

James W. Levis

North Carolina State University
Department of Civil, Construction, and Environmental Engineering
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A. Professional Preparation

Carnegie Mellon University	Mechanical Engineering	BS, 2004
North Carolina State University	Civil Engineering	MS, 2008
North Carolina State University	Civil Engineering	PhD, 2013

MS Thesis Title: *A life-cycle analysis of alternatives for the management of waste hot-mix asphalt, commercial food waste, and construction and demolition waste*

PhD Dissertation Title: *A mathematical programming life-cycle assessment model for solid waste management decision making*

B. Employment

2014-present	Research Assistant Professor, NCSU, Raleigh, NC, USA
2019	Fulbright Scholar, Technical University of Denmark, Kgs. Lyngby, Denmark
2018	Visiting University Scholar, RTI International, RTP, NC, USA
2013-2014	Postdoctoral Research Scholar, NCSU, Raleigh, NC, USA
2006-2013	Graduate Research Assistant, NCSU, Raleigh, NC, USA
2004-2006	Quality Engineer, Westinghouse Electric Company, Columbia, SC, USA

C. Research Interests

environmental systems analysis, life-cycle assessment, sustainable waste resource management, sustainable biomaterials production and recovery, renewable energy systems and modeling, environmental policy and decision support

D. Teaching

Engineering Principles of Solid Waste Management, Environmental Life-Cycle Assessment, Civil Engineering Systems, Hydraulics Lab

E. Awards and Honors

Fulbright Scholar – 2019
Environmental Science: Nano – HOT Article, 2019
RTI International – Visiting University Scholar, 2018
Air & Waste Management Association 1st Place Dissertation Award, 2014
International Solid Waste Association Runner-up Publication Award, 2011
Environmental Science and Technology 2nd Runner-up Best Policy Analysis Paper, 2011
Environmental Science and Technology Top Ten Most Read Paper, 2011

ASME – Material and Energy Recovery Division Scholar, 2011-2012
Outstanding Teaching Assistant nomination, 2010
Environmental Research and Education Foundation Fiessinger Scholar, 2009-2013
NSF Graduate Research Fellow Honorable Mention, 2008
Provost Fellow, North Carolina State University, 2006
George Westinghouse Signature Award, 2006
Graduated with University and College Research Honors, Carnegie Mellon University, 2004

F. Professional Memberships

American Society of Civil Engineers, Association of Environmental Engineering and Science Professors

G. Publications**Submitted Peer Reviewed Publications**

1. Berglund, E., Monroe, J., Ahmed, I., Noghabaei, M., Do, J., Pesantez, J., Fasaee, M. A. K., Bardaka, E., Han, K., Proestos, G., **Levis, J. W.**, (*submitted*) Smart Infrastructure: A Vision for the Role of the Civil Engineering Profession in Smart Cities. *Journal of Infrastructure Systems*.

Published Peer Reviewed Publications

1. Cobo, S., **Levis, J. W.**, Dominguez-Ramos, A., Irabien, A. (2019) Economics of enhancing nutrient circularity in an organic waste valorization system. *Environ. Sci. Technol.* 53(11): 6123-6132, DOI: 10.1021/acs.est.8b06035.
2. Henriksen, T., **Levis, J. W.**, S. R., Barlaz, M. A., Damgaard, A. (2019) Comparison of approaches to fill data gaps and calculate process completeness in LCA - A solid waste management case study. *Int. J. Life Cycle Ass. (in-press)*, DOI: 10.1007/s11367-019-01592-z.
3. Jaunich, M. K., **Levis, J. W.**, DeCarolis, J. F., Barlaz, M. A., Ranjithan, R. S., (2019) Solid waste management policy implications on waste process choices and systemwide cost and greenhouse gas performance. *Environ. Sci. Technol.* 53(4): 1766-1775, DOI: 10.1021/acs.est.8b04589.
4. Grieger, K., Bossa, N., **Levis, J. W.**, von Borries, K. J. F., Strader, P., Cuchiara, M., Hendren, C. O., Hansen, S. F., Jones, J. (2018) Application and Testing of Risk Screening Tools for Nanomaterial Risk Analysis. *Environ. Sci-Nano.*, 5(8): 1844-1858, DOI: 10.1039/C8EN00518D.
5. **Levis, J. W.**, Weisbrod, A., Van Hoof, G., Barlaz, M. A. (2017) A Review of the Environmental Releases from Uncontrolled Solid Waste Disposal Sites. *Crit. Rev. Env. Sci. Tech.*, 47(12): 1003-1041, DOI: 10.1080/10643389.2017.1342513.
6. Karam, A., McMillan, C., Lai, Yi-Chun, Sederoff, H., Grunden, A., Ranjithan, S. R., **Levis, J. W.**, Ducoste, J. J., de los Reyes, F. L. (2017) Construction and set-up of an economic bench-scale algal photosynthetic bioreactor with temperature, light, and pH monitoring for kinetic growth tests. *JoVE*, 124, DOI: 10.3791/55545
7. Martinez-Sanchez, V. **Levis, J. W.**, Damgaard, A., DeCarolis, J. F., Barlaz, M. A., Astrup, T. (2017) Evaluation of Externality Costs in Life-Cycle Optimization of Municipal Solid Waste Management Systems. *Environ. Sci. Technol.*, 51(6): 3119–3127, DOI: 10.1021/acs.est.6b06125.

8. Lang, J. R., Allred, B. M., Field, J. A., **Levis, J. W.**, Barlaz, M. A., (2017) National Estimate for Per- and Polyfluoroalkyl Substances (PFASs) Release to U.S. Municipal Landfill Leachate. *Environ. Sci. Technol.*, 51(4), 2197–2205, DOI: 10.1021/acs.est.6b05005.
9. Stanisavljevic, N., **Levis, J. W.**, Barlaz, M. A., (2017). Life-Cycle Implications of Alternatives for Compliance with EU Directives for Municipal Solid Waste Management: A Case study from Serbia. *J. Ind. Ecol.*, DOI: 10.1111/jiec.12564
10. Hodge, K. L., **Levis, J. W.**, DeCarolis, J. F., Barlaz, M. A. (2016). A Systematic Evaluation of Industrial, Commercial, and Institutional Food Waste Management Strategies in the U.S., *Environ. Sci. Technol.* 50(16): 8444–8452, DOI: 10.1021/acs.est.6b00893.
11. Jaunich, M. K., **Levis, J. W.**, DeCarolis, J. F., Gaston, E. V., Barlaz, M. A., Bartelt-Hunt, S. L., Jones, E. G., Hauser, L., Jaikumar, R. (2016). Characterization of municipal solid waste collection operations. *Resourc. Conserv. Recyc.*, 114: 92–102, DOI: 10.1016/j.resconrec.2016.07.012.
12. Jaunich, M. K., **Levis, J. W.**, Barlaz M. A., & Ranjithan, S. R., (2016). A Life-cycle Process Model for Municipal Solid Waste Collection, *J. Environ. Eng-ASCE.*, 142(8), DOI: 10.1061/(ASCE)EE.1943-7870.0001065.
13. Pressley, P.N., **Levis, J. W.** Damgaard, A. Barlaz, M. A., DeCarolis, J. D. (2014) Analysis of Material Recovery Facilities for Use in Life-Cycle Assessment. *Waste Manag.*, 35: 307-317, DOI: 10.1016/j.wasman.2014.09.012.
14. **Levis, J. W.**, Barlaz, M. A., DeCarolis, J. F., Ranjithan, S. R. (2014). A Systematic Exploration of Efficient Strategies to Manage Solid Waste in U.S. Municipalities: Perspectives from the Solid Waste Optimization Life-Cycle Framework (SWOLF). *Environ Sci Technol.* 48(7): 3625-3631, DOI: 10.1021/es500052h.
15. **Levis, J. W.**, Barlaz, M. A., DeCarolis, J. F., Ranjithan, S. R. (2013). A generalized multistage optimization modeling framework for life cycle assessment-based integrated solid waste management. *Environ. Modell. Softw.*, 50(2013): 51-65, DOI: 10.1016/j.envsoft.2013.08.007.
16. **Levis, J. W.**, Barlaz, M. A. (2011). What is the Most Environmentally Beneficial Way to Treat Commercial Food Waste? *Environ. Sci. Technol.*, 45(17): 7438-7444, DOI: 10.1021/es103556m.
17. **Levis, J. W.**, Barlaz, M. A. (2011). Is Biodegradability a Desirable Attribute for Discarded Solid Waste? Perspectives from a National Landfill Greenhouse Gas Inventory Model. *Environ. Sci. Technol.*, 45(13): 5470-5476, DOI: 10.1021/es200721s.
18. **Levis, J. W.**, Barlaz, M. A., Tayebali, A., Ranjithan, S.R. (2011). Quantifying the Greenhouse Gas Emission Reductions Associated with Recycling Hot Mix Asphalt. *Road Materials and Pavement Design.* 12(1): 57-77, DOI: 10.3166/RMPD.12.57-77
19. **Levis, J. W.**, Barlaz, M. A., Themelis, N. J., Ulloa, P. (2010). Assessment of the State of Food Waste Treatment in the United States and Canada. *Waste Manage.*, 30(8-9): 1486-1494, DOI: 10.1016/j.wasman.2010.01.031.

Conference Publications and Presentations

1. Barlaz, M. A., **Levis, J. W.** (2018), Life-Cycle Model Development and Transparency: Challenges and Choices, *2nd Conference on Life Cycle Assessment of Waste*, Snekkersten, Denmark, June 2018.
2. **Levis, J. W.**, Barlaz, M. A. (2017), Multistage Life-Cycle Optimization for Developing and Evaluating Current and Future Solid Waste Systems, *2nd Conference on Life Cycle Assessment of Waste*, Snekkersten, Denmark, June 2018.

3. Jaunich, M. K., **Levis, J.W.**, Barlaz, M.A., DeCarolis, J.F., Ranjithan, S.R. (2018). Life-Cycle Modeling for Future Solid Waste Management Planning. *Proc. from the Global Waste Management Symposium*, Indian Wells, California, February 2018.
4. Levis, J. W., Barlaz, M. A. (2017). Life-Cycle Modeling of Municipal Solid Waste Landfills. *Geotechnical Frontiers 2017*; Orlando, FL, March 2017
5. Roberson, J., Jaunich, M.K., **Levis, J.W.**, Barlaz, M.A. (2017). Solid Waste Life-Cycle Modeling. *NC SWANA 2017 Fall Conference*; Raleigh, NC, November 2017.
6. **Levis, J. W.**, Barlaz, M. A., Raanjithan, S. R., DeCarolis, J. F., (2017). Life-Cycle Modeling of Open Dumping and Burning of Solid Waste in Emerging and Developing Countries. *Sardinia Symposium 2017*; Sardinia, Italy, October 2017.
7. **Levis, J. W.**, (2017), Proactive development of optimal solid waste management strategies in response to future waste, energy, and greenhouse gas policies, *2017 Joint Conference ISIE and ISSST*, Chicago, IL, June 2017.
8. **Levis, J. W.**, Lydia R. Seabrook, L. R., Amanda Karam, A., McMillan, C., Ranjithan, S. R., (2016), A modular life-cycle cost and life-cycle assessment framework for evaluating micro-algae to fuel systems, *6th International Conference on Algal Biomass, Biofuels, & Bioproducts*, San Diego, CA, July 2016.
9. Hodge, K.L., **Levis, J.W.**, Barlaz, M.A., DeCarolis, J.F. (2016). A Systematic Evaluation of Industrial, Commercial, and Institutional Food Waste Management Strategies in the U.S. *Proc. from the Global Waste Management Symposium*, Palm Springs, California, January 2016.
10. **Levis, J. W.**, Barlaz, M. A., Raanjithan, S. R., DeCarolis, J. F., (2016). Proactive Development and Evaluation of Solid Waste Management Strategies in Response to Future Energy Systems. *Proc. from the Global Waste Management Symposium*, Palm Springs, California, January 2016.
11. **Levis, J. W.**, Barlaz, M. A., Raanjithan, S. R., DeCarolis, J. F., (2015). A Systemic Evaluation of the Costs and Environmental Impacts Associated with Future Municipal Solid Waste Management. *Sardinia Symposium 2015*; Sardinia, Italy, October 2015.
12. **Levis, J.W.**, Barlaz, M. A., DeCarolis, J.F., S.R., Ranjithan, S. R. (2015). A Systematic Exploration of Efficient Strategies to Manage Solid Waste in U.S. Municipalities: Perspectives from the Solid Waste Optimization Life-Cycle Framework (SWOLF). *Air & Waste Management Association Annual Conference 2015*; Raleigh, NC, June 2015.
13. Renz, B., Evans, C., Barlaz, M.A., **Levis, J.W.**, Kollar, T., Boland, C. (2015). Developing Energy and Greenhouse Gas Emission Factors for Anaerobic Digestion in U.S. EPA's Waste Reduction Model. *LCA XV*; Vancouver, BC, October 2015.
14. Jaunich, M.K., **Levis, J.W.**, Barlaz, M.A., DeCarolis, J.F. (2015). Municipal Solid Waste Collection Using Life-Cycle Methodology. *Air & Waste Management Association Annual Conference 2015*; Raleigh, NC, June 2015.
15. **Levis, J.W.**, Barlaz, M. A., DeCarolis, J.F., S.R., Ranjithan, S. R. (2015). Proactive Development and Evaluation of Sustainable Solid Waste Systems under Various Future Energy Scenarios. *2015 AEESP Research and Education Conference*; New Haven, CT, June 2015.
16. Hodge, K.L., Levis, J.W., Barlaz, M.A., DeCarolis, J.F. (2015) A Systematic Evaluation of Industrial, Commercial, and Institutional Food Waste Management Strategies in the U.S. *2015 AEESP Research and Education Conference*; New Haven, CT, June 2015.

17. Levis, J.W., Karam, A., McMillan, C., Ranjithan, S.R. (2015) A Life-Cycle Model for Prospective Analysis of Microalgal-Based Biofuels, *2015 AEESP Research and Education Conference*; New Haven, CT, June 2015.
18. Manavi, R., Karam, A., McMillan, C., **Levis, J. W.**, de los Reyes, F.L., Ducoste, J.J., Ranjithan, S.R., (2015). Life-Cycle Optimization Framework for Photosynthetic Biorefineries (PSBRs). *Proc. from the 249th ACS National Meeting & Exposition*, Denver, Colorado, March 2015.
19. **Levis, J. W.**, Barlaz, M. A., (2014). A New Life-Cycle Methodology to Estimate the U.S. National Average Landfill Gas Collection Efficiency for Various Landfill Types. *Proc. from the Intercontinental Landfill Research Symposium*, Crystal River, Florida, October 2014.
20. **Levis, J. W.**, Barlaz, M. A., (2014). Comparison of the Life-Cycle Emissions from Commercial Source-Separated Organic Waste Management Alternatives. *Proc. from the Global Waste Management Symposium*, Orlando, Florida, June 2014.
21. **Levis, J. W.**, Barlaz, M. A., (2014). A New Life-Cycle Methodology to Estimate the U.S. National Average Landfill Gas Collection Efficiency for Various Landfill Types. *Proc. from the Global Waste Management Symposium*, Orlando, Florida, June 2014.
22. **Levis, J. W.**, Barlaz, M. A., Raanjithan, S. R., DeCarolis, J. F., (2014). Optimal Sustainable Solid Waste Management in Consideration of Changes to Population, Waste Generation and Composition, and the Energy System. *Proc. from the Global Waste Management Symposium*, Orlando, Florida, June 2014.
23. Jaunich, M. K., Gaston, E. V., **Levis, J. W.**, Barlaz, M. A., (2014). Environmental Implications of Empirical Solid Waste Collection Data from U.S. Municipalities. *Proc. from the Global Waste Management Symposium*, Orlando, Florida, June 2014.
24. **Levis, J. W.**, DeCarolis, J. D., Barlaz, M. A., Ranjithan, R. S. (2013). Maximizing Life-Cycle Sustainability of Future Solid Waste Management Systems. *Proc. from the 2013 AEESP Education & Research Conference*, Golden, Colorado, July 2013.
25. **Levis, J. W.**, Barlaz, M. A. (2013). How will future changes to waste composition affect solid waste management? *Waste Expo 2013*, New Orleans, Louisiana, May 2013.
26. **Levis, J. W.**, Barlaz, M. A. (2012). Greenhouse Gas Mitigation Costs Associated with Solid Waste Management Policies. *Proc. from Venice 2012, Fourth International Symposium on Energy from Biomass and Waste*, Venice, Italy, November 2012.
27. Ranjithan, R. S., **Levis, J.**, Barlaz, M.A., DeCarolis, J.D. (2012) Application of a multi-stage life-cycle optimization model to minimize cost and greenhouse emissions from solid waste management, *2012 World Environmental & Water Resources Congress*, Albuquerque, New Mexico, May 2012.
28. **Levis, J. W.**, DeCarolis, J. D., Barlaz, M. A., Ranjithan, R. S. (2011). A Mathematical Programming Life-Cycle Assessment Model for Solid Waste Management Decision Making. *Proc. from the 2011 AEESP Education & Research Conference*, Tampa Bay, Florida, July 2011.
29. Damgaard, A., Barlaz, M. A., DeCarolis, J. D., **Levis, J. W.** (2011). Carbon Footprint and the Problem with a Single Emissions Metric: The case of the Municipal Waste Landfill. *International Society for Industrial Ecology*, Berkley, California, June 2011.
30. **Levis, J. W.**, DeCarolis, J. D., Barlaz, M. A., Ranjithan, R. S. (2011). Is banning yard waste from landfills an effective greenhouse gas mitigation policy? *Proc. from the 2011 World Environmental & Water Resources Congress*, Palm Springs, California, May 2011.

31. **Levis, J. W.**, DeCarolis, J. D., Barlaz, M. A., Ranjithan, R. S. (2011). Modeling and Optimization of Solid Waste Management Operations in a Carbon-Regulated Environment. *Proc. from the 2011 World Environmental & Water Resources Congress*, Palm Springs, California, May 2011.
32. **Levis, J. W.**, Barlaz, M. A. (2010). Cost Effective Solid Waste Management Decision Making in Consideration of Climate Change Policy. *Proc. from the Global Waste Management Symposium*, San Antonio, Texas, October 2010.
33. **Levis, J. W.**, DeCarolis, J. D., Barlaz, M. A., Ranjithan, R. S. (2009). Life-Cycle Assessment of Solid Waste Management in a Carbon Constrained Environment. *US-Korea Conference*, Raleigh, North Carolina, July 2009.
34. **Levis, J. W.**, Barlaz, M. A., Ranjithan, R.S. (2008). A Life-Cycle Inventory of Alternatives for the Management of Commercial Food Waste. *Proc. from the Intercontinental Landfill Research Symposium*, Copper Mountain, Colorado, October 2008.
35. **Levis, J. W.**, Barlaz, M. A., Ranjithan, R.S. (2008). A Life-Cycle Inventory of Alternatives for the Management of Commercial Food Waste. *Proc. from the Global Waste Management Symposium*, Copper Mountain, Colorado, October 2008.

Invited Lectures and Seminars

1. **Levis J. W.**, (2017), Life-Cycle Inventory Data: The Key Ingredient to a Robust LCA, *Environmental Research and Education Foundation Life-Cycle Assessment Workshop*, Raleigh, NC, April 6.
2. Thornloe, S., Vance, R., **Levis J. W.**, Weitz, K., (2017), Tools of the Trade: Available and Upcoming LCA Models (PANEL DISCUSSION), *Environmental Research and Education Foundation Life-Cycle Assessment Workshop*, Raleigh, NC, April 6.
3. Hodge, K. L., Levis J. W., (2015), A Systematic Evaluation of Industrial, Commercial, and Institutional Food Waste Management Strategies, *Environmental Research and Education Foundation Organics Summit*, EREF, San Jose, CA, July 16-17.
4. **Levis, J. W.**, (2015), Introduction to Solid Waste Research at North Carolina State University and the Solid Waste Optimization Life-cycle Framework (SWOLF), University of Novi Sad, Novi Sad, Serbia, September 26.
5. Hodge, K. L., Levis J. W., (2015), A Systematic Evaluation of Industrial, Commercial, and Institutional Food Waste Management Strategies, *Canadian Waste to Resource Conference*, Montreal, QA, November 4.
6. **Levis, J. W.**, (2012), Analysis of Landfill Times to Begin Collection, Begin Energy Recovery, Terminate Collection Under NSPS, *WARM Landfill Gas Modeling Meeting*, US EPA, Arlington, VA, October 23.
7. **Levis, J. W.**, Staley, B. (2011). Sustainability in Solid Waste Management. *Sustainability Symposium*, Wilmington, North Carolina, March 2011.
8. **Levis, J. W.**, Barlaz, M. A. (2011). Sustainability in Solid Waste Management Decision Making. *Environmental Research and Education Foundation Regional Summit*, Indianapolis, Indiana, April 2011.
9. **Levis, J. W.**, Barlaz, M. A. (2011). Is Biodegradability a Desirable Attribute for Discarded Solid Waste? *Environmental Research and Education Foundation Regional Summit*, Raleigh, North Carolina, September 2011.

10. **Levis, J. W.**, (2011). A mathematical programming life-cycle assessment model for solid waste management decision making. *Environmental Research and Education Foundation Annual Board Meeting*, EREF, San Antonio, TX, December 8.
11. EPA Organics Workshop, May 13-14, (2008) Washington, D.C. This is a small group invited to discuss composting and landfill life-cycle process models.

Reports

1. **Levis, J. W.**, Barlaz, M. A., (2016). WARM Anaerobic Digestion Process Model Documentation. Final report to ICF.
2. **Levis, J. W.**, Staley, B. F., (2015). Comparison of Greenhouse Gas Emissions from Open Dumps and Engineered Landfills.
3. **Levis, J. W.**, DeCarolis, J. D., Ranjithan., S. R., Barlaz, M. A., (2015). Integrated Solid Waste Management and Its Environmental Sustainability in a Carbon Constrained Environment. Final Project Report to the Environmental Research and Education Foundation, Raleigh, NC.
4. **Levis, J. W.**, Barlaz, M. A., (2014). Landfill Gas Monte Carlo Model Documentation and Results. Report to ICF for the U.S. EPA Waste Reduction Model (WARM), http://epa.gov/epawaste/conserva/tools/warm/pdfs/lanfl_gas_mont_carlo_modl.pdf Accessed: October 30, 2014.
12. **Levis, J. W.**; Barlaz, M. A., (2013) *Anaerobic Digestion Process Model Documentation*, Project Report, North Carolina State University, Raleigh, NC; <http://www4.ncsu.edu/~jwlevis/AD.pdf>. Accessed: October 30, 2014.
13. **Levis, J. W.**; Barlaz, M. A., (2013). *Composting Process Model Documentation*, Project Report, North Carolina State University, Raleigh, NC; <http://www4.ncsu.edu/~jwlevis/Composting.pdf>. Accessed: October 30, 2014.
14. **Levis, J. W.**, Barlaz, M. A., S. R. Ranjithan, (2009), A Life-Cycle Analysis of Alternatives for the Management of Construction and Demolition Waste, final report prepared for the Delaware Solid Waste Authority.
15. **Levis, J. W.**, Barlaz, M. A., S. R. Ranjithan, (2009), A Life-Cycle Analysis of Alternatives for the Management of Waste Hot Mix Asphalt, final report prepared for the Delaware Solid Waste Authority
16. **Levis, J. W.**, Barlaz, M. A., S. R. Ranjithan, (2009), Life-Cycle Inventory Model for Commercial and Industrial Food Waste Management, final report prepared for the Delaware Solid Waste Authority.

H. Projects

1. *Systematic Sensitivity and Uncertainty Analysis for Life-Cycle Optimization of Future Solid Waste Systems*; PIs: **Levis**; Fulbright Program; 03/2019 - 07/2019
2. *A Life-Cycle Cost and Analysis Framework for Peracetic Acid and Alternative Disinfectants*; PI: **Levis**; Eastman Chemical Company; 01/2017-06/2018
3. *Development of a Life-Cycle Model for Open Dumps and Informal Waste Collection*; PIs: **Levis**, Barlaz; RTI International; 11/2016-08/2017.
4. *Development and Assessment of Cost-Effective Sustainable Integrated Organics Management Strategies*; PI: **Levis**; Environmental Research and Education Foundation; 03/2016-08/2017.
5. *Maximizing Energy for Waste While Minimizing Life-Cycle Environmental Burdens and Cost*; PIs: **Levis**, Barlaz; RTI International; 12/2014-03/2017.

6. *Renewable Paving Binders from Top-lit Updraft Kilning of Biomass*; PIs: Castorena, Yuan, **Levis**; National Science Foundation; 06/2015-05/2018.
7. *Development of a Predictive Model to Estimate Emissions from Open Dumps in Emerging Economies*; PIs: Barlaz, **Levis**; Procter & Gamble; 03/2015-05/2017.
8. *Solid Waste Management Planning for Wake County in Consideration of Cost, Energy and Environmental Emissions*; PIs: Barlaz, **Levis**, Ranjithan, DeCarolis; Wake County Solid Waste Division; 07/2014-06/2017.
9. *SAVI: International Institute for Solid Waste Management Life-Cycle Modeling*; PIs: Barlaz, DeCarolis, **Levis**, Ranjithan; National Science Foundation; 08/2014-08/2017.
10. *A Systematic Evaluation of Industrial, Commercial, and Institutional Food Waste Management Strategies in the U.S.*; PI: Barlaz; Covanta Energy; 09/2013-07/2016.
11. *EFRI-PSBR: Closing the Loop -- Towards a PSBR Design Framework for Self-Sustained Marine Microalgal-Based Fuel Production*; PIs: Grunden, Sederoff, de los Reyes, Ducoste, Ranjithan; National Science Foundation; 09/2013-09/2017.
12. *The Environmental Sustainability of Integrated Solid Waste Management in a Carbon Constrained World*; PIs: DeCarolis, Barlaz, Ranjithan; National Science Foundation; 08/2010-08/2015.
13. *Integrated Solid Waste Management and Its Environmental Sustainability in a Carbon Constrained Environment*; PIs: DeCarolis, Barlaz, Ranjithan; Environmental Research and Education Foundation; 01/2010-12/2014.

I. Graduate Student Advising**Chair/Co-Chair**

1. Keith L. Hodge, MS, Environmental Engineering, (2015), *Systematic Evaluation of Alternatives for Industrial, Commercial, and Institutional Food Waste Management Strategies in the U.S.* Co-Chair.
2. Mojtaba Sardarmehni, PhD, Civil Engineering, (2021-expected), Chair.
3. Yixuan Wang, PhD, Civil Engineering, (2021-expected), Chair.
4. Pedro H. C. Anchieta, MS, Operations Research, (2020-expected), Co-Chair.

Committee Member

1. Amanda L. Karam, MS, Environmental Engineering, (2016). *Development of Photochemical Microsensors for Evaluating Light Distributions within Microalgal Photosynthetic Bioreactors.* Committee Member.
2. Xiaohui Zheng, MS, (2015). *Environmental Engineering, Measuring, Evaluating, and Modeling Energy Use and Emission Rates for a Plug-In Hybrid Electric Vehicle Based on Real-World Measurement.* Committee Member.
3. Megan K. Jaunich, PhD, Civil Engineering, (2018-expected). Committee Member.