

Nancy Diaz-Elsayed, Ph.D.

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Location: Tampa, FL ♦ Profile: www.linkedin.com/in/nancydiazelsayed/

Education

University of California at Berkeley

Berkeley, CA

Ph.D. in Mechanical Engineering

May 2013

M.S. in Mechanical Engineering

May 2010

Certificates: Management of Technology and Engineering and Business for Sustainability

Dissertation Title: “Development of energy models for production systems and processes to inform environmentally benign decision-making” (Faculty Advisor: the late Professor David Dornfeld)

M.S. Project Title: “Process parameter selection for energy consumption reduction in machining”

Massachusetts Institute of Technology (MIT)

Cambridge, MA

B.S. in Mechanical Engineering, Minor in Management

June 2008

Thesis Title: “Double-sided microchannel patterning and through-hole production using injection molding of polypropylene” (Faculty Advisor: Professor David Hardt)

Research Interests: Smart & Sustainable Systems

- Energy monitoring and modeling to improve operations, prevent cutting tool failure, and enhance maintenance strategies for production equipment
- Prognostics and health management for manufacturing equipment
- Closed-loop urban ecosystems in the production of manufactured goods, power, and water

Professional Experience

University of South Florida, Dept. of Civil & Environmental Eng.

Tampa, FL

Research Assistant Professor (full-time)

December 2017 – Present

Research Assistant Professor (part-time)

March 2016 – December 2017

Autodesk, Inc. (contractor)

Tampa, FL

Sustainable Manufacturing Specialist (full-time)

April 2015 – April 2016

Sustainable Manufacturing Specialist (part-time)

August 2013 – April 2015

University of South Florida, Dept. of Civil & Environmental Eng.

Tampa, FL

Research Assistant Professor (part-time)

January 2014 – April 2015

University of California, Berkeley, Dept. of Mechanical Eng.

Berkeley, CA

Graduate Student Researcher

January 2009 – May 2013

University of California, Berkeley

Berkeley, CA

ME 101: High Mix/Low Volume Manufacturing

Mechanical Engineering

Graduate Student Instructor

August 2011 – December 2011

Graduate Student Instructor

August 2010 – December 2010

Research and Industry Experience

University of South Florida

Tampa, FL

Research Assistant Professor (Dept. of Civil and Environmental Eng.)

2014 - 2015, 2016 - Present

Developing a power model of Computer Numerically Controlled machine tools via machine learning (artificial neural networks and regression models) for anomaly detection and to inform sustainability recommendations.

Contributing manufacturing systems expertise in the application of prognostics and health management technologies to manufacturing operations. Investigating wastewater-based resource recovery (water, energy, and nutrients). Evaluating the influence of factors affecting the optimal degree of centralization (e.g., topography, population density, urban form, etc.) across sustainability indicators (NSF Grant No. 1454559).

Used life cycle assessment and life cycle cost analysis to evaluate the impacts of onsite wastewater treatment systems for nutrient management, investigated tradeoffs for centralized vs. decentralized systems and active vs. passive systems, and facilitated collaboration between internal and external stakeholders (EPA Grant No. RD835569). Managing project milestones, mentoring researchers (2 Ph.D., 3 M.S., and 3 B.S. students to date), preparing NSF annual reports, and co-authoring grant applications (submitted to NSF, DOI, NIST & AAUW).

Autodesk, Inc.

Sustainable Manufacturing Specialist

Tampa, FL

2013 - 2016

Led product management efforts for a building intelligence application that combined real-time sensor data with Building Information Models to improve the performance of production systems and equipment. Assessed user needs via user testing sessions and customer interviews, managed industrial and research partnerships, and socialized sustainable manufacturing offerings, including Computational Fluid Dynamics (CFD) services for the design of Heating, Ventilation, and Air Conditioning (HVAC) systems for factories, with internal stakeholders and manufacturing customers. Conducted market research and technology evaluations to identify partners and investment opportunities in energy and smart manufacturing solutions, which resulted in Autodesk leading a \$7M investment round in Panoramic Power.

Laboratory for Manufacturing and Sustainability

Graduate Student Researcher (Dept. of Mechanical Engineering)

Berkeley, CA

2009 - 2013

University of California at Berkeley

Advisor: Professor David Dornfeld

Developed methods to model and optimize the environmental impact of high mix, discrete part manufacturing systems while capturing the stochastic nature of production. Characterized the power demand of machine tools to recommend strategies to reduce the energy consumed during operation. Collaborated with industrial partners to identify research topics, present key findings, and broaden the impact of the research group.

Proposal Preparation and Grants Awarded**DOI Desalination and Water Purification Research Grant**

Shared amount: \$130,268

Status: In review

Project Role: Co-PI; contributed edits of the proposal.

Project Title: "Effective Energy Recovery in Desalination Water Utilities through Pressure-Retarded Osmosis"

AAUW American Short-Term Research Publication Grant

Amount: \$6,000

Status: In review

Project Role: PI; crafted the research idea, wrote the proposal narratives, and prepared the application.

Project Title: "The Cost of Reactive Maintenance for Small- to Medium-Sized Manufacturers"

NIST Measurement Science and Engineering Research Grant

October 1, 2018 - Present

Shared amount: \$100,000

Status: Awarded

Project Role: USF PI (manufacturing expert); helped craft the proposal idea, contributed to proposal writing.

Project Title: "Characterization of Prognostics and Health Management Technologies for Manufacturing at Small and Medium sized Enterprises"

Publications

Google Scholar: Citations (915) & h-index (10); **Legend:** *undergraduate mentee; **graduate mentee; presenter

Journal Articles:

- [1] **Diaz-Elsayed, N.**, Rezaei, N.**, Guo, T., Mohebbi, S., & Zhang, Q. Wastewater-based resource recovery technologies across scale: A review. *Resources, Conservation & Recycling*. (accepted)
- [2] Rezaei, N.**; **Diaz-Elsayed, N.**; Mohebbi, S.; Xie, X.; Zhang, Q. (2019): A Multi-Criteria Sustainability Assessment of Water Reuse Applications: A Case Study in Lakeland, Florida. *Environmental Science: Water Research & Technology*, 5, pp. 102-118.
- [3] **Diaz-Elsayed, N.**; Xu, X.**; Balaguer-Barbosa, M.*; Zhang, Q. (2017): An Evaluation of the Sustainability of Onsite Wastewater Treatment Systems for Nutrient Management, *Water Research*, 121, pp. 186-196.
- [4] **Diaz-Elsayed, N.**; Dornfeld, D.; Horvath, A. (2015): A Comparative Analysis of the Environmental Impacts of Machine Tool Manufacturing Facilities, *Journal of Cleaner Production*, 95, pp. 223-231.
- [5] **Diaz-Elsayed, N.**; Jondral, A; Greinacher, S; Dornfeld, D.; Lanza, G. (2013): Assessment of Lean and Green Strategies by Simulation of Manufacturing Systems in Discrete Production Environments, *CIRP Annals – Manufacturing Technology*, 62(1), pp. 475-478.

Publications (cont'd)

Legend: *undergraduate mentee; **graduate mentee; presenter

Book Chapters:

- [1] Helu, M.; **Diaz-Elsayed, N.**; Dornfeld, D. (2018): Manufacturing Equipment, In: Energy Efficient Manufacturing: Theory and Applications, eds. J. Sutherland, D. Dornfeld, B. Linke, Wiley-Scrivener.
- [2] Vijayaraghavan, A.; Yuan, C.; **Diaz, N.**; Fleschutz, T.; Helu, M. (2012): Closed-loop Production Systems, In: Green Manufacturing: Fundamentals and Applications, ed. D. Dornfeld, Springer, NY.
- [3] Dornfeld, D.; Yuan, C.; **Diaz, N.**; Zhang, T.; Vijayaraghavan A. (2012): Introduction to Green Manufacturing, In: Green Manufacturing: Fundamentals and Applications, ed. D. Dornfeld, Springer, NY.

Refereed Conference Proceedings:

- [1] **Diaz, N.**; Ninomiya, K.*; Noble, J.; Dornfeld, D. (2012): Environmental Impact Characterization of Milling and Implications for Potential Energy Savings in Industry, in: Proceedings of the 5th CIRP International Conf. on High Performance Cutting (HPC2012), pp. 535-540, Zurich, Switzerland.
- [2] **Diaz, N.**; Dornfeld, D. (2012): Cost and Energy Consumption Optimization of Product Manufacture in a Flexible Manufacturing System, in: Proceedings of the 19th CIRP International Conf. on Life Cycle Engineering (LCE2012), pp. 411-416, Berkeley, CA, USA.
- [3] **Diaz, N.**; Redelsheimer, E.*; Dornfeld, D. (2011): Energy Consumption Characterization and Reduction Strategies for Milling Machine Tool Use, in: Proceedings of the 18th CIRP International Conf. on Life Cycle Engineering (LCE2011), pp. 263-267, Braunschweig, Germany.
- [4] **Diaz, N.**; Choi, S.; Helu, M.; Chen, Y.; Jayanathan, S.; Yasui, Y.; Kong, D.; Pavanaskar, S.; Dornfeld, D. (2010): Machine Tool Design and Operation Strategies for Green Manufacturing, in: Proceedings of the 4th CIRP International Conf. on High Performance Cutting (HPC2010), Vol. 1, pp. 271-276, Gifu, Japan.
- [5] **Diaz, N.**; Helu, M.; Jayanathan, S.; Chen, Y.; Horvath, A.; Dornfeld, D. (2010): Environmental Analysis of Milling Machine Tool Use in Various Manufacturing Environments, IEEE International Symposium on Sustainable Systems and Technology, Washington, D.C., USA.
- [6] Niggeschmidt, S.; Helu, M.; **Diaz, N.**; Behmann, B.; Lanza, G.; and Dornfeld, D. (2010): Integrating Green and Sustainability Aspects into Life Cycle Performance Evaluation, in: Proceedings of the 17th CIRP International Conf. on Life Cycle Engineering (LCE2010), pp. 366-371, Hefei, China.
- [7] Mazzeo, A.D.; **Diaz, N.**; Dirckx, M.; Hardt, D.E. (2007): Single-Step Through-Hole Punching and Double-Sided Hot Embossing of Microfluidic Channels, in: Proceedings of the 2nd International Conf. on Micromanufacturing (ICOMM), Greenville, SC, USA.

Non-Refereed Conference Proceedings:

- [1] **Diaz, N.**; Helu, M.; Ninomiya, K.*; Dornfeld, D. (2012): Impact of the Manufacturing Phase on the Life Cycle of Machined Products, in: Proceedings of the Machine Tool Technologies Research Foundation (MTTRF2012) 2012 Annual Meeting, Iga, Japan.
- [2] **Diaz, N.**; Behrendt, T.; Choi, S.; Kong, D.; Ninomiya, K.*; Dornfeld, D. (2011): Environmental Impact Accounting of Machining, in: Proceedings of the Machine Tool Technologies Research Foundation (MTTRF2011) 2011 Annual Meeting, pp. 89-94, Chicago, IL, USA.
- [3] **Diaz, N.**; Helu, M.; Dornfeld, D. (2010): Design and Operation Strategies for Green Machine Tool Development, in: Proceedings of the Machine Tool Technologies Research Foundation (MTTRF2010) 2010 Annual Meeting, pp. 77-82, San Francisco, CA, USA.
- [4] **Diaz, N.**; Helu, M.; Jarvis, A.; Tönissen, S.; Dornfeld, D.; Schlosser, R. (2009): Strategies for Minimum Energy Operation for Precision Machining, in: Proceedings of the Machine Tool Technologies Research Foundation (MTTRF2009) 2009 Annual Meeting, pp. 47-50, Shanghai, China.

Select Presentations and Invited Talks

Legend: presenter (when there were multiple contributors); **graduate mentee

ASME Manufacturing Science and Engineering Conference College Station, TX June 18-22, 2018

Diaz-Elsayed, N. & Zhang, Q.

“Design Considerations across Discrete and Continuous Processes for Sustainable Systems” (poster)

Industry Forum: Monitoring, Diagnostics, and Prognostics for MFG NIST May 7-11, 2018

“Production Monitoring for Performance and Energy Efficiency Improvements”

2018 WaterReuse California Annual Conference Monterey, CA March 25-28, 2018

Rezaei, N.**, Sierra-Altamiranda, A., **Diaz-Elsayed, N.**, Charkhgard, H., & Zhang, Q.

“A multi-objective optimization model for water system management: site and technology selection, capacity allocation, and degree of decentralization. Case study: Hillsborough County.” (poster)

Autodesk University

Las Vegas, NV December 2-4, 2015

Diaz-Elsayed, N. & **Deodhar, A.**

“Managing Factory Operations with the Internet of Things”

TECH Talks Seminar Series

Georgia Tech December 9, 2013

“Characterizing the Energy Consumption of Manufacturing Processes & Systems to Inform Decision-Making”

Teaching Experience

Engineering Design Principles & Practices

USF April 9, 2018

Department of Mechanical Engineering (Graduate-level course)

Guest Lecture: “Designing Sustainable & Connected Solutions: Case Studies from Research & Industry”

Green Engineering for Sustainability

USF March 2017

Department of Environmental Engineering (Undergraduate- and graduate-level course)

Guest Lectures: “A Sustainability Analysis of Onsite Wastewater Treatment Systems for Nutrient Management” and “Carbon Footprint and Water Footprint”

Sustainable Manufacturing

UC Berkeley March 12, 2013

Department of Mechanical Engineering (Graduate-level course)

Guest Lecture: “Managing Energy Use in Manufacturing Systems and Processes”

Summer Math and Science Honors (SMASH) Academy

UC Berkeley July 12-26, 2012

Introduced high school students to design and manufacturing principles, provided an introduction to CAD software, and mentored students in the design and fabrication of a solar cook stove for developing countries.

Sustainable Manufacturing Short Course

UC Berkeley May 22, 2012

Prepared lecture materials and co-taught a short course on sustainable manufacturing for industry and academic professionals.

ME 101: High Mix Low Volume Manufacturing

UC Berkeley Fall 2010 & 2011

Graduate Student Instructor (GSI) of a senior-level, mechanical engineering manufacturing systems course at UC Berkeley. Received the Outstanding GSI Award for the Dept. of Mechanical Engineering.

Interviews and Media Coverage

- Berkeley Engineer (2013) “Greening the Factory Floor” (Spring 2013, Vol. 3). Available at: <http://issuu.com/shawnm/docs/berkeley-engineer-spring-2013/16?e=1339261/2456069>
- ASME ME Today (2012) “Sustainable Manufacturing: Interview with Nancy Diaz.” Available at: <https://www.asme.org/career-education/early-career-engineers/me-today/sustainable-manufacturing-interview-nancy-diaz>
- Diversity Graduate Student Organizations at UC Berkeley (2012). Available at: <https://youtu.be/Tv5kwp27N0w>
- National interview with *Univision* for Women’s History Month and International Women’s Day (aired March 8, 2012 in Spanish)
- Asia Pacific Metalworking Equipment News “Machine Tool Design & Operation Strategies for Green Manufacturing” (April 2011)

Fellowships and Awards

USF Postdoctoral Travel Award (\$400)	Spring 2018
Ford Foundation Pre-doctoral Fellowship (\$60,000)	Fall 2008 - Spring 2013
Alfred P. Sloan Foundation Graduate Scholarship (\$8,662)	Spring 2010 – Spring 2013
UC Chancellor’s Fellowship for Graduate Study (\$50,000)	Fall 2008 - Spring 2011
HENAAC Top Graduate Student Leadership Award Recipient	October 2011
CIRP NSF Fellowship (\$2,410)	July 2009
Outstanding Graduate Student Instructor Award	April 2011
MIT Albert G. Hill Prize Recipient	May 2007

Service

United States Green Building Council (USGBC) Secretary of the USGBC Tampa Bay Chapter.	Jan 2018 – Present
National Academies of Sciences, Engineering, and Medicine Member of the planning committee for the workshop: Revisiting the Manufacturing USA Institutes.	Oct 2018 – Nov 2018

Leadership and Memberships

American Society of Mechanical Engineers (Member)	March 2018 - Present
CIRP Research Affiliate	Spring 2012 - Fall 2014
Society of Hispanic Professional Engineers (Member)	Fall 2004 - Spring 2013
UC Berkeley LAGES (President, Co-President)	Fall 2010 - Spring 2013
UC Berkeley Broadening Participation Committee	Dec 2011 - Summer 2012
MIT Pi Tau Sigma Mechanical Engineering Honor Society	Fall 2007 - Spring 2008
MIT La Union Chicana por Aztlan (President, VP, Treasurer...)	Fall 2004 – Spring 2008

Volunteer Experience

MIT Educational Counselor Interview applicants from the Tampa Bay region for undergraduate programs at MIT.	Tampa, FL	2013 - Present
American Cancer Society Hope Lodge Facilitated a game night for cancer patients and their families at the Hope Lodge located on the USF campus.	Tampa, FL	March 2017
Boys and Girls Club of San Francisco, Tenderloin Clubhouse Tutored high school students, advised on the college application process, and assisted with art activities.	San Francisco, CA	2012 - 2013
Techbridge Facilitated engineering workshops for young girls in elementary and middle school. Led a workshop for teachers (Fall 2012) to help them incorporate engineering education into their curriculum.	Oakland, CA	2008 - 2013