

Saniya A. LeBlanc

Associate Professor

Department of Mechanical & Aerospace Engineering

The George Washington University

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EXPERTISE: *Advanced Manufacturing* *Energy Systems* *Techno-economics*
Thermal Transport *Nanomaterials*

EDUCATION

STANFORD UNIVERSITY	Stanford, CA	2006 – 2012
<i>Ph.D. in Mechanical Engineering, minor in Materials Science & Engineering</i>		2012
<i>M.S. in Mechanical Engineering</i>		2009
• Dissertation: <i>Electrothermal Properties of Nanowire Materials for Energy Conversion Systems</i>		
AMERICAN UNIVERSITY	Washington, D.C.	2006
<i>Graduate Certificate in Teaching</i>		
UNIVERSITY OF CAMBRIDGE	Cambridge, England	2005
<i>M. Phil. in Engineering</i>		
• Thesis: <i>Design and Development of a Thermally-Actuated Bimorph Microdevice</i>		
GEORGIA INSTITUTE OF TECHNOLOGY	Atlanta, GA	2003
<i>B.S. in Mechanical Engineering, minor in French, with highest honor</i>		

AWARDS & FELLOWSHIPS

<i>National Science Foundation CAREER Award</i>		2020
<i>GW Bender Teaching Award</i>		2019
<i>Women in Technology Leadership Award finalist</i>		2019
<i>ASEE 20 Under 40 High-Achieving Researchers and Educators</i>		2018
<i>GW School of Engineering & Applied Science Outstanding Junior Teacher Award</i>		2017
<i>Sandia National Laboratories Fellowship</i>		2010 – 2012
<i>Stanford's Diversifying Academia, Recruiting Excellence Fellowship</i>		2010 – 2012
<i>ASME Materials Division Award</i>		2012
<i>National Science Foundation Graduate Research Fellowship</i>		2006 – 2009
<i>Winston Churchill Foundation Scholarship</i>		2003 – 2004
<i>United Technologies Fellowship</i>		2002 – 2003
<i>Georgia Tech President's Scholarship</i>		1998 – 2003

RESEARCH & INDUSTRY EXPERIENCE

THE GEORGE WASHINGTON UNIVERSITY	Washington, DC	2020 – present
<i>Associate Professor, Department of Mechanical and Aerospace Engineering</i>		
<i>Assistant Professor, Department of Mechanical and Aerospace Engineering</i>		2014 – 2020
• Create energy conversion technologies using advanced materials and manufacturing techniques.		
• Authored successful grant proposals to National Science Foundation, U.S. Department of Energy Advanced Manufacturing Office, Office of Naval Research, Army Research Office, Virginia Center for Innovative Technology, Duke Energy Renewables Innovation Fund, and industry sponsors including large defense contractor.		
ALPHABET ENERGY	Hayward, CA	2012 – 2013
<i>Research scientist</i>		
• Joined an energy technology startup company as 15 th employee and sole research scientist.		

- Developed research, development, and manufacturing characterization solutions for thermoelectric technologies. Designed and evaluated thermal and electrical measurements on novel materials. Evaluated potential of new materials. Conducted multi-university student design competition.

STANFORD UNIVERSITY Stanford, CA 2005 – 2014

Visiting scholar, NanoHeat Laboratory, Department of Mechanical Engineering

- Advised nanowire characterization and thermoelectric system modeling projects. Mentored undergraduate and graduate students. Advised and managed two undergraduate female engineering students in research. Provided career development mentoring.

Research assistant, NanoHeat Laboratory, Department of Mechanical Engineering

- Authored successful grant proposals for Sandia National Labs, Precourt Energy Efficiency Center, and Analog Devices. Collaborated on successful grant proposals for National Science Foundation, Department of Energy, and Office of Naval Research.
- Assessed thermoelectric and photovoltaic energy conversion potential of novel materials. Utilized optical and electrical techniques to investigate properties of nanostructured films and individual nanowires. Developed a system-level model of thermoelectric generators in combustion applications.
- Investigated microchannel flow for convective heat transfer solution to electronics cooling challenges.

FIRELAKE CAPITAL Palo Alto, CA 2008 – 2012

Technical consultant

- Assessed technology that was proposed to venture capital firm for the purpose of generating power from waste-heat in industrial applications. Determined weaknesses of technology's development and proposed options for experimental improvements to increase technical rigor.

BOSCH, RESEARCH AND TECHNOLOGY CENTER Palo Alto, CA 2008

Intern, Thermoelectrics initiative

SCHLUMBERGER, RIBOUD PRODUCT CENTER Clamart, France 2002

Intern, Oilfield services mechanical team

VISTEON, NORTH PENN ELECTRONICS FACILITY Lansdale, PA 1999 – 2001

Co-op Engineer, Manufacturing engineering

GEORGIA INSTITUTE OF TECHNOLOGY Atlanta, GA 1998 – 2003

Undergraduate researcher, MEMS and manufacturing

TEACHING EXPERIENCE

THE GEORGE WASHINGTON UNIVERSITY Washington, DC 2020 – present

Associate Professor

Assistant Professor

2014 – 2020

- Created new undergraduate and graduate level courses: Nanotechnology in Energy Applications, Nanotechnology Devices & Systems: how they are made, measured, and monetized, Connecting Nanotechnology to Your World.

STANFORD UNIVERSITY Stanford, CA 2007 – 2012

Graduate mentor, Guest lecturer

TEACH FOR AMERICA Washington, DC 2004 – 2006

Corps member

- Selective national corps of motivated young people who teach in the nation's lowest income communities for at least two years to eliminate educational inequity.

BELL MULTICULTURAL HIGH SCHOOL

Washington, DC

2004 – 2006

Teacher, Math and Physics

- Developed and taught math and physics curricula for courses in which most students were English Language Learners, and all were from minority groups. On average, students entered the school year a minimum of four grade levels behind in math ability. Utilized educational research in mathematics, science, psychology, sociology, literacy, and instructional practice to guide over 75% of my students in demonstrating grade-level proficiency in math by the end of the year.
- Created advanced physics class to motivate students to pursue technical majors in college. Formulated semester-long engineering project focused on utilizing engineering for social justice at the end of which students provided technical reports and presentations to peers, administrators, teachers, and engineers. Over 80% of students in class went to college and chose engineering majors.

SERVICE**INSTITUTE FOR GLOBALLY TRANSFORMATIVE TECHNOLOGIES**

2012 – present

Technical advisor

- Advise projects utilizing scientific/technological breakthroughs for sustainable global development.

AMERICAN SOCIETY FOR ENGINEERING EDUCATION

2009 – present

- Received national ASEE 20 Under 40 recognition in 2018.
- Co-chaired Mid-Atlantic regional conference.
- Co-founded Stanford University chapter.

STANFORD OFFICE OF SCIENCE OUTREACH

2011 – 2012

Program mentor

- Partnered with Industry Initiatives for Science and Math Education to mentor high school teacher in redesigning undergraduate heat transfer course. Aided teacher in redesigning high school courses with project-based learning and energy applications and creating introduction to engineering class.
- Mentored underrepresented minority high school students in conducting research and completing science fair projects. All mentored students competed and won awards.

CAÑADA COLLEGE

Redwood City, CA

2009 – 2012

Volunteer, Math, Engineering, Science Achievement program

- Coached community college students in developing essays for scholarships and internships.
- Developed counseling workshops for National Science Foundation-sponsored summer math camp.

COLLEGE SUMMIT

Nationwide

2005 – 2011

College counselor, Workshop director

- Volunteered at college campuses in a program to enhance college enrollment of low-income students.

THE MINERALS, METALS, & MATERIALS SOCIETY

2018 – present

SUSTAINABLE NANOTECHNOLOGY ORGANIZATION

2018 – present

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

1999 – present

MATERIALS RESEARCH SOCIETY

2009 – present

WOMEN IN SCIENCE AND ENGINEERING

Stanford, CA

2009 – 2012

PUBLICATIONS & CONFERENCES**Book chapter:**

H. Zhang and S. LeBlanc, “Processing Parameters for Selective Laser Sintering or Melting of Oxide Ceramics,” *Three-dimensional Printing and Additive Manufacturing of High-performance Metals and Alloys*, Ed. X. Tan and S.B. Tor, InTechOpen, 2018.

S. LeBlanc, “Nanotechnology as a Tool for Science and Scientific Literacy,” *Women in Nanotechnology in Women in Engineering*, Ed. L. Friedersdorf and P. Norris, 2019.

Journals:

- B. Sisik, S. LeBlanc, "The Influence of Leg Shape on Thermoelectric Performance under Constant Temperature and Heat Flux Boundary Conditions," December 2020.
- H. Zhang, S. LeBlanc, "Laser Additive Manufacturing Process Development for Bismuth Telluride Thermoelectric Material." (under review)
- Y. Thimont, S. LeBlanc, "The Impact of Thermoelectric Leg Geometries on Thermal Resistance and Power Output," *J. of Applied Physics*, September 2019.
- M. Orrill, D. Abel, M. Wagner, S. LeBlanc, "Ink Synthesis and Inkjet Printing of Electrostatically Stabilized Multilayer Graphene Nanoshells," *J. of Colloid and Interface Science*, January 2020.
- J. Tronolone, M. Orrill, W. Song, H.S. Kim, B.Y. Lee, S. LeBlanc, "Electric Field Assisted Self-Assembly of Viruses into Colored Thin Films," *Nanomaterials*, September 2019.
- M. Carter, A. El-Desouky, M. Andre, P. Bardet, S. LeBlanc, "Pulsed Laser Melting of Bismuth Telluride Thermoelectric Materials," *J. of Manufacturing Processes*, April 2019.
- H. Zhang, D. Hobbix, G. Nolas, S. LeBlanc, "Laser Additive Manufacturing of Powdered Bismuth Telluride," *J. of Materials Research*, November 2018. (invited article)
- A. El Desouky, M. Carter, M. Mahmoudi, A.Elwany, S. LeBlanc, "Influences of Energy Density on Microstructure and Consolidation of Selective Laser Melted Bismuth Telluride Thermoelectric Powder," *J. of Manufacturing Processes*, January 2017.
- M. Orrill, S. LeBlanc, "Printed Thermoelectric Materials and Devices: A review of fabrication techniques, advantages, and challenges," *J. of Applied Polymer Science*, August 2016. (invited article)
- A. El Desouky, M. Carter, M. A. Andre, P.M. Bardet, S. LeBlanc, "Rapid Processing and Assembly of Semiconductor Thermoelectric Materials for Energy Conversion Devices," *Materials Letters*, December 2016. (featured letter)
- T.J. Hendricks, S.K. Yee, S. LeBlanc, "Cost Scaling of a Real-World Exhaust Waste Heat Recovery Thermoelectric Generator: A Deeper Dive," *J. of Electronic Materials*, 2015.
- M.T. Dunham, M.T. Barako, S. LeBlanc, M. Asheghi, B. Chen, K.E. Goodson, "Power Density Optimization for Micro Thermoelectric Generators," *Energy*, October 2015.
- S. LeBlanc, "Thermoelectric Generators: Linking Material Properties and Systems Engineering for Waste Heat Recovery," *Sustainable Materials and Technologies*, December 2014. (invited article)
- S. LeBlanc, S.K. Yee, M.L. Scullin, C. Dames, K.E. Goodson, "Material and Manufacturing Cost Considerations for Thermoelectrics," *Renewable & Sustainable Energy Reviews*, February 2014.
- S.K. Yee, S. LeBlanc, M.L. Scullin, C. Dames, K.E. Goodson, "\$/W Metric for Thermoelectric Power Generation: Beyond ZT," *Energy & Environmental Science*, December 2013.
- S. LeBlanc, B. Swartzentruber, J. Martinez, G. Christoforo, T. Kodama, K.E. Goodson, "Nanoscale Manipulation, Heating, and Welding of Nanowires," Heat Transfer Photogallery, *J. of Heat Transfer*, vol. 134, August 2012, 080910-1.
- S. LeBlanc, S. Phadke, T. Kodama, A. Salleo, K.E. Goodson, "Electrothermal Phenomena in Zinc Oxide Nanowires and Contacts," *Applied Physics Letters*, vol. 100, April 2012.

R. Luharuka, S. LeBlanc, J.S. Bintoro, Y.H. Berthelot, P.J. Hesketh, "Simulated and experimental dynamic response characterization of an electromagnetic microvalve," *Sensors and Actuators A*, vol. 143, 16 May 2008, 399-408.

Y. Gao, A.M. Marconnet, M.A. Panzer, S. LeBlanc, S. Dogbe, Y. Ezzahri, A. Shakouri, K.E. Goodson, "Nanostructured Interfaces for Thermoelectrics," *J. of Electronic Materials*, 2009.

Conference Proceedings:

R. Welch, D. Hobbis, G. Nolas, S. LeBlanc, "Meso-, Micro-, and Nano-structures Induced in Bismuth Telluride Thermoelectric Materials by Laser Additive Manufacturing," *Proceedings of SPIE Defense & Commercial Sensing*, April 2020. (invited)

R. Korte, S. LeBlanc, "Investigating the Experiences that Develop Competence for Newly Hired Engineers in an Electric Power Company," *Proceedings of the ASEE Annual Conference & Exposition*, June 2020.

S. LeBlanc, E. Shittu, "Nanotechnology Fellows Program: Integrating Interdisciplinary Education, Professional Development, and Outreach," *Proceedings of the ASEE Annual Conference & Exposition*, June 2018.

H. Zhang, S. Wang, P. Taylor, J. Yang, S. LeBlanc, "Selective Laser Melting of Half-Heusler Thermoelectric Materials," *Proceedings of SPIE Defense & Commercial Sensing*, April 2018. (invited)

N. Batista, A. El-Desouky, J. Crandall, S. Wang, J. Yang, S. LeBlanc, "Power Metallurgy Characterization of Thermoelectric Materials for Selective Laser Melting," *Proceedings of TechConnect 2017*, May 2017.

M. Orrill, D. Abele, N. Banek, M. Wagner, S. LeBlanc, "Inkjet Printing of Carbon Nanospheres," *Proceedings of TechConnect 2017*, May 2017.

S. LeBlanc, S. Renninger, E. Shittu, "Nanotechnology Fellows Program: Preparing Undergraduate Students for Careers in Nanotechnology," *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, June 2016.

S. LeBlanc, "Nanotechnology Fellows Program: An Interdisciplinary Practicum for Nanotechnology Undergraduate Education," *Proceedings of the NSF-AAAS Symposium on Envisioning the Future of Undergraduate STEM Education: Research and Practice*, April 2016.

A. El Desouky, A. Read, P. Bardet, M. Andre, S. LeBlanc, "Selective Laser Melting of a Bismuth Telluride Thermoelectric Powder," *Proceedings of Solid Freeform Fabrication Symposium*, August 2015.

S. LeBlanc, S.K. Yee, M.L. Scullin, "\$/W Costs of Thermoelectric Waste-Heat Recovery for Stationary Applications," *Proceedings of TechConnect 2014*, May 2014.

M. Dunham, M. Barako, S. LeBlanc, M. Asheghi-Roudheni, K.E. Goodson, B. Chen, "Modeling and Optimization of Small Thermoelectric Generators for Low-Power Electronics," *Proceedings of InterPACK 2013*, July 2013.

S. LeBlanc, Y. Gao, K.E. Goodson, "Thermoelectric Heat Recovery from a Tankless Water Heating System," *Proceedings of IMECE 2008*, November 2008.

Conference Presentations:

H. Zhang, R. Welch, S. LeBlanc, "Structural Modification Induced by Laser Processing of Thermoelectric Materials," *Solid Freeform Fabrication Symposium*, August 2019.

S. LeBlanc, H. Zhang, P. Rammos, "Laser Additive Manufacturing of Thermoelectric Materials," 2019 TMS Annual Meeting & Exposition, March 2019.

S. LeBlanc, E. Shittu, "Academic and Professional Impacts of an Undergraduate Nanotechnology Fellows Program," 2018 Sustainable Nanotechnology Organization Conference, November 2018. (*invited*)

H. Zhang, P. Rammos, S. LeBlanc, "Transport Properties of Laser Processed Thermoelectric Materials," Solid Freeform Fabrication Symposium, August 2018.

S. LeBlanc, "Laser Additive Manufacturing with Bismuth Telluride and Magnesium Silicide," International Conference on Thermoelectrics, July 2018.

S. LeBlanc, E. Shittu, "Nanotechnology Fellows Program: Integrating Interdisciplinary Education, Professional Development, and Outreach," ASEE Annual Conference & Exposition, June 2018.

S. LeBlanc, H. Zhang, "Laser Melting of Thermoelectric Materials," Materials Research Society Spring Meeting, April 2018.

H. Zhang, S. Wang, A. El-Desouky, M. Carter, N. Batista, J. Crandall, A. Elwany, J. Yang, S. LeBlanc, "Selective Laser Melting of Bismuth Telluride and Half-Heusler Thermoelectric Materials," Solid Freeform Fabrication Symposium, Austin, TX, August 2017.

H. Zhang, A. El-Desouky, S. Wang, M. Carter, N. Batista, J. Crandall, J. Yang, S. LeBlanc, "Selective Laser Melting of Thermoelectric Materials," International Conference on Thermoelectrics, July 31-August 3, Pasadena, California, 2017. (*invited*)

S. LeBlanc, S.K. Yee, M.L. Scullin, C. Dames, K.E. Goodson, "Thermoelectric Power Generation: Material, Manufacturing, and System Costs in \$/W," IMECE 2014, Montreal, Canada.

M. Dunham, M. Barako, S. LeBlanc, M. Asheghi-Roudheni, K.E. Goodson, B. Chen, "Modeling and Optimization of Small Thermoelectric Generators for Low-Power Electronics," InterPACK 2013, July 16-23, Burlingame, California.

S. LeBlanc, S. Phadke, T. Kodama, A. Salleo, K.E. Goodson, "Electrothermal Characterization of Zinc Oxide Nanowire Contacts," IMECE 2011, November 11-17, Denver, Colorado, USA.

S. LeBlanc, S. Phadke, T. Kodama, A. Salleo, K.E. Goodson, "Thermoelectric Properties of Zinc Oxide Nanowires and Nanowire Films," Materials Research Society Spring Meeting, April 25-29, San Francisco, California, 2011.

S. Phadke, S. LeBlanc, Y.M. Park, T. Kodama, J.Y. Lee, P. Peumans, K.E. Goodson, A. Salleo, "Studying Charge Transport in ZnO Nanowire Thin Films Using Single Nanowire/Nanowire Junction Measurements," Materials Research Society Spring Meeting, April 25-29, San Francisco, California, 2011.

S. LeBlanc, K.E. Goodson, "Thermoelectric Heat Recovery from a Tankless Water Heating System," Proceedings of IMECE 2008, October 31-November 6, Boston, Massachusetts, USA.

Patent Application:

S. LeBlanc, H. Zhang, A. El-Desouky, M. Carter, "Semiconductor and Thermoelectric Materials and Methods of Making the Same Using Selective Laser Melting," U.S. Patent Application No. 16/256,707, filed January 2019.

Selected Invited Talks:

“Rapid Melting and Solidification of Semiconductor Materials During Laser Additive Manufacturing,” Workshop: Adaptive Sample Preparation & Target Fabrication to Enable High-Throughput Materials Science, Los Alamos National Laboratory, hosted by Texas A&M University, May 15, 2019.

“Additive Manufacturing of Energy Materials: A Case Study in Thermoelectrics,” MaP Distinguished Lecture Series on Additive Manufacturing, ETH Zurich, April 9, 2019.

“An Innovation for Power Generation: Additive Manufacturing of Thermoelectric Materials,” Department of Mechanical Engineering, Temple University, March 22, 2019.

“Rethinking Power Generation: Additive Manufacturing of Thermoelectric Materials,” Department of Mechanical Engineering, University of Virginia, February 28, 2019.

“An Innovation for Power Generation: Additive Manufacturing of Thermoelectric Materials,” Department of Mechanical Engineering, Carnegie Mellon University, September 21, 2018.

“Laser Powder Bed Fusion of Energy Conversion Materials,” 3rd Additive Manufacturing Symposium, Center for Additive Manufacturing and Logistics, North Carolina State University, April 12, 2018.

“Cost-Performance Metrics of Thermoelectric Devices: Linking Materials, Manufacturing, and Systems,” WE-Heraeus Seminar, Bad Honnef, Germany, April 10, 2018.

“Expanding Additive Manufacturing to Include Energy Conversion Materials: A Case Study in Thermoelectric Power Generation,” Army Research Laboratory, March 9, 2018.

“A Manufacturing Innovation for Thermoelectric Power Generation: Selective Laser Melting of Thermoelectric Materials,” Department of Physics Colloquium, The University of South Florida, October 6, 2017.

“Expanding the Additive Manufacturing Materials Frontier: Selective Laser Melting of Thermoelectric Materials,” Center for Additive Manufacturing and Logistics, North Carolina State University, December 9, 2016.

“Selective Laser Melting of Semiconductor Materials for Energy Conversion Applications,” Naval Research Laboratory, November 4, 2016.

“Thermoelectric Devices: Linking Materials, Systems, and Cost,” Joint U.S.-Africa Materials Institute, June 8, 2016.

“Additive Manufacturing of Thermoelectric Power Generators,” Northrop Grumman, November 5, 2015.

“Cost-Performance Metrics of Thermoelectric Devices,” Germany National Thermoelectrics Workshop, University of Duisburg, October 8, 2015.

“Waste-Heat Recovery with Thermoelectrics: Linking Materials, Systems, and Cost to Determine \$/W,” Army Research Laboratory, April 28, 2015.

“Thermoelectric Power Generation: Linking Materials, Systems, and Cost,” Materials for Energy and Sustainable Development group, National Institute of Standards and Technology, April 17, 2014.

“Transporting Engineers Closer to Home,” Woodruff School Graduate Women talks, Woodruff School of Mechanical Engineering, Georgia Institute of Technology, January 23, 2012.

“The Feasibility of Thermoelectric Power Generation: Linking Materials, Systems, and Cost,” Environmental Energy Technologies Division seminar, Lawrence Berkeley National Laboratories, November 6, 2012.

“Electrothermal Properties of Nanowire Materials for Energy Conversion Systems,” Mechanical Engineering Department seminar, Clemson University, February 22, 2012.

“Energy Harvesting with Nanostructured Thermoelectrics,” NSF ADVANCE grant seminar, Mechanical Engineering Department, California State Polytechnic University, March 7, 2011.

“Energy Harvesting with Nanostructured Thermoelectrics,” Department of Mechanical Engineering, Santa Clara University, February 2, 2011.

“Thermal Metrology of Electronic and Energy Conversion Systems,” Quantum Electronics Group, University of California, Santa Cruz, May 4, 2009

