier-Robbins, P., Kim, M., Overholt, W.A., **Gaby, J.C.**, Hatt, J.K., Spain, J.C., Rosselló-Móra, R., Huettel, M., Kostka, J.E., Konstantinidis, K.T. (2019) *Macondimonas diazotrophica* gen. nov., sp. nov., a novel gammaproteobacterial genus dominating crude-oil contaminated sediments. *ISME J* 13: 2129–2134. [17]
7. Svensson, K., Paruch, L., **Gaby, J.C.**, Linjordet, R. (2018) Feeding frequency influences process performance and microbial community composition in anaerobic digesters treating steam exploded food waste. *Bioresource Technology* 269: 276-284. [22]
8. Herstad, K.M.V., Moen, A., **Gaby, J.C.**, Moe, L., and Skancke, E. (2018) Characterization of the fecal and mucosa-associated microbiota in dogs with colorectal epithelial tumors. *PLoS One* 13(5): e0198342. [15]
9. **Gaby, J.C.**, Rishishwar, L., Valderrama-Aguirre, L.C., Green, S., Valderrama-Aguirre, A., Jordan, I.K. and Kostka, J.E. (2018) Diazotroph community characterization via a high-throughput *nifH* amplicon sequencing and analysis pipeline. *Appl and Environ Microbiol* 84 (4): e01512-17. [42]
10. **Gaby, J.C.**, Zamanzadeh, M., and Horn, S.J. (2017) The effect of temperature and retention time on methane production and microbial community composition in staged anaerobic digesters fed with food waste. *Biotechnol for Biofuels* 10: 302. [53]
11. Warren, M.J., Lin, X., **Gaby, J.C.**, Kretz, C.B., Kolton, M., Morton, P.L., Pett-Ridge, J., Weston, D.J., Schadt, C.W., Kostka, J.E., and Glass, J.B. (2017) Molybdenum-based diazotrophy in a *Sphagnum* peatland in northern Minnesota. *Appl Environ Microbiol* 83 (17) e01174-17. [31]
12. Greses, S., **Gaby, J.C**., Aguado, D., Ferrer, J., Seco, A., and Horn, S.J. (2017) Microbial community characterization during anaerobic digestion of *Scenedesmus* spp. under mesophilic and thermophilic conditions. *Algal Res* 27: 121–130. [26]

13. **Gaby, J.C.** and Buckley, D.H. (2017) The use of degenerate primers in qPCR analysis of functional genes can cause dramatic quantification bias as revealed by investigation of *nifH* primer performance. *Microb Ecol* 74: 701–708. [28]
14. **Gaby, J.C** and Buckley, D.H. (2015). Assessment of Nitrogenase Diversity in the Environment, p 209-216. *In* Bruijn, F.J. (ed), Biological Nitrogen Fixation, vol 1. John Wiley & Sons, Inc., Indianapolis, IN. [5]
15. **Gaby, J.C.** and Buckley, D. H. (2014). A comprehensive aligned *nifH* gene database: a multipurpose tool for studies of nitrogen-fixing bacteria. *Database: The Journal of Biological Databases and Curation*, 2014, bau001. doi:10.1093/database/bau001 [139]
16. **Gaby, J.C.** and Buckley, D.H. (2012) A Comprehensive Evaluation of PCR Primers to Amplify the *nifH* gene of Nitrogenase. *PLoS ONE* **7**(7): e42149. [296]
17. **Gaby, J.C.** and Buckley, D.H. (2011) A global census of nitrogenase diversity. *Environ Microbiol* **13**: 1790-1799. [146]

Seminar Presentations

January 30, 2020. Carbon Cycling: A Multi-Omics Approach to Identify Microbial Enzyme Systems That Breakdown Plant Hemicellulose & Nitrogen Cycling: A Suite of Molecular Tools for the Study of Nitrogen-Fixing Bacteria in the Environment. **Los Alamos National Laboratories Bioscience Division**, Los Alamos, New Mexico, USA.

December 4, 2018. Dietary Mannan Selectively Enriches and Activates Microbes in the Cecum and Colon of Pigs. **3Rd International Metaproteomics Symposium**, Leipzig, Germany.

November 20, 2018. In-depth analysis of shifts in microbial community composition and function with mannan diet. **Wood Prebiotics - Exploring tree-derived hemicelluloses as a source for prebiotics**, Ås, Norway.

November 13, 2018. A suite of molecular tools for ecological studies of nitrogen-fixing bacteria. **Nordic Enivronmental Nucleotide Network (NENUN)**, Copenhagen, Denmark.

June 15, 2017. Multi-omic characterization of a commercial-scale, food-waste biogas reactor. **2nd International Metaproteomics Symposium**, Alghero, Italy.

February 20, 2017. From microbiomes to productive, healthy crops: metagenomics to enable agricultural advances. **Norwegian Institute of Bioeconomy Research (NIBIO)**, Ås, Norway.

January 20, 2017. Metabolic characteristics of 361 genomes recovered from the Oslo, EGE biogas reactor using shotgun metagenomics. **Norwegian Biochemical Society 2017 Contact Meeting**, Storefjell, Norway.

September 26, 2016. Assessment of short vs. long read assemblies and their applicability to assessing microbial community dynamics and metabolism in a mesophilic biogas reactor. **Functional Metagenomics 2016 Conference**, Inderøy, Norway.

October 23, 2015. From microbiomes to productive, healthy crops: metagenomics to enable agricultural advances. **University of California, Davis Department of Plant Pathology**. Davis, CA, USA.

October 6, 2015. Molecular tools to study the diversity and ecology of nitrogen-fixing bacteria associated with crops. **University of Georgia Institute of Plant Breeding, Genetics & Genomics**. Athens, GA, USA.

March 28-29, 2015. Diazotroph community dynamics in oil-contaminated sands of Pensacola Beach, Florida following the Deepwater Horizon oil spill. **Southeastern Biogeochemistry Symposium**. Atlanta, GA, USA.

April 23-28, 2012. Microbial nitrogen cycling in a land-use series of the Colombian Paramo. **Fulbright U.S. Student Enhancement Seminar, Andean Region**. Quito, Ecuador.

September 30, 2011. The diversity and ecology of free-living diazotrophs. **Corporacion Corpogen**. Bogota, Colombia.

April 8, 2011. Diversity and ecology of asymbiotic nitrogen-fixing bacteria. **Cary Institute for Ecosystem Studies**. Millbrook, NY, USA.

November 5, 2010. Assessment of quantitative, real-time PCR for enumeration of free-living diazotrophs reveals pitfalls of PCR-based methods. **Biogeochemistry and Environmental Biocomplexity Student Mini-symposium**. Cornell University, Ithaca, NY, USA.

September 28, 2010. Quantitative, real-time PCR of the *nifH* functional genes (nitrogen fixation) using degenerate primers: how to avoid repetition of the same old PCR pitfalls. **Cornell Department of Microbiology**. Cornell University, Ithaca, NY, USA.

April 2, 2009. Factors determining rates of N-fixation by free-living N fixers in soil. **Cary Institute for Ecosystem Studies**. Millbrook, NY, USA.

October 2, 2009. Ecological study of a widespread but poorly characterized group of free-living, nitrogen-fixing bacteria. **Cornell Department of Microbiology**. Cornell University, Ithaca, NY, USA.

January 4, 2008. Diversity of nitrogenase: current status of the census. **Cornell Department of Microbiology**. Cornell University, Ithaca, NY, USA.

April 27, 2007. Anammox-related *Planctomycetes* in soil. **Cornell Department of Microbiology**. Cornell University, Ithaca, NY, USA.

Poster Presentations

Gaby JC, L Michalak, L Lagos, S Leanti La Rosa, PB Pope, M Øverland, B Westereng. (August 12-17, 2018) Prebiotics for livestock: tree-derived galactoglucomannan alters the gut microbiology of weaning piglets. **ISME 2018 17th International Symposium on Microbial Ecology**. Leipzig, Germany.

Gaby JC, S Greses, M Arntzen, D Aguado, J Ferrer, A Seco, and SJ Horn. (July 9-13, 2017) Metagenomic and Proteomic Analysis of Laboratory-scale, Mesophilic AnMBR and Thermophilic CSTR Biogas Reactors Receiving Microalgal Biomass Feedstock from a Photobioreactor Recovering Wastewater Effluent Nutrients. **Federation of European Microbiological Societies (FEMS) 7th Congress of European Microbiologists**. Valencia, Spain.

Gaby JC, E Govasmark, LH Hagen, L Paruch, L Solli, PB Pope, and SJ Horn. (September 25-28, 2016) Assessment of short vs. long read assemblies and their applicability to assessing microbial community dynamics and metabolism in a mesophilic biogas reactor. **Functional Metagenomics 2016** conference. Inderøy, Norway.

Gaby JC, M. Zamanzadeh, PB Pope, and SJ Horn. (August 21-26, 2016) Microbial community composition and dynamics in two-phase biogas rector systems. **ISME 2016 16th International Symposium on Microbial Ecology**. Montreal, Canada.

Gaby JC, Overholt WA, and Kostka JE. (May 30-June 2, 2015) Diazotroph Diversity in Petroleum-Contaminated Sands of Pensacola Beach Following the Deepwater Horizon Oil Spill. **American Society for Microbiology 115th General Meeting**. New Orleans, LA, USA.

Warren MJ, JC **Gaby**, X Lin, PL Morton, JE Kostka, JB Glass. (December 15-19, 2014) Interactions between nitrogen fixation and methane cycling in northern Minnesota peat bogs. **American Geophysical Union Fall Meeting**. San Francisco, CA, USA.

Gaby JC, Kostka JE. (May 17-20, 2014) High-Throughput Analysis of Diazotroph Diversity in Marine, Wetland, and Agricultural Systems. **American Society for Microbiology 114th General Meeting**. Boston, MA, USA.

Gaby JC, Steck P, Blejwas M, Jordan IK, Kostka JE. (April 5-6, 2014) A High-throughput Sequencing Pipeline for Characterization of Nitrogen-fixing Communities. **Southeastern Biogeochemistry Symposium**. Atlanta, GA, USA.

Hsu S-F, **Gaby** JC, and Buckley DH. (June 28-July 1, 2009) Exploring the links between the diazotrophic community and their function in soils. **15th Continuous Flow Isotope Ratio Mass Spectrometry Workshop**. Ithaca, NY, USA.

Gaby JC and Buckley DH. (June 1-5, 2008) The nitrogenase *nifH* gene: current status of the census. **American Society for Microbiology 108th General Meeting**. Boston, MA, USA

Teaching Experience

Amplicon Sequence Variant Calling with DADA2 in R workshop (NMBU, 2018)
Lecturer in **Bioinformatics for Functional Metagenomics** course (NMBU, 2017 and 2019)
ARB sequence database workshop, (Corporación Corpogen, 2012)
Quantitative, Real-time PCR workshop (The National University of Colombia, 2012)
Teaching assistant for **General Microbiology Lecture and Lab** (Cornell, 2005-2006)

Professional Development

MBL Microbial Diversity Course, 6 week intensive course (Woods Hole, MA, 2007)
Big Data and Machine Learning 1 week course at Swedish University of Agricultural Sciences (Uppsala, Sweden, 2017)
Analysis of Multivariate Data from Ecology and Environmental Science, using PRIMER v6, 1 week workshop (Orlando, FL, 2013)
Flow Cytometry for Microbial Community Analysis, 1 day workshop (NMBU, Norway, 2019)

Professional Society Membership

International Society for Microbial Ecology (ISME)
American Society for Microbiology (ASM)
Federation of European Microbiological Societies (FEMS)
Norwegian Biochemical Society (NBS)

Peer Review Service

ISMEJ, Frontiers in Microbiology, Applied and Environmental Microbiology, FEMS Microbiology Ecology, FEMS Microbiology Letters, Microbial Ecology, Environmental Microbiology Reports, PLoS ONE, Soil Biology and Biochemistry, Global Change Biology, Freshwater Biology, Soil Science, Bioinformatics, PeerJ.