

Joseph E. Weaver

PhD Candidate

Department of Civil, Construction and Environmental Engineering

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Education and Employment

- 2020 (Expected) Doctor of Philosophy in Civil Engineering
Minor in Biotechnology
North Carolina State University
Advisors: Prof. Francis L. de los Reyes III, Prof. Joel J. Ducoste
- 2013 Master of Science, Environmental Engineering
North Carolina State University
Advisor: Prof. Morton A. Barlaz
- 2002-2011 Software Engineer
Sonalysts Incorporated
- 2001 Bachelor of Science, Electrical Engineering
Cornell University

Fellowships and Awards

- 2020 Postdoctoral Research Fellowship in Biology, National Science Foundation. NSF Award 2007151.
- 2020 W. Wesley Eckenfelder Graduate Research Award for 2020 from the American Academy of Environmental Engineers.
- 2019 NCSU College of Engineering Travel Award. Covering travel to the IWA MEWE 2019 Conference, Hiroshima.
- 2019 NCSU Graduate Student Association Travel Award. Covering travel to the IWA MEWE 2019 Conference, Hiroshima.
- 2017 Fellow, Microbial Biotechnology Training Program, Graduate Assistance in Areas of National Need. US Department of Education GAANN Award P200A140020
- 2017 3rd place poster, *What's Driving Microbial Community Assembly in Full-Scale Wastewater Treatment?* NC-AWWA-WEA Annual Conference, Raleigh, NC
- 2014 1st place poster, *Effect of Variable Shear on the Formation of Aerobic Granules in an Eccentric Couette Micro-reactor*. CCEE WREE Annual Symposium, Raleigh, NC
- 2012 2nd place poster, *Anaerobic biodegradability of plastics in laboratory-scale landfill reactors*. Global Waste Management Symposium, Phoenix, AZ

Publications

1. Wu, L., Ning, D., Zhang, B., Li, Y., Zhang, P., Shan, X., Zhang, Q., Brown, M.R., Li, Z., Van Nostrand, J.D., Ling, F., Xiao, N., Zhang, Y., Vierheilig, J., Wells, G.F., Yang, Y., Deng, Y., Tu, Q., Wang, A., Acevedo, D., Agullo-Barcelo, M., Andersen, G.L., de Araujo, J.C., Boehnke, K.F., Bond, P., Bott, C.B., Bovio, P., Brewster, R.K., Bux, F.,

Cabezas, A., Cabrol, L., Chen, S., Etchebehere, C., Ford, A., Frigon, D., Gómez, J.S., Griffin, J.S., Gu, A.Z., Habagil, M., Hale, L., Hardeman, S.D., Harmon, M., Horn, H., Hu, Z., Jauffur, S., Johnson, D.R., Keucken, A., Kumari, S., Leal, C.D., Lebrun, L.A., Lee, J., Lee, M., Lee, Z.M.P., Li, M., Li, X., Liu, Y., Luthy, R.G., Mendonça-Hagler, L.C., de Menezes, F.G.R., Meyers, A.J., Mohebbi, A., Noyola, A., Oehmen, A., Palmer, A., Parameswaran, P., Park, J., Patsch, D., Reginatto, V., de los Reyes, F.L., Rossetti, S., Sidhu, J., Sloan, W.T., Smith, K., de Sousa, O.V., Stephens, K., Tian, R., Tooker, N.B., De los Cobos Vasconcelos, D., Wakelin, S., Wang, B., *Weaver, J.E.*, West, S., Wilmes, P., Woo, S-G., Wu, J-H., Wu, L., Xi, C., Xu, M., Yan, T., Yang, M., Young, M., Yue, H., Zhang, Q., Zhang, W., Zhang, Y., Zhou, H., Zhang, T., He, Z., Keller, J., Nielsen, P.H., Alvarez, P.J.J., Criddle, C.S., Wagner, M., Tiedje, J.M., He, Q., Curtis, T.P., Stahl, D.A., Alvarez-Cohen, L., Rittmann, B.E., Wen, X. and Zhou, J. (2019) Global diversity and biogeography of bacterial communities in wastewater treatment plants. **Nature Microbiology** 4, 1183–1195 doi:10.1038/s41564-019-0426-5

2. *Weaver, J.E.*, Wang, L., de los Reyes III, F.L., and Barlaz, M.A (2019) Systems and Methods for Studying Microbial Processes and Communities in Landfills. in **Understanding Terrestrial Microbial Communities** Hurst, CJ ed. Springer ISBN:978-3-030-10777-2
3. *Weaver, J.E.*, Williams, J.C., Ducoste, J.J., and de los Reyes III, F.L. (2019) Measuring the Shape and Size of Activated Sludge Particles Immobilized in Agar with an Open Source Software Pipeline. **Journal of Visualized Experiments** v143, e58963. doi:10.3791/58963
4. *Weaver, J.E.*, Hong, H., Ducoste, J.J., and de los Reyes III, F.L. (2018) Controlling aerobic biological floc size using Couette-Taylor bioreactors. **Water Research** v147, pp 177-183. doi:10.1016/j.watres.2018.09.060
5. *Weaver, J.E.*, Ducoste, J.J., and de los Reyes III, F.L. (2016) Fluid shear variation potentially plays a role in aerobic granular sludge formation. **Proceedings of the Water Environment Federation**, WEFTEC 2016, v2016 i11 pp 5737-5744. doi:10.2175/193864716819706734
6. de los Reyes III, F.L., *Weaver, J.E.* and Wang, L. (2015) A methodological framework for linking bioreactor function to microbial communities and environmental conditions. **Current Opinion in Biotechnology** v33, pp 112-118. doi:10.1016/j.copbio.2015.02.002
7. *Weaver, J.E.*, (2013) Effect of Inoculum Source on the Rate and Extent of Anaerobic Biodegradation Under the direction of Barlaz, M.A., and de los Reyes III, F.L. **MS Thesis**, North Carolina State University, Raleigh, NC.

In Prep

1. *Weaver, J.E.*, de los Reyes III, F.L., and Ducoste, J.J. (2020) A combined CFD-Biokinetic Model of Aerobic Wastewater Treatment Using and Open Source Pipeline

2. *Weaver, J.E., Ducoste, J.J., and de los Reyes III (2020) Microbial Community Assembly of Two Full Scale Wastewater Treatment Plants with Initially Identical Populations*

Presentations and Conference Invitations

Presented

1. *Weaver, J.E., and de los Reyes III, F.L. (Nov 2019). Microbial Community Assembly in Two Full Scale Aerobic Basins Containing Identical Starting Populations: Drivers and Implications, 8th IWA Microbial Ecology and Water Engineering Specialist Conference (MEWE2019), Hiroshima, Japan.*
2. *Weaver, J.E., de los Reyes III, F.L. and Ducoste, J.J. (2016) Inducing aerobic granular sludge formation through unevenly distributed hydrodynamic shear rates. NC AWWA-WEA, Raleigh, NC.*
3. *Weaver, J.E., de los Reyes III, F.L. and Ducoste, J.J. (2016) Fluid shear variation potentially plays a role in aerobic granular sludge formation. WEFTEC, New Orleans, LA.*
4. *Weaver, J.E., and Barlaz, M.A. (2015) Effect of Inoculum source on the rate and extent of anaerobic biodegradation A&WMA National Conference, Raleigh, NC.*

Invited Conferences

1. *Microbial ecology for engineering biology (2020), the Theo Murphy international scientific meeting of The Royal Society, Buckinghamshire UK. n.b. conference cancelled due to COVID-19*

Teaching and Mentoring

Training

2019 Completed the NCSU Teaching and Communication Certificate.

Teaching Assistant

Spring 2019	Senior Design Project	(CE 481)
Spring 2019	Environmental Biotechnology	(CE 774)
Fall 2019	Water Supply and Wastewater Systems	(CE 484)
Spring 2018	Global WASH	(CE 497/596)
Fall 2017	Water Supply and Wastewater Systems	(CE 484)
Fall 2014	Biological Principles of Environmental Engineering	(CE 573)

Guest Lectures and Labs

Spring 2015 thru Fall 2018	Metagenomics: Ordination and data visualization	(BIT 495/477/577)
Falls 2014 -2017	Environmental chemistry and microbiology: Identifying problem organisms in wastewater	(CE 378)

via microscopy.

Internal Workshops

2014 *Laziness, Levers, and Literature. How to search and manage the literature.*
NCSU CCEE Department Seminar.

Mentoring

2016 – 2018 Research Internship Summer Experience (RISE) Program. Responsible for
(Summers) training and mentoring undergraduate researchers while they performed their
own summer research culminating in poster presentation.

2017 Formed and coordinated graduate cohort written prelim study group.

2013 Graduated student mentor to Ally Patrick, *Thermal Acclimation of Mesophilic
Inocula for Thermophilic Biochemical Methane Potential Tests*. NCSU Spring
Undergraduate Research Symposium.

Community and Service

Peer Review

2013 - 2019 Four articles reviewed for: *Water Science & Technology*, *Waste Management*,
and *Journal of Environmental Engineering*.

Service

2019-2020 Lab group representative, Environmental Engineering Lab Condition and
Safety Committee

2019 Invited panel member, “Tell It Like It Is”: Teaching Assistant Discussion
Panel for the NCSU campus-wide New TA workshop

2015 Chair, program committee. NCSU CCEE WREE Graduate Research
Symposium.

Outreach

2013 - 2016 Boy Scouts of America Engineering Merit Badge Day.

2017 – 2018 Girl Scouts of America Engineering Day.

Grant Writing

As Primary Investigator

2019 Weaver, Joseph E. *Individual Based Modelling of Chemically Mediated Microbial
Interactions in Biofilms*. NSF-Postdoctoral Research Fellowship in Biology
(**Awarded** NSF 2007151)

As contributing writer

2017 de los Reyes III, Francis L. and Ducoste, Joel J. *Using Microbial Ecology Theory to
Understand Microbial Community Dynamics and Improve Function of Anaerobic
Bioreactors*. NSF.(**Awarded**)

- 2017 de los Reyes III, Francis L. *Understanding substrate-community interactions to develop resilient anaerobic digestion of food waste* EREF. **(Awarded)**
- 2016 de los Reyes III, Francis L. and Ducoste, Joel J. *Microbial ecology theory as a framework for understanding and improving anaerobic co-digestion*. NSF.

Professional Development

Certificates

- 2019 NCSU Teaching and Communication Certificate

Fellowship: Microbial Biotechnology Training Program, US Department of Education Graduate Assistance in Areas of National Need

- 2016 Capstone Semester Seminars
- 2016 Professional Development Semester Seminar
- 2015 Research Ethics Seminar

Pedagogy

- 2017 Introduction to Teaching
- 2017 Responding to Student Writing
- 2017 Teaching Portfolio
- 2017 Avoiding Death by PowerPoint
- 2017 How to Engage with Diverse Learning Styles
- 2017 Managing Conflict in the Classroom
- 2017 Teaching Assistant Orientation Symposium
- 2017 Moodle Essentials
- 2015 AEESP Case Studies in Project Based Learning

Grant Writing

- 2019 Semester mini-course on grant identification, drafting, and submission
- 2018 Broadening the Impacts of Your Research