**KRISTINA OCHSNER ARMSTRONG**

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| (573) 680-0641 | 105 Valetta Lane |
| koay9f@gmail.com | Oak Ridge, Tennessee 37830 |

# OBJECTIVE SUMMARY

Researcher experienced in chemical and mechanical engineering looking to promote energy efficiency and new technologies to assist with the building of energy efficient systems that will create an impact upon the world.

# EXPERIENCE

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| Oak Ridge National Laboratory | February 2019 - present |

**Research Associate**

* Lead engineering support for the Department of Energy’s (DOE) MEASUR and VERIFI software tools.
* Assisting partners as a Technical Account Manager for the Better Plants Program as they achieve their energy use reduction goal and connect them with DOE resources to reach greater energy savings.
* Perform Life Cycle Energy/GHG (LCA) and Techno-economic analyses (TEA) on several topics:
	+ Assessment of Food Loss and Waste along U.S. Food Supply Chain
	+ Innovative High-Feed Rate Additive Manufacturing Using Sustainable Nano- Micro- Cellulose-Reinforced Thermoplastic Composites (with Soydan Ozcan)
	+ Development of Value Added, Recycled Feedstocks for Additive Manufacturing and Fiber Reinforced Composites (with Soydan Ozcan)
	+ Development of two software tools for Additive Manufacturing production cost and life cycle energy and GHG emissions
	+ LCA/TEA expert for two BOTTLE verification teams
* Assist team members with additional projects as needed.

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| Oak Ridge Associated Universities | September 2015 – February 2019 |

**Post Masters Research Associate**

* *Energy Efficiency Research and Analysis Group (June 2017 – February 2019)*:
	+ Providing engineering support for the Department of Energy’s (DOE) effort to transition several legacy software tools (PSAT, FSAT, PHAST, MotorMaster, AirMaster, SSMT) to a modern, open-source format (MEASUR).
	+ Assisting partners as a Technical Account Manager for the Better Plants Program as they achieve their energy use reduction goal and connect them with DOE resources to reach greater energy savings.
	+ Assist team members with additional projects as needed.
* *Center for Transportation Analysis (January 2017 – June 2017):*
	+ Created a web-based, open-source tool for calculating and comparing energy requirements of several different processing pathways of Fiber Reinforced Composite Polymers (FRCP) to promote Carbon Fiber Reinforced Polymer (CFRP) use and new energy/cost saving processes.
	+ Wrote and edited two publication for peer-reviewed on automotive electronic Life Cycle Energy.

**Advanced Short-Term Research Opportunity (ASTRO) Intern**

* Created a model to compare energy requirements of several different processing pathways CFRP to promote CFRP use and new energy/cost saving processes. Conducted background literature reviews.
* Conducted a strategic analysis on wide bandgap (WBG) semiconductor power electronics for the DOE Advanced Manufacturing Office. Gained basic grounding in semiconductors & power electronics. Produced and presented slide decks with SWOT and potential energy savings analysis for each major application area. Wrote ORNL report on U.S. competitiveness in WBG power electronics. Presented summary of report at 2016 WiPDA conference.

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| Colorado State University**-** Fort Collins, Colorado | August 2011 - August 2013 |

**Graduate Research Assistant**

* Investigated the energetic practicality and resource availability of microalgae growth/wastewater treatment inclusive system for biofuels production (thesis). Presented poster and presentation at conferences.
* Investigated current practices in food, energy and/or waste systems' analysis, specifically life cycle assessment, focusing on synergistic connections. Evaluated analyses of synergistic systems and conducted a life cycle analysis of a synergistic system using recommendations gathered in initial analysis (thesis).

# EDUCATION

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| Colorado State University- Fort Collins | August 2013 |

*Master of Science (Mechanical Engineering), GPA 4.0 Summa Cum Laude*

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| University of Missouri- Rolla | December 2006 |

*Bachelor of Science (Chemical Engineering), GPA 3.7 Magna Cum Laude*

# RELEVANT RECENT PROJECTS

MEASUR: Manufacturing Energy Assessment Software for Utility Reduction June 2017 – present

* Aid programmers in understanding and implementing engineering aspects of MEASUR
* Assist with the day-to-day operations of project: help run group meetings, determine priorities of tasks and set list of tasks to complete for each deadline, size and assign tasks, develop new tasks, verify that tasks have been implemented into the code correctly
* Revise, update and write new code for the various engineering components of MEASUR

VERIFI: Visualizing Energy Reporting Information and Financial Implications January 2020 – present

* Aid programmers in understanding and implementing engineering/analysis aspects of VERIFI
* Assist with the day-to-day operations of project: help run group meetings, determine priorities of tasks and set list of tasks to complete for each deadline, size and assign tasks, develop new tasks, verify that tasks have been implemented into the code correctly
* Develop new algorithm for energy savings analysis for VERIFI and Better Plants

Innovative High-Feed Rate Additive Manufacturing Using Sustainable Nano/Microcellulose-Reinforced Thermoplastic Composites August 2020 – present

* Develop energy and GHG analysis for current status of projects, including a calculator to update findings with system changes
* Maintain repository of energy and GHG footprint of all permutations of materials created and processes used

Development of Value Added, Recycled Feedstocks for Additive Manufacturing and Fiber Reinforced Composites August 2020 – present

* Develop cost, energy, and GHG model for mechanical recycling processes
* Estimate energy and GHG impact of composites produced in U.S., with special focus on wind sector
* Present results of model to key DOE and industrial stakeholders

Additive Manufacturing for Geothermal Well Applications February 2019 – December 2021

* Developed calculation methodology for estimating the time and cost of conventionally and additively manufacturing parts for geothermal well applications.
* Prepared section of ORNL report detailing methodology, analysis, and results

# TECHNICAL SKILLS

* Microsoft Office Applications
	+ Word
	+ Excel
	+ PowerPoint
* Technical communication (writing and presenting)
* Energy, GHG/carbon, cost, and market strategic analysis
* Other technical software
	+ ASPEN Plus
	+ MathCAD
	+ R Studio
* R and Visual Basic programing languages

# KEY WEBPAGES, PRESENTATIONS & PUBLICATIONS

## Journal Articles

* Wenquan Dong, **Kristina Armstrong**, Mingzhou Jin, Sachin Nimbalkar, Wei Guo, Jie Zhuang, and Joe Cresko. (2022). A framework to quantify mass flow and assess food loss and waste in the US food supply chain, Communications Earth & Environment 3, no. 1. 1-11.
* Wei Guo, Thomas Wenning, Jennifer Travis, Michael Stowe, **Kristina Armstrong,** Sachin Nimbalkar, Eli Levine. (2022). Initial Findings from US Department of Energy’s Better Plants Virtual In-Plant Training on 50001 Ready. Energies. Accepted with Revisions.
* Christopher Price, **Kristina Armstrong**, Yarom Polsky, Annie Wang, Sachin Nimbalkar, Phillip Chesser, Brian Post, and Jiann-Cherng Su. (2021). A techno-economic framework for comparing conventionally and additively manufactured parts for geothermal applications, Journal of Manufacturing Processes, 72, 458-468.
* Wei Guo, Thomas Wenning, Jennifer Travis, Kristina Armstrong, Sachin Nimbalkar, Eli Levine. (2021). Delivering Effective Virtual Energy-Focused Trainings: Successful Strategies and Lessons Learned from the Virtual Cohort In-Plant Training Pilot. International Journal of Energy Management, 3:3, 32-47
* **Kristina Armstrong,** Sujit Das, and Joe Cresko (2020), “The energy footprint of automotive electronic sensors”, Sustainable Materials and Technologies. 25, p.e00195.
* Wei Guo, Thomas Wenning, Sachin Nimbalkar, Kiran Thirumaran, **Kristina Armstrong,** and Eli Levine. (2019). A New Methodology for Calculating the Energy Performance of Manufacturing Facilities, Energy Engineering, 116:2, 7-21
* David Vance, Sachin Nimbalkar, Arvind Thekdi, **Kristina Armstrong**, Thomas Wenning, Joe Cresko, and Mingzhou Jin. (2019). Estimation of and Barriers to Waste Heat Recovery from Harsh Environments in Industrial Processes, Journal of Clean Production. Volume 222, Pages 539-549
* Wei Guo, Thomas Wenning, Sachin Nimbalkar, Kiran Thirumaran, **Kristina Armstrong,** and Eli Levine, (2018). “Comparison of One- and Two-Variable Linear Regression Models and Classic Energy Intensity for Energy Performance Tracking of Two Manufacturing Sectors,” Journal of Energy Engineering, 115:5, 8-25.
* Pablo Cassorla, Sujit Das, **Kristina Armstrong**, and Joe Cresko, Life Cycle Energy Impacts of Automotive Electronics. (2017). Smart and Sustainable Manufacturing Systems, Vol. 1, No. 1, pp. 262-288.

## ORNL Technical Reports

* Arvind Thekdi, Sachin U. Nimbalkar, Senthil Sundaramoorthy, **Kristina O. Armstrong**, Anthony Taylor, Jack E. Gritton, Thomas Wenning, and Joe Cresko. (2021). Technology Assessment on Low-Temperature Waste Heat Recovery in Industry. 2021.ORNL/TM-2021/2150
* Mini Malhotra, Sachin U Nimbalkar, **Kristina O Armstrong**, Kiran Thirumaran, Susana Garcia Gonzalez. (2021) Plant Water Profiler: A Water Balance and True Cost of Water Calculator for Manufacturing Plants. ORNL/TM-2021/1918
* Eli Levine, **Kristina O Armstrong**, Chris Price, Thomas Wenning, Alexandra Davis, Paulomi Nandy, Sachin U Nimbalkar. (2020). Saving Energy: A QuickStart Guide for Small/Medium Manufacturers. ORNL/SPR-2020/1767.
* Yarom Polsky, **Kristina O Armstrong**, Chris Price, Jian-cherng Su, Annie Wang, Brian Post, Phillip Chesser. (2020). Study of Additive Manufacturing Applications to Geothermal Technologies Final Project Report. ORNL/TM-2019/1408
* **Kristina O Armstrong**, Susana Garcia Gonzalez, Sachin U. Nimbalkar. (2020) Opportunities for Using the Industrial Assessment Center Database for Industrial Water Use Analysis. ORNL/TM/2020/1805
* **Kristina O. Armstrong,** Bruce Hedman, Thomas Wenning, Jorge Gutiérrez, Elena Berger, and Patricia Garland, (2018)., Combined Heat and Power in Mexico: Market Opportunity Analysis ORNL/SPR-2018/964.
* **Kristina Armstrong**, Sujit Das, and Laura Marlino, (2017), Wide Bandgap Semiconductor Opportunities in Power Electronics, ORNL/TM-2017/702

## Presentations

* **Kristina Armstrong**, David Rawls, Prasath Vinayagamoorthy, Jonathan Settell, MEASUR-ing Up: Leveraging the Capabilities of the MEASUR Tool Suite, Better Buildings Webinar Series, DD November 2022, Knoxville, TN.
* **Kristina Armstrong**, Alex Botts, Chris Price, Kiran Thirumaran, Senthil Sundaramoorthy, Subodh Chaudhari, DOE Industrial Software Tools Workshop, Better Buildings, Better Plants Summit, 17 May 2022, Arlington, VA.
* **Kristina Armstrong,** Thomas Wenning, Gina Accawi, “The MEASUR Tools Suite,” AIST Workshop, 16 March 2022, Knoxville, TN.
* **Kristina Armstrong,** Eli Levine. Saving Energy: A QuickStart Guide for Small/Medium Manufacturers. Better Plants Webinar Series, 18 October 2021, Knoxville, TN.
* **Kristina Armstrong**, Mini Malhorta, Sachin Nimbalkar, Asha Shibu, Rochelle Samuel, “Plant Water Profiler: A Tool for Determining Water Balance, True Cost of Water, and Water Savings Potential for Manufacturing Plants,” in International Water Conference, 11 – 14 November 2019, Orlando, FL.
* **Kristina Armstrong**, Thomas Wenning, Sachin Nimbalkar, and Sandy Glatt, “Innovative Open-Source Energy Software to Drive and Enable Energy Savings and Process Optimization,” 2019 ACEEE Summer Study on Energy Efficiency in Industry, Portland, OR, August 12-15, 2019.
* **Kristina Armstrong,** “The New DOE MEASUR Tools Suite,” Exhibit Hall Workshop at World Energy Engineering Congress, 17 – 19 October 2018, Charlotte, NC.
* Bruce Hedman, **Kristina O. Armstrong,** Thomas Wenning, Jorge Gutiérrez, Elena Berger, and Patricia Garland, “Combined Heat and Power in Mexico: Market Opportunity Analysis,” in 4th Cogenera Congress- the GREEN Expo, 3-4 September 2018, Mexico City, Mexico.
* Sachin Nimbalkar, Mini Malhorta, **Kristina Armstrong**, Asha Shibu, Rochelle Samuel, “Plant Water Profiler (PWP) Tool for Industry,” in Better Buildings Summit 2018, 21 – 24 August 2018, Cleveland, OH.
* Mini Malhotra, Sachin Nimbalkar, Asha Shibu, **Kristina Armstrong**, Rochelle Samuel, “Plant Water Profiler (PWP) Tool for Industry,” in 40th Industrial Energy Technology Conference, 13 – 15 June 2018.
* **Kristina O. Armstrong**, Sujit Das, Joe Cresko, “Wide Bandgap Semiconductor Opportunities in Power Electronics” in 4th IEEE Workshop on Wide Bandgap Power Devices and Applications (WiPDA), 7 – 9 November 2016, Fayetteville, AR.
* **Kristina O. Armstrong** and Thomas H. Bradley, “Development and Analysis of Microalgae Cultivation/Wastewater Treatment Inclusive System.” in 4th International Conference on Algal Biomass, Biofuels & Bioproducts, 15-18 June 2014, Santa Fe, NM.

## Other

* Gina Accawi, Robert Mark Root, Nick Blondheim, Dmitry Howard, Rachel Hernandez, **Kristina Armstrong**, et al., MEASUR – Manufacturing Energy Assessment Software for Utility Reduction v1.0. 2022, <https://measur.ornl.gov> or <https://github.com/ORNL-AMO/AMO-Tools-Desktop>
* **Kristina O. Armstrong**, “Fact Sheet - Combined Heat and Power in Mexico: Market Opportunity Analysis,” 2018
* **Kristina Armstrong** and Sujit Das, “FRPC Energy Use Estimation Tool”, 2017, <http://energytoolestimator.com/>
* **Kristina Armstrong** and Sujit Das, “User Manual: FRPC Energy Use Estimation Tool”, 2017, (Unpublished Report)
* **Kristina O. Armstrong**, Analysis of Life Cycle Assessment of Food/Energy/Waste Systems and Development and Analysis of Microalgae Cultivation/Wastewater Treatment Inclusive System. MS Thesis, Colorado State University, Department of Mechanical Engineering, 2013. Available: https://dspace.library.colostate.edu/handle/10217/80202