

December 2022

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University Distinguished Professor

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ACADEMIC PREPARATION

B. S.	1982	Mechanical Engineering, University of Illinois, Urbana-Champaign
M. S.	1984	Mechanical Engineering, University of Illinois, Urbana-Champaign
Ph.D.	1992	Mechanical Engineering, University of Texas, Austin

PROFESSIONAL EXPERIENCE

The Pennsylvania State University (Penn State)

Department of Mechanical Engineering

August 2021 – present, University Distinguished Professor

Director, Engineering Ambassador Network

January 2017 – August 2021, University Distinguished Professor and Department Head

August 2006 – December 2016, Professor and Department Head

Research (directed funded research projects in excess of \$36M):

- Convective Heat Transfer Studies – Funding support: Department of Energy, ARPA-E, National Science Foundation, Siemens Energy, Mitsubishi Heavy Industries, IHI (Japan), United Technologies Research Center, and United Technologies-Pratt & Whitney's Center of Excellence, Federal Aviation Administration, NASA, Solar Turbines

Teaching:

- Ph.D. and M.S. Research, graduate level advising
- Senior Thesis for B.S. Honors Students (ME 494H)
- First Year Seminar on Toy Fundamentals (ME 101s)
- First Year Seminar on Smart Lego Robots and Design (ME 102s)

Virginia Polytechnic Institute and State University (Virginia Tech)

Mechanical Engineering Department

July 2004 – June 2006, Assistant Department Head for Research; VT ADVANCE Professor

July 2005 – June 2006, William S. Cross Professor of Mechanical Engineering

July 2003 – June 2006, Professor, Mechanical Engineering Department

April 2002 – June 2006, Director, Center for Turbomachinery and Propulsion

July 2001 – June 2003, Associate Professor

January 1999 – June 2001, Assistant Professor

Research:

- Convective Heat Transfer Studies – Funding support: Department of Energy, the National Science Foundation, Siemens Energy, and United Technologies-Pratt & Whitney
- Thermal analyses of Integrated Circuits – Financial support from the National Science Foundation Engineering Research Center on Power Electronics

Teaching:

- Ph.D. and M.S. Research, graduate level course (ME 5994 and 7994)
- Turbulence and Turbulent Flows (ESM 5554)
- Boundary Layer Theory (AOE 5114)
- Fluid Mechanics (ME 3404)
- Senior Capstone Design (ME 4015 and ME 4016)

University of Wisconsin-Madison

Mechanical Engineering Department

November 1994 – December 1998, Assistant Professor

Research:

- Experimental and Numerical Studies in Freestream Turbulence Effects – Funding support: National Science Foundation CAREER Award and the Department of Energy
- Experimental and Numerical Studies of Endwall Vortical Flows with the Development of a Fillet– Funding support from United Technologies-Pratt & Whitney
- Flowfield Measurements Along Louvered Fin Heat Exchangers – Funding support from Modine Manufacturing

Teaching:

- Ph.D. and M.S. Research, graduate level course (ME 790 and ME 890)
- Convective Heat Transfer (ME 765)
- Fluid Mechanics (ME 363)
- Heat Transfer (ME 364)
- Freshman Design (EPD 160)

Karlsruhe Institute of Technology, Karlsruhe Germany

Institute for Thermal Turbomachinery

January 1993 – November 1994, Post-Doctoral Research Associate

Research:

- Design and development of a transonic film-cooling facility
- Flowfield measurements of a film-cooled, turbulent boundary layer– Funding support from the BRITE-EURAM Program

University of Texas

Mechanical Engineering Department

January 1988 – December 1992, Research Assistant

June 1989 – August 1989 Teaching (Assistant Instructor): Fluid Mechanics (ME 330)

Lawrence Livermore National Laboratory

Nuclear Test and Engineering Division

September 1984 – December 1988, Research Engineer

University of Illinois at Urbana-Champaign

Department of Mechanical Engineering

August 1982 - August 1984 Research and Teaching Assistant

HONORS AND AWARDS

ASME R. Tom Sawyer Award, 2023
ASME Heat Transfer Memorial Award, 2022
AIAA Thermophysics Award, 2022
AIAA Fellow, 2021
AIAA Air Breathing Propulsion Award, 2019
ABET Claire L. Felbinger Diversity Award, 2017
53rd AIAA/SAE/ASME Joint Propulsion Conference Best Paper Award, 2017
University Distinguished Professor, Penn State, 2017
ASME Edwin F. Church Medal for Engineering Education, 2016
College of Engineering's Distinguished Service Alumni Award, University of Illinois, 2016
ASME George Westinghouse Gold Medal, 2015
ASME Distinguished Service Award, 2015
Howard B. Palmer Faculty Mentoring Award, Penn State, 2015
Society of Women Engineers Distinguished Engineering Educator Award, 2014
Distinguished Alumnae in Mechanical Science and Engineering, University of Illinois, 2013
Rosemary Schraer Mentoring Award, Penn State, 2012
U. S. White House *Champion of Change* in Science, Technology, Engineering, and Math, 2011
Best Heat Transfer Paper, ASME's IGTI, 2005, 2009, 2013, 2016, 2021
Top 10 cited papers from 2005-2010 in the *International Journal of Heat and Fluid Flow*
ASME Distinguished Service Award, 2008
William S. Cross Professorship, Virginia Tech, 2005-06
ASME Fellow, 2004
Distinguished Alumnae in Mechanical Engineering, University of Texas, 2004
College of Engineering Faculty Fellow, Virginia Tech, 2003-2006
AdvanceVT Professorship, Virginia Tech, 2003-2006
Power Generation Distinguished Lecturer, Siemens, 2002 and 2004
Ingersoll-Rand Faculty Award, Virginia Tech, 2001
W. M. Rohsenow Best Presentation for Gas Turbine Heat Transfer, ASME, 1997, 2005, 2009
CAREER Award, National Science Foundation, 1996
Non-tenured Faculty Grant, 3M, 1996, 1997, 1998
University of Wisconsin Chancellor's Faculty Recruitment Award, 1994

RESEARCH EXPERTISE

Convective heat transfer taking theory to application in developing new cooling designs for harsh, high temperature environments that lead to increases in energy efficiency in power producing energy systems. Setting up unique experimental facilities that address needed predictive methods for convective heat transfer and pressure loss in various cooling methods. Using additive manufacturing and computational optimization methods to develop new, complex cooling strategies that are not possible with traditional manufacturing.

EDUCATIONAL LEADERSHIP

Distinguished Professor, Mechanical Engineering Department, 2021-present*

- Director of the Engineering Ambassador Network composed of 20+ institutions who educate undergraduate engineering students on effective messages for exciting k-12 students on how engineers contribute to our health, happiness, and safety.

- Co-PI / PI on research experience for undergraduates in sustainable aviation sponsored by the National Science Foundation and NASA.

Department Head, Mechanical Engineering Department, 2006-2021*

- Led a major curriculum change to modernize the Bachelors of Science in Mechanical Engineering degree at Penn State. Features of the new curriculum included: i) an emphasis on computations and mechatronics; ii) a new laboratory course emphasizing systems with modern topics such as big data, renewable energy, autonomous systems, and other such topics; and iii) a two-part course for one credit that includes career planning, business principles for engineers, ethics and several other topics of importance for skill development.
- Developed and offered the first micro-credentialing workshops in the College of Engineering to enhance students' skills identified by companies to include topics such as technical communications, geometric tolerancing, project management, value engineering, introduction to machine learning, and others. These workshops, taught by instructors from industry, are between four and eight hours. Students' proficiency is assessed at the end of the workshop and a badge is presented if assessment is positive.
- Led and instituted global team projects for the mechanical engineering capstone course. Developed numerous global partnerships to carry out these projects involving students from Penn State and another international university partner to address an industry-proposed problem.
- Led the development and offering of an on-line Master of Science in Mechanical Engineering. Program approved by the Graduate School (first M.S. program at Penn State to be offered on-line). Program now has over 100 students enrolled.
- Led the development and offering of an on-line and resident Master of Engineering in Additive Manufacturing and Design, which was the first in the U.S., involving five departments and two Colleges at Penn State. Program now has over 90 students enrolled.
- Co-founder of the Engineering Ambassador Program at Penn State and the Engineering Ambassador Network involving over 37 institutions reaching 40,000 K-12 students each year. This program is a professional development program teaching communication and leadership to our college students with an outreach mission to local high schools. Using the National Academy of Engineering's *Changing the Conversation* messages, Engineering Ambassadors communicate the excitement of engineering to high school students. Effort funded through the National Science Foundation and Raytheon Technologies.

** prior to July 2019, Department Head of Mechanical and Nuclear Engineering*

SIGNIFICANT SERVICE TO THE PROFESSION

- Department of the Air Force Scientific Advisory Board, 2023- present (approval in process)
- National Academies of Sciences, Engineering, Medicine's Smart Manufacturing Study Committee, 2022-present
- National Academies of Sciences, Engineering, Medicine / NASA Aeronautics Research and Technology Roundtable, 2022-present
- ASME Technical Committee on Publications & Communications, January 2022-present
- ASME TurboExpo Executive Committee, June 2021-present
- Gas Turbine Association, member, 2021-present
 - Chair of the Government Relations Committee
- ASME TurboExpo Conference Chair, June 2021

- Panel Organizer and Moderator: Minding the Gap: Unlocking DE&I for Gas Turbine Engineering
- Zero Carbon Flight on the Horizon Panel Organizer and Moderator, ARPA-E, May 2021
- AIAA Gas Turbine Engine Technical Committee, 2021-present
- National Academies of Sciences, Engineering, Medicine's Gas Turbine Development Study Committee, Member, 2018-2019
- ASME Board of Governor Member, 2018-2020
- NASA Advisory Council, Aeronautics Committee, 2013-2020
- National Science Foundation's Committee of Visitors for Engineering Education Division, 2016
- National Academies of Sciences, Engineering, Medicine's Low Carbon Aviation Study Committee, Co-Chair, 2015-2016
- ASME Energy Conversion and Storage Segment, Leader and Member, 2014-2016
- Advisory board membership for engineering at Georgia Tech, University of Illinois-Urbana-Champaign, University of Texas, Lehigh University, Brigham Young University
- Program reviewer for Mechanical Engineering Departments at University of Delaware (2022), Texas A&M University (2020), University of Texas-Dallas (2019), Carnegie-Mellon (2019), University of Colorado (2018), University of Florida (2017), Iowa State University (2016), Purdue University (2015), and University of Minnesota (2014)
- ASME Committee on Honors, Member from 2009-10; Chair from 2010-14
- Board of Directors for the International Gas Turbine Institute, Member, 2009-12; Vice Chair, 2012-13; Chair 2013-14; and Special Advisor to the Chair, 2016-17
- ASME Mechanical Engineering Department Head Executive Council, Member for 2006, Secretary from 2007-2009, Vice Chair from 2010-2012; Chair from 2012-13
- ASME Vision 2030 Committee (ME curriculum reform), Member, 2008-2011
- ASME Knowledge and Communities Re-organization Task Force, 2013-14
- ASME Center for Education Board of Directors, 2010-2014

DEPARTMENT FUNDRAISING

- \$7M gift to name the Nuclear Engineering Program (transitioned to a Department)
- \$3M gift for ME Chair and excellence fund
- \$2M unrestricted gift from ME alumni
- \$450K gift for the E-Knowledge Commons
- \$750K endowed scholarship/fellowship gift for ME / \$175K endowed scholarship/fellowship gift for NucE
- Lee Everett Professorship
- \$250K for ME graduate fellowships from an alum
- \$100K gift for endowing the Hochreiter Distinguished Seminar Series
- Four Early Career Professorships: Kenneth K. and Olivia Kuo Early Career Professorship; Kenneth Kuan-Yun Kuo Early Career Professorship; Clyde Shuman Early Career Professorship; Martin W. Trethewey Early Career Professorship
- \$2M gift from Toshiba-Westinghouse
- \$350K gift from United Technologies for the Engineering Ambassadors
- \$11K/year for MNE Innovation Competition and recognition of an ME Junior
- \$125K from Volvo for an early faculty development funds
- \$125K from five corporations to fund the E-Knowledge Commons group meeting rooms.

INVITED GOVERNMENTAL TECHNICAL BRIEFINGS/TESTIMONIES

- Organizer and presenter for a US Congressional Briefing on Gas Turbines, ASME Sponsored, March 2022
- Invited Testimonial to the Space and Aeronautics Subcommittee of the U.S. House of Representatives' Science, Space, and Technology Committee, March, 2021
- Invited presenter for Congressional Briefing on the NASA University Leadership Initiative Program, NASA hosted, July 2021
- Invited presenter for Gas Turbine Association to the American Ceramic Association, May 2021
- Invited presenter in a US Congressional Briefing on Gas Turbines, April 2019
- Invited presenter in a US Congressional Briefing on Gas Turbines, September 2017
- Invited presenter in a US Congressional Briefing on Gas Turbines, September 2016 (<https://www.asme.org/about-asme/advocacy-government-relations/policy-publications/capitol-update/october-7-2016-capitol-update#1>)
- Invited presenter for the Low Carbon Aviation Report by the National Academies of Sciences, Engineering, and Medicine to the FAA, DOE, USDA, USAF, AIAA, House Subcommittee, Office of Science and Technology, and EPA, Summer 2016
- Invited presenter in a US Congressional Briefing on Digital Manufacturing, May 2016 (http://housemanufacturingcaucus-reed.house.gov/sites/housemanufacturingcaucus.house.gov/files/wysiwyg_uploaded/Briefing%20on%20Digital%20and%20Cyber%20Manufacturing_Final.pdf)
- Invited presenter in a US Congressional Briefing on Gas Turbines, March 2016 (http://gasturbine.org/docs/newdocs/GTA-AGA_Capitol_Hill_Briefing_Flyer_Feb_2016.pdf)
- Invited presenter for ASME to the *Education and Skills for Manufacturing-US Teaching Methods and Course Structures*, Institution of Mechanical Engineers, London England, February 2013

INVITED LECTURES AND KEYNOTE PRESENTATIONS (Last eight years)

Exploring Additive Manufacturing for Cooling Channel Designs, invited keynote, 26th National and 4th International Indian Society for Heat and Mass Transfer-American Society of Thermal and Fluids Engineers 2021 Conference, December 2021

Exploring Additive Manufacturing for Cooling Channel Designs, Washington University, November 2021

The Economist – Sustainability Week: Countdown to COP26, The Economist, Panel Moderator, September 2021 <https://events.economist.com/sustainability-week-countdown-to-cop/>

R&D: Paving the Way to a More Sustainable, Resilient NAS, Air Traffic Controllers Tech Symposium: May 2021, panelist, <https://www.atca.org/agenda-symp>

Sustainable Aviation, Public Broadcast System (PBS), May 2021

Examining R&D Pathways to Sustainable Aviation, March 2021, U.S. House of Representatives Committee on Science, Space & Technology: Subcommittee on Space and Aeronautics, invited presentation: <https://www.youtube.com/watch?v=1b0gouZ2rd0>

Meeting the Demands of Developing Programs, invited panelist, ASME International Mechanical Engineering Education Leadership Summit, March 2021

New Frontiers of Thermal Transport, invited speaker, National Science Foundation Workshop, January, 2021

Improving Diversity and Inclusion in your Department, invited panelist, ASME Engineering Education, November 2020

Directional Effects of Additively Manufactured Components, University of California-Irvine, October 2020

What's the next breakthrough: Technology or Integration, AIAA Propulsion and Energy Forum 360 Panelist, August 2020

Additive Manufacturing Effects on Turbine Cooling, University of Houston, February 2020

Additive Manufacturing Effects on Turbine Cooling, Clemson University, February 2020

Development of a National Experimental Turbine (NExT), invited speaker, 13th Operational Energy Summit, Washington DC, January 2020

Advanced Technologies for Gas Turbines, AIAA SciTech Panel, January 2020

Using Additive Manufacturing to Advance Convective Cooling Designs, invited keynote seminar for the ASME International Mechanical Engineering Conference, November 2019

University-Industry-Academia Collaboration to Develop the National Experimental Turbine (NExT), invited keynote at DOE's University Turbine Systems Research Program Workshop, November 2019

Advanced Technologies for Gas Turbines, National Academies of Sciences, Engineering, and Medicine' Aeronautics Science and Engineering Board, September, 2019

Additive Manufacturing Effects on Turbine Cooling, Case Western Reserve, September 2019

Effects of Additive Manufacturing on Convective Heat Transfer, invited keynote seminar for the American Society of Thermal and Fluids Engineers Conference, March 2018

Aligning Engineering Education: Opportunities for Collaboration between Universities, Industry, and Professional Societies, National Academies of Sciences, Engineering, and Medicine, December 2018

Additive Manufacturing for Heat Exchange, University of Delaware, September 2018

Additive Manufacturing for Heat Exchange, University of Texas at Dallas, October 2018

Exploiting Additive Manufacturing for Cooling, University of Colorado, January 2018

Exploiting Additive Manufacturing for Cooling, University of Michigan, November 2017

Additive Manufacturing for Turbine Cooling, Oxford University, March 2017

Exploiting Additively Manufactured Microchannels for Heat Exchange, University of Tennessee, Deans Distinguished Seminar Series, January 2017

Additive Manufactured Microchannels for Cooling Gas Turbine Airfoils, University of Illinois at Urbana-Champaign, October 2016

Commercial Aircraft Propulsion and Energy Systems Research: Reducing Global Emissions, AIAA Forum 360, Propulsion and Energy, Salt Lake City, UT, July 2016

Additive Manufactured Microchannels for Cooling Gas Turbine Airfoils, Distinguished Seminar, University of Alabama-Huntsville, February 2016

Additive Manufactured Microchannels for Cooling Gas Turbine Airfoils, Distinguished Seminar, University of Wisconsin-Madison, October 2015

Additive Manufactured Microchannels for Cooling Gas Turbine Airfoils, Distinguished Seminar, University of Central Florida, September 2015

Additive Manufactured Microchannels for Cooling Gas Turbine Airfoils, The Pratt & Whitney Distinguished Lecture, University of Connecticut, April 2015

Additive Manufactured Microchannels for Cooling Gas Turbine Airfoils, Colorado State University, April 2015

Blockage Effects on Cylindrical and Shaped Film Cooling Holes, Villanova University, September 2014

Blockage Effects on Cylindrical and Shaped Film Cooling Holes, Texas A&M University, September 2014

Recent Developments in Film Cooling, Siemens Energy, 2013

Impacts of Particle Ingestion on External and Internal Flow Paths, UTC Scholar Lecture, September 2012

Flowfield and Heat Transfer Measurements in Low Aspect Ratio Pin Fin Arrays, Rensselaer Polytechnic Institute, September 2012

Flowfield and Heat Transfer Measurements in Low Aspect Ratio Pin Fin Arrays, Purdue University, August 2012

Simulations of Multi-Phase Particle Deposition on Film-Cooled Turbine Components, Shanghai Jiao Tong University, June 2011

RESEARCH SUPERVISION

Doctoral Student Advisees

Radomsky, Roger, 2000, *High Freestream Turbulence Studies on a Scaled-Up Stator Vane*, Mechanical Engineering, University of Wisconsin-Madison. (Raytheon)

Lethander, Andrew, 2003, *Evaluation of a Fillet Design for a First Vane*, Mechanical Engineering, Virginia Tech. (Air Force Research Lab)

Colban, Will, 2005, *Performance of Shaped Film-Cooling Holes on a Turbine Vane*,” (Recipient of NSF Honorable Mention, Recipient of 2nd Place for the the Paul E. Torgersen Graduate Student PhD Poster for Research Excellence Award) Mechanical Engineering, Virginia Tech. (Amber Kinetics, Director)

Sewall, Evan, 2005, *Heat Transfer Predictions for Ribbed Surfaces*, co-advised with D. Tafti, Mechanical Engineering, Virginia Tech. (GE Power)

- Barringer, Mike, 2006, *Developing and Testing a Combustor Simulator for Investigating High Pressure Turbine Aerodynamics and Heat Transfer* (recipient of Best Technical Presentation, AIAA 28th Dayton-Cincinnati Aerospace Science Symposium; Recipient of Incentive Award at the Propulsion Directorate, AFRL), Mechanical Engineering, Virginia Tech. (Penn State, Associate Res Prof)
- Sundaram, Narayan, 2007, *Effects of Surface Conditions on Endwall Film-Cooling* (recipient of 2nd Place for the the Paul E. Torgersen Graduate Student PhD Poster for Research Excellence Award; recipient of 2005 Best Heat Transfer Paper at the International Gas Turbine and Aeroengine Congress and Exposition) Mechanical Engineering, Virginia Tech. (Amazon)
- Scrittore, Joe, 2008, *Experimental Study of the Effect of Dilution Jets on Film Cooling Flow in a Gas Turbine Combustor*, Mechanical Engineering, Virginia Tech. (NAVAIR)
- Knost, Daniel, 2008, *Parametric Investigation of the Combustor-Turbine Interface Leakage Geometry*, Mechanical Engineering, Virginia Tech. (Stewart-Haas Racing Crew Chief)
- Cardwell, Nick, 2010, *Investigation of Particle Trajectories for Wall Bounded Turbulent Two-Phase Flows*, co-advised with P. Vlachos (recipient of 2005 Best Heat Transfer Paper at the International Gas Turbine and Aeroengine Congress and Exposition), Mechanical Engineering, Virginia Tech. (Bractlet, Vice Pres of Operations)
- Lawson, Seth, 2011, *Simulating Particle Deposition from Coal-Derived Fuels*, (recipient of IGTI Travel Award, 2009 Best Heat Transfer Paper at the International Gas Turbine and Aeroengine Congress and Exposition) Mechanical Engineering, Penn State. (Department of Energy-NETL, Program Manager)
- Lynch, Steve, 2011, *The Effect of Endwall Contouring on Boundary Layer Development in a Turbine Blade Passage*, (recipient 2005, 2006, 2007 Virginia Space Grant Fellowship, Wilbur Wright Fellowship, 2006 Gordan C. Oates Graduate Award, and 2009 Warren M. Rosenhow Best IMECE Heat Transfer Presentation), Mechanical Engineering, Virginia Tech. (Penn State, Associate Professor)
- Thrift, Alan, 2011, *Contour Effects on Secondary Flows*, Mechanical Engineering, Penn State. (Siemens Energy)
- Ostaneck, Jason, 2012, *Flowfield Interactions in Low Aspect Pin Fin Arrays* (recipient of a fellowship from the Science, Mathematics and Research for Transformation-SMART Program) Mechanical Engineering, Penn State. (Purdue Polytechnic, Assistant Professor)
- Mensch, Amy, 2015, *Using Conjugate Heat Transfer Analyses to Assess the Cooling Performance on a Turbine Endwall* (recipient of the Alan Brockett Penn State-Pratt & Whitney Graduate Award, College of Engineering Distinguished Teaching Fellow) Mechanical Engineering, Penn State. (National Institute of Standards and Technology)
- Schroeder, Robert, 2015, *High Density Ratio Film-Cooling Studies*, Mechanical Engineering, Penn State (recipient of a three year fellowship from the NASA Aeronautics Scholarship Program). (Sargent-Lundy)
- Gibson, Jeffrey, 2015, *Deposition Effects on Turbine Endwalls* (recipient of a one year University Graduate Fellowship and Graduate Teaching Fellowship) Mechanical Engineering, Penn State. (Siemens Energy)
- Clark, Ken, 2016, *Sealing Effectiveness of a Turbine Rim Seal at Engine-Relevant Conditions*, 2016 (recipient of a three year National Defense Science and Engineering Graduate Fellowship) Mechanical Engineering, Penn State. (Pratt & Whitney)

- Stimpson, Curtis, *MicroChannel Cooling through the Uses of Additive Manufacturing*, (recipient of a one year University Graduate Fellowship; 2017 PSU Alumni Dissertation Award—only two given in the College of Engineering) Mechanical Engineering, Penn State. (Honeywell)
- Kirsch, Katie, 2017, *Optimized Microchannel Cooling Made Possible through Additive Manufacturing* (recipient of a National Science Foundation Graduate Fellowship; Alan Brockett Award; and AIAA/SAE/ASME Joint Propulsion Conference Best Paper Award, ASME Heat Transfer Best Paper Award) Mechanical Engineering, Penn State. (Raytheon Technologies Research Center)
- Snyder, Jacob, 2019, *Improving Turbine Cooling through Control of Surface Roughness in the Additive Manufacturing Process*, (AIAA/SAE/ASME Joint Propulsion Conference Best Paper Award, recipient of the 2019 PSU Alumni Dissertation Award) Mechanical Engineering, Penn State. (Pratt & Whitney)
- Knisely, Brian, 2021, *Integration of Infrared Thermography to Measure Part-to-Part Cooling Variations on Turbine Blades*, Mechanical Engineering, Penn State. (Carrier)
- Monge-Concepcion, Ivan, 2021, *The Effect of Vane Trailing Edge Flow on Inter-Stage Turbine Sealing*, Mechanical Engineering, Penn State, recipient of Sloan Fellowship (Honeywell)
- Siroka, Shawn, 2021, *Advanced Heat Flux Gauges Applied to Test Turbines Operating in Steady Facilities*, (recipient of ASME best paper award), Mechanical Engineering, Penn State. (Industrial Research Technology)
- Deshong, Eric, 2022, *Fault Characterization and Diagnostics Supporting Condition-Based Operation and Maintenance of Gas Turbine Engines*, (recipient of AT&T Fellowship), Mechanical Engineering, Penn State. (Honeywell)

Current Doctoral Advisees

- Wildgoose, Alexander, Mechanical Engineering, Penn State (passed Comprehensive Exam)
- Veley, Emma, Mechanical Engineering, Penn State (passed Comprehensive Exam)
- Wilkins, Peter, Mechanical Engineering, Penn State (passed Comprehensive Exam)
- Corbett, Thomas, Mechanical Engineering, Penn State (passed Qualifying Exam)
- Rozman, Maria, Mechanical Engineering, Penn State (passed Qualifying Exam)
- Gailey, Nicholas, Mechanical Engineering, Penn State (passed Qualifying Exam)
- Schaeffer, Chad, Mechanical Engineering, Penn State
- Weise, Connor, Mechanical Engineering, Penn State

Masters of Science Advisees

- Bangert, Boris, 1996, *Development and Testing of a Scaled-up Turbine Vane Cascade*, Mechanical Engineering, University of Wisconsin.
- Martin, Cheryl, K. A., 1997, *Leading Edge Film Cooling Conceptual Design Through CFD*, Mechanical Engineering, University of Wisconsin.
- Springer, Marlow, 1998, *Flowfield Studies in Louvered Fins Relevant to Compact Heat Exchangers*, Mechanical Engineering, University of Wisconsin. (Nominated by the Mechanical Engineering Department as the best thesis in 1998).
- Kang, Brian, 1998, *Detailed Measurements in the Endwall Region of a Gas Turbine Stator Vane*, Mechanical Engineering, University of Wisconsin.

- Hermanson, Kristina, 1999, *Effect of Inlet Conditions on Endwall Secondary Flows*, Mechanical Engineering, University of Wisconsin.
- Zess, Gary, 1999, *Methods to Reduce the Leading Edge Horseshoe Vortex in a Gas Turbine Stator Vane*, Mechanical Engineering, University of Wisconsin.
- Lemmon, Chris, 2000, *Internal Geometry Effects on Film Cooling*, Mechanical Engineering, University of Wisconsin.
- Lyman, Andrew, 2000, *Heat Transfer Measurements in Louvered Fin Arrays*, Mechanical Engineering, Virginia Tech.
- Barringer, Michael, 2001, *Heat Transfer and Flowfield Measurements Downstream of a Scaled-Up Combustor*, Mechanical Engineering, Virginia Tech.
- Weinberger, Sarah, 2001, *Predictions of the Flowfield and Heat Transfer in a Turbine Vane Test Section Downstream of a Combustor Liner*, Mechanical Engineering, Virginia Tech.
- Colban, Will, 2002, *Effects of Realistic Combustor Exit Profiles on Vane Endwall Heat Transfer*, Mechanical Engineering, Virginia Tech (Outstanding Scholar in Mechanical Engineering at Virginia Tech; Honorable Mention for the NSF Graduate Fellowship).
- Stephan, Ryan, 2002, *Heat Transfer Measurements Along Louvered Fins*, Mechanical Engineering, Virginia Tech.
- Pang, Yingfeng, 2002, *Thermal Analyses of IPEMs*, co-advised with Dr. Elaine Scott, Mechanical Engineering, Virginia Tech.
- Sewall, Evan, 2002, *Thermal Analyses of Electronic Components*, Mechanical Engineering Department, Virginia Tech, continued on for a PhD co-advised with Dr. Danesh Tafti.
- Vakil, Sachin, 2002, *Flow and Thermal Field Measurements in a Combustor Simulator Relevant to a Gas Turbine Aero-Engine*, Mechanical Engineering, Virginia Tech.
- Hohlfeld, Erik, 2003, *Simulations of Blowing for Blade Tip and Hub Cooling*, Mechanical Engineering, Virginia Tech (recipient of FLUENT Best Student Paper, 2003).
- Couch, Eric, 2003, *Adiabatic Effectiveness Measurements for Blade Tip Cooling*, Mechanical Engineering, Virginia Tech.
- Christophel, Jesse, 2003, *Adiabatic Effectiveness Measurements for Blade Hub Cooling*, Mechanical Engineering, Virginia Tech.
- Knost, Daniel, 2003, *Endwall Film-Cooling for a First Vane*, Mechanical Engineering, Virginia Tech.
- Ebeling, Chris, 2003, *Tube Wall Heat Transfer Coefficients for Compact Heat Exchangers*, Mechanical Engineering Department, Virginia Tech.
- Gratton, Andrew, 2003, *Heat Transfer Coefficients on a Contoured Vane*, Mechanical Engineering, Virginia Tech.
- Ranson, William, 2004, *Adiabatic Effectiveness Measurements of Leakage Flows Near the Hub Region of Gas Turbine Engines*, Mechanical Engineering, Virginia Tech.
- Prausa, Jeffrey, 2004, *Heat Transfer Coefficient and Adiabatic Effectiveness Measurements for an Internal Turbine Vane Cooling Feature*, Mechanical Engineering, Virginia Tech.
- Morris, Angela, 2005, *Experimental and Computational Study of a Turbine Blade Tip with a Shelf*, Mechanical Engineering, Virginia Tech (University Turbine Systems Fellowship Recipient).

- Elder, Erin, 2005, *Advance Cooling Concepts*, Mechanical Engineering, Virginia Tech (recipient of a Virginia Space Grant Fellowship).
- Walsh, Scott, 2005, *Effects of Sand Ingestion on the Film-Cooling of Turbine Blades*, Mechanical Engineering, Virginia Tech (University Turbine Systems Fellowship Recipient).
- Sanders, Paul, 2005, *Effects of Louver Length and Vortex Generators to Augment Tube Wall Heat Transfer in Louvered Fin Heat Exchangers*, Mechanical Engineering, Virginia Tech.
- Cardwell, Nick, 2005, *Effects of Gap Leakages on Endwall Film-Cooling*, Mechanical Engineering, Virginia Tech (1st Place Presentation for the Paul E. Torgersen Graduate Student MS Research Excellence Award; University Turbine Systems Fellowship Recipient).
- Brumbaugh, Scott, 2006, *Development of a Methodology to Measure Aerodynamic Forces on Pin Fins in Channel Flow*, Mechanical Engineering, Virginia Tech.
- Lyall, Evan, 2006, *Heat Transfer for Low Aspect Ratio Pin Fins*, Mechanical Engineering, Virginia Tech.
- Lawson, Michael, 2006, *Practical Applications of Delta Winglets in Compact Heat Exchangers with Louvered Fins*, Mechanical Engineering, Virginia Tech.
- Land, Cam, 2006, *Effects of Sand Ingestion on the Cooling of Turbine Blade Outer Air Seals*, Mechanical Engineering, Virginia Tech.
- Carullo, Jeff, 2006, *Effects of Freestream Turbulence, Turbulence Length Scale, and Reynolds Number on Turbine Blade Heat Transfer in a Transonic Cascade*, Mechanical Engineering, Virginia Tech.
- Lawson, Seth, 2007, *Heat Transfer from Multiple Row Arrays of Low Aspect Ratio Pin Fins*, Mechanical Engineering, Virginia Tech.
- Thrift, Alan, 2007, *Aerodynamic Force and Pressure Loss Measurements on Low Aspect Ratio Pin Fin Arrays*, Mechanical Engineering Department, Virginia Tech.
- Lynch, Steve, 2007, *Endwall Heat Transfer and Shear Stress for a Nozzle Guide Vane with Fillets and a Leakage Interface*, Mechanical Engineering, Virginia Tech (1st Place Poster for the Paul E. Torgersen Graduate Student Research Excellence Award).
- Ostaneck, Jason, 2008, *Establishing a Methodology for Resolving Convective Heat Transfer from Complex Geometries*, Mechanical Engineering, Penn State.
- Musgrove, Grant, 2009, *Computational Predictions and Experimental Measurements of the Performance of a Louver Particle Separator for Use in Gas Turbine Engines*, Mechanical Engineering, Penn State.
- Neely, Gaelyn, 2009, *Heat Transfer and Friction Factor Augmentation in Rib Turbulated Flow*, Mechanical Engineering, Penn State.
- Weaver, Steve, 2010, *Heat Transfer and Pressure Drop Augmentation in Micro Channels with Pin Fins*, Mechanical Engineering, Penn State.
- Breneman, Duane, 2011, *Dirt Plugging in a Seal Pin Geometry*, Mechanical Engineering, Penn State.
- Eberly, Molly, 2012, *Shaped Film Cooling Studies at High Density Ratios*, Mechanical Engineering, Penn State.
- Kirsch, Katie, 2013, *Pin Fin Surface Heat Transfer in Arrays of Oblong-Shaped Pin Fins*, Mechanical Engineering, Penn State.

Whitfield, Chris, 2013, *High Density Ratio Film Cooling*, Mechanical Engineering, Penn State.

Shrager, Adam, 2017, *Flowfield Measurements Relative to Dilution Jets in a Combustor*, Mechanical Engineering, Penn State.

Huelsmann, Nathan, 2020, *Effects of Jet Impingement on Convective Heat Transfer and Discharge Coefficients in Effusion Holes*, Mechanical Engineering, Penn State.

Cory, Trevor, 2020, *Dust Feed and Weave Topology Effects in Gas Turbine Cooling*, Mechanical Engineering, Penn State.

Creer, Riley, 2020, *Impact of Dilution Jets on Combustor Liner Static Pressure and Effusion Cooling*, Mechanical Engineering, Penn State.

Edelson, Ryan, 2021, *Wave Topology Effects on Gas Turbine Cooling Technology*, Mechanical Engineering, Penn State.

Bollapragada, Sudhakar, 2022, *Additively Manufactured Tip Shoes for an Industrial Gas Turbine Engine: Manufacturing and Structural Integrity Assessment*, Additive Manufacturing and Design, Penn State

Fallon, Brandon, 2022, *Dirt Mitigation Techniques in Double-Walled Combustor Liners*, Mechanical Engineering, Penn State

Masters of Science Advisees

Justin Wolff, Additive Manufacturing and Design, Penn State

Kelsey McKormack, Mechanical Engineering, Penn State

Ethan Bonn, Mechanical Engineering, Penn State

Kyle McFerran, Mechanical Engineering, Penn State

Liam Boyd, Mechanical Engineering, Penn State

Diplom Advisees

J. Sauer, *Development of a High Freestream Turbulence Generator*, Diplom Arbeit, 1996.

M. Schwaenen, *Simulations of Pin Fin Arrays*, Diplom Arbeit, 2005.

Undergraduate Senior Honor Theses and Research Supervised

Nikki Matson, 1996, University of Wisconsin

Brian Kang, 1997, University of Wisconsin

Will Colban 2001, Virginia Tech (NSF Graduate Fellowship Honorable Mention)

Jesse Christophel, 2002, Virginia Tech

William Ranson, 2003, Virginia Tech

Andrew Graham, 2003, Virginia Tech (NSF Graduate Fellowship Recipient)

Scott Walsh, 2003, Virginia Tech (University Turbine Systems Fellowship Recipient)

Joe Scrittore 2003, Virginia Tech (University Turbine Systems Fellowship Recipient)

Kaitlin Keim, 2004, 2004-05, Virginia Tech

Elizabeth Hoppe, 2005, Virginia Tech

Betsy Thompson, 2005, Virginia Tech

Jason Ostanek, 2005, Virginia Tech (SMART Fellowship Recipient)

Benjamin Cruz-Perez (Univ of Puerto Rico-Mayaguez), 2007, Penn State

Josuan Hilerio-Sánchez (Univ of Puerto Rico-Mayaguez), 2007, Penn State

John Lucena Jimenez (Univ of Puerto Rico-Mayaguez), 2008, Penn State
 Scott Fishbone, 2010, BS Honors, Penn State, *Measurements of Thermal Conductivity*
 Elizabeth Donofrio, 2010, Penn State, *Measurements of Pin Fin Heat Transfer*
 Jacob Snyder, 2013, Penn State, *Development of a CO2 Sensing Device*
 Shane Haydt, 2013, Penn State, *Pin Fin Spacing Visualization*
 Carly Seneca, 2013, Penn State, *Pin Fin Shape Effects*
 Mimi Overbaugh, 2013, Penn State, *Attachment Methods for Thermocouples*
 Jeffrey Glusman, 2013, Penn State, *Simulating Roughness Effects for Film Cooling*
 Kate Fersten, 2016-17, Penn State, *Additive Manufactured Pin Fin Studies*
 Jackie Trautman, 2017, Penn State, *Additive Manufactured Component Testing*
 Carolyn Orth, 2017, BS Honors, Penn State, *Comparison of Various Additive Manufacturing Processes*
 Sara Fox, 2022, BS Honors, Penn State, *Dirt Deposition on AM Parts*
 Haylee Wormer, 2020, Penn State, *Pressure Drop Characteristics in Supply Pipes to START*

Non-Tenure Faculty, Staff, and Post Doctorate Supervision

Leland Tien, Research Engineering, Steady Thermal Aero Research Turbine (START) Lab,
 June 2022-present
 Scott Fishbone, Project Manager, Steady Thermal Aero Research Turbine (START) Lab,
 July 2018-present
 Mike Barringer, Research Associate Professor, Steady Thermal Aero Research Turbine
 (START) Lab, January 2007-present
 Reid Berdanier, Research Associate Professor, Steady Thermal Aero Research Turbine
 (START) Lab, July 2016-present
 Jeremiah Bunch, Research Engineering Technician, Steady Thermal Aero Research Turbine
 (START) Lab, July 2016 - present
 Jay Neal, Project Manager, Steady Thermal Aero Research Turbine (START) Lab, July
 2016-2018
 David Johnson, Research Associate, Steady Thermal Aero Research Turbine (START) Lab,
 October 2012-Dec 2017
 Andrew Coward, Research Associate, Steady Thermal Aero Research Turbine (START)
 Lab, October 2012-2015
 Ting Wang, Visiting Professor from Shanghai Jiao Tong University, *Studies in Particle-Gas
 Flows*, August 2010-May 2011
 Nick Cardwell, Post-Doctorate from Virginia Tech, *Time-Resolved Digital Particle Image
 Velocimetry Studies in Ribbed Channels*, January 2010-May 2010
 Narayan Sundaram, Post-Doctorate from Virginia Tech, *Investigation of Gaps on Turbine
 Endwall Flows*, July 2008-April 2009
 Mike Barringer, Post Doctorate from Virginia Tech, *Studies in Three-Dimensional
 Boundary Layers*, September 2005 – December 2006
 Satoshi Hada, Visiting Scholar from Mitsubishi Heavy Industries, *Simulations of Vane
 Gaps and Slots*, January 2004 – December 2004

PATENTS

Apparatus and Method for Inhibiting Radial Transfer of Core Gas Flow within a Core Gas Flow Path of a Gas Turbine Engine, US Patent 6,419,446

Apparatus and Method for Inhibiting Radial Transfer of Core Gas Flow within a Core Gas Flow Path of a Gas Turbine Engine, European Patent 00306649.5-231

Systems and Methods for Determining Heat Transfer Characteristics, US Patent 8,104,953

Cooling arrangement for a turbine engine component, US Patent 9,145,779

Cooling Holes of Turbines, US Patent 201,514,880,900

Cooling Holes of Turbines, European Patent 16192670.4-1610

TECHNICAL CONTRIBUTIONS

Peer Reviewed Study Reports and Congressional Testimonies

Examining R&D Pathways to Sustainable Aviation, March 2021, U.S. House of Representatives Committee on Science, Space & Technology: Subcommittee on Space and Aeronautics, invited presentation: <https://www.youtube.com/watch?v=1b0gouZ2rd0>

Commercial Aircraft Propulsion and Energy Systems Research: Reducing the Global Carbon Emissions, National Academies of Sciences, Engineering, Medicine, committee member, https://sites.nationalacademies.org/DEPS/ASEB/DEPS_161178

Advanced Technologies for Gas Turbines, National Academies of Sciences, Engineering, Medicine, committee co-chair, https://sites.nationalacademies.org/DEPS/ASEB/DEPS_190328

Book Chapters

- 4 Thole, K. A., 2022, "From Watching Planes in the Sky to Making Turbines More Efficient," *Women in Mechanical Engineering – Energy & Environment* (Springer).
- 3 Bogard, D. G. and Thole, K. A., 2007, "Gas Turbine Film Cooling," *Turbine Science and Technology* (AIAA Progress in Astronautics and Aeronautics: AIAA).
- 2 Bogard, D. G., and Thole, K. A., 1998, "Wall Bounded Turbulent Flows," *CRC Handbook of Fluid Dynamics* (Boca Raton: Chemical Rubber Company, CRC Press) Section 13.5, pp. 13.49 - 13.63.
- 1 Bogard, D. G., and Thole, K. A., 1998, "Coherent Structures," *CRC Handbook of Fluid Dynamics* (Boca Raton: Chemical Rubber Company, CRC Press) Section 13.4, pp. 13.40 - 13.48.

Peer Reviewed Journal Publications

(Thole ranks first for publishing the most papers in the *Journal of Turbomachinery* since 1999, which has a 20-30% acceptance rate. Note many of the journal papers listed are also presented as conference papers at TurboExpo. Google Citations > 11,500; H-Index = 62)

- 161 Gutierrez, D., Yoon, C., Furgeson, M. T., Veley, E., Bogard, D. G., Thole, K. A.,
 “Evaluation of Adjoint Optimized Holes – Part I Baseline Performance,” *Journal of Turbomachinery* <https://doi-org.ezaccess.libraries.psu.edu/10.1115/1.4056390>
- 160 Veley, E., Thole, K. A., Furgeson, M. T., Bogard, D. G., 2023, “Printability and Overall Cooling Performance of Additive Manufactured Holes with Inlet and Exit Rounding,” *Journal of Turbomachinery*, vol. 145 (3), pp. 031017
- 159 Corbett, T. M., Thole, K. A., Sudhakar, B., 2023, “Impacts of Pin Fin Shape and Spacing on Heat Transfer and Pressure Losses,” *Journal of Turbomachinery*, vol. 145 (5), pp. 051014.
- 158 DeShong, E. T., Berdanier, R. A., and Thole, K. A., 2023, “Predictive Modelling of Local Film-Cooling Flow on a Turbine Rotor Blade,” *Journal of Turbomachinery*, vol. 145 (4), pp. 041014.
- 157 Wildgoose, A. J., Thole, K. A., Subramanian, R., Kersting, L., Kulkarni, A., 2023, “Impacts of the Additive Manufacturing Process on the Roughness of Engine Scale Vanes and Cooling Channels,” *Journal of Turbomachinery*, vol. 145 (4), pp 041013.
- 156 Corbett, T. M., Thole, K. A., Sudhakar, B., 2023, “Amplitude and Wavelength Effects for Wavy Channels”, *Journal of Turbomachinery*, vol. 145(3), pp. 031011.
- 155 Edelson, R. and Thole, K. A., 2023, “Impact of Ceramic Matrix Composite Topology on Overall Effectiveness,” *Journal of Turbomachinery*, vol. 145 (3), pp. 0311016.
- 154 Rozman, M., DeShong, E. T., Thole, K. A., Berdanier, R. A., Robak, C., 2023, “Characterizing Flow Instabilities During Transient Events in the Turbine Rim Seal Cavity,” *Journal of Turbomachinery*, vol. 145(3), pp. 031014.
- 153 Costa, H., Profito, F., Zhang, X., and Thole, K. A., 2022, “Optimizing the surface of manufactured components for friction, adhesion, and convective heat transfer,” *MRS Bulletin*, MRSB-D-22-00180R1.
- 152 Monge-Concepcion, I., Berdanier, R. A., Barringer, M. D., Thole, K. A., 2023, “Use of Multiple Tracer Gases to Quantify Vane Trailing Edge Flow into Turbine Rim Seals,” *Journal of Turbomachinery*, vol. 145 (1), pp. 011006.
151. Schroeder, R. P., and Thole, K. A., 2022, “Adiabatic Effectiveness Measurements for a Baseline Shaped Film Cooling Hole,” *Journal of Turbomachinery*, vol. 144 (12), pp. 121003.
- 150 Wilkins, P. H., Lynch, S. P., Thole, K. A., Vincent, T., Quach, S., and Kaufman, E., 2022, “Experimental Investigation into the Effect of a Ceramic Matrix Composite Surface on Film Cooling,” *Journal of Turbomachinery*, vol. 144(12), pp. 121006.
- 149 DeShong, E. T., Peters, B., Paynabar, K., Gebraeel, N., Thole, K. A., Berdanier, R. A., “Applying Infrared Thermography as a Methods for On-Line Monitoring of Turbine Blade Coolant Flow,” *J of Turbomachinery*, vol. 144(1), pp. 111009.
- 148 Monge-Concepción, I, Siroka, S., Berdanier, R. A., Barringer, M. B., Thole, K. A. and Robak, C., 2022, “Influence of Vane Trailing Edge Flow on the Formation of Cavity Cells and Rim Sealing” *Journal of Turbomachinery*, vol. 144(6), pp. 061014.

- 147 Wilkins, P. H., Lynch, S. P., Thole, K. A., Vincent, T., Quach, S., Mongillo, D., 2022, "Effect of Ceramic Matrix Composite Surface on Film Cooling," *Journal of Turbomachinery*, vol. 144(8), pp. 081014.
- 146 Siroka, S., Berdanier, R. A., Thole, K. A., 2022, "Development of Coated Heat Flux Gauges for Fast Responding Measurements," *Measurement Science and Technology*, vol. 33, pp. 045104.
- 145 Siroka, S., Berdanier, R. A., Thole, K. A., 2022, "Two-Layer Transient Heat Transfer Using Impulse Response Methods," *International Journal of Heat and Mass Transfer*, vol. 187 (15), pp. 122511.
- 144 DeShong, E, Peters, B., Berdanier, R., Thole, K., Paynabar, K. and Gabraeel, N., 2022, "Correlating Time-Resolved Pressure Measurements with Rim Sealing Effectiveness for Real-Time Turbine Health Monitoring", *J of Turbomachinery*, vol. 144 (6), pp. 061004.
- 143 Cory, T., Edelson, R., and Thole, K. A., Tyler, V., Quach, S. and Mongillo, D., 2022, "Impact of Ceramic Matrix Composite Topology on Friction Factor and Heat Transfer," *J of Turbomachinery*, vol 144 (3), pp. 031003.
- 142 DeShong, E., Siroka, S., Berdanier, R., Thole, K. A., 2022, "Evaluating the Influence of Rotor-Casing Eccentricity on Turbine Efficiency Including Time-Resolved Flow Field Measurements," *J of Turbomachinery*, vol. 144 (2), pp. 021012.
- 141 Stafford, G., McClain, S., Hanson, D.R., Kunz, R. F., Thole, K. A., 2022, "Convection in Scaled Turbine Internal Cooling Passages with Additive Manufacturing Roughness," *J of Turbomachinery*, vol. 144(4), pp. 041008.
- 140 Thole, K. A., Lynch, S. P., Wildgoose, A., 2021, "Review of Advances in Convective Heat Transfer Developed through Additive Manufacturing" *Adv in Heat Transfer*, vol. 53, pp. 249-325.
- 139 Siroka, S., Foley, B., Berdanier, R. A., Thole, K. A., 2021, "Application of 3-omega method for thin-film heat flux gauge calibration," *Measurement Science and Technology*, vol. 32, No. 11, pp. 114001.
- 138 Leung, S. L., Hargrove, B., Marsh, E., Gregg, A., & Thole, K., 2020, "Prompting by COVID-19 to Rethink the Purpose of Engineering Laboratory Education - Develop Practical Competence to Solve Real-World Problem," *Advances in Engineering Education*, 8(4).
- 137 McClain, S. T., Hanson, D. R., Cinnamon, E., Snyder, J. C., Kunz, R. F., Thole, K. A., 2021, "Flow in a Simulated Turbine Blade Cooling Channel with Spatially Varying Roughness Caused by Additive Manufacturing Orientation," *Journal of Turbomachinery*, vol. 143(7), pp. 071013.
- 136 Wildgoose, A. J., Thole, K. A., Sanders, P. Wang, L., 2021, "Impact of Additive Manufacturing on Internal Cooling Channels with Varying Diameters and Build Directions," *Journal of Turbomachinery*, vol. 143 (7), pp. 071003.
- 135 Huelsmann, N. C., Thole, K. A., 2021, "Effects of Jet Impingement on Convective Heat Transfer in Effusion Holes," *Journal of Turbomachinery*, vol. 143 (6), pp. 061011.

- 134 Wilkins, P. H., Lynch, S. P., Thole, K. A., Quach, S., Vincent, T., 2021, “Experimental Heat Transfer and Boundary Layer Measurements on a Ceramic Matric Composite Surface,” *Journal of Turbomachinery*, vol. 143 (6), pp. 061010, <https://doi.org/10.1115/1.4050314>.
- 133 Knisely, B. F., Berdanier, R. A., Thole, K. A., Haldeman, C. W., Markham, J. R., Cosgrove, J. E., Carlson, A. E., Scire, J. J., 2021, “Acquisition and Processing Considerations for Infrared Images of Rotating Turbine Blades,” *Journal of Turbomachinery*, vol. 143 (4), pp. 041013.
- 132 Berdanier, R. A., DeShong, E. T., Thole, K. A., Robak, 2021 “Evaluating the Effects of Transient Purge Flow on Stator-Rotor Seal Performance,” *Journal of Turbomachinery*, vol. 143(2), pp. 021006.
- 131 Snyder, J. C. and Thole, K. A., 2020, “Tailoring Surface Roughness Using Additive Manufacturing to Improve Internal Cooling,” *Journal of Turbomachinery*, vol. 142(7), pp. 071004.
- 130 Monge-Concepción, I, Berdanier, R. A., Barringer, M. B., Thole, K. A. and Robak, C., 2020, “Evaluating the Effect of Vane Trailing Edge Flow on Turbine Rim Sealing” *Journal of Turbomachinery*, vol. 142(8), pp. 081001.
- 129 Snyder, J. C. and Thole, K. A., 2020, “Performance of Public Film Cooling Geometries Produced through Additive Manufacturing” *Journal of Turbomachinery*, vol. 142(5), pp. 051009.
- 128 Snyder, J. C. and Thole, K. A., 2020, “Effect of Additive Manufacturing Process Parameters on Turbine Cooling” *Journal of Turbomachinery*, vol. 142(5), pp051007.
- 127 Siroka, S., Berdanier, R. A., Thole, K. A., Chana, K., Haldeman, C. W., and Anthony, R. J., 2020, “Comparison of Thin Film Heat Flux Gauge Technologies Emphasizing Continuous-Duration Operation,” *Journal of Turbomachinery*, vol. 142(9), pp. 091001.
- 126 Berdanier, R. A., Monge-Concepcion, I., Knisely, B. F., Barringer, M., Thole, K. A., Grover, E., 2019, “Scaling Sealing Effectiveness in a Stator-Rotor Cavity for Differing Blade Spans,” *Journal of Turbomachinery*, Vol. 141 (5), pp. 051007.
- 125 Kirsch, K. and Thole, 2018, “Numerical Optimization, Characterization, and Experimental Investigation of Additively Manufactured Communicating Microchannels” *Journal of Turbomachinery*, Vol. 140 (11), pp. 111003.
- 124 Stimpson, C., Snyder, J., Thole, K. A., and Mongillo, D., 2018 “Effects of Coolant Feed Direction on Additively Manufactured Film Cooling Holes” *Journal of Turbomachinery*, Vol 140(11), pp. 111001.
- 123 Kirsch, K. L. and Thole, K. A., 2018, “Isolating the Effects of Surface Roughness versus Wall Shape in Numerically Optimized, Additively Manufactured Micro Cooling Channels,” *Experimental Thermal and Fluid Science*, Vol. 98, p. 227-238.
- 122 Shrager, A., Thole, K. A., and Mongillo, D., 2018 “Effects of Effusion Cooling Pattern Near the Dilution Hole for a Double-Walled Combustor Liner – Part 1: Overall Effectiveness Measurements”, *Journal of Engineering for Gas Turbines and Power*, Vol. 141 (1), pp. 011022.

- 121 Shrager, A., Thole, K. A., and Mongillo, D., 2018 “Effects of Effusion Cooling Pattern Near the Dilution Hole for a Double-Walled Combustor Liner – Part 2: Flowfield Measurements”, *Journal of Engineering for Gas Turbines and Power*, Vol. 141 (1), pp. 011023.
- 120 Clark, K., Barringer, M., Johnson, D., Thole, K. A., Grover, E., and Robak, C., 2018 “Effects of Purge Flow Configuration on Sealing Effectiveness in a Rotor-Stator Cavity” *Journal of Engineering for Gas Turbines and Power*, vol. 140(11), pp. 112502.
- 119 Town, J., Straub, D. Black, J., Thole, K. A., and Shih, T., 2018 “State-of-the-Art Cooling Technology for a Turbine Rotor Blade,” *Journal of Turbomachinery*, vol. 140 (7), pp. 071007.
- 118 Stimpson, C. K., Snyder, J. C., Thole, K. A., and Mongillo, D., 2017 “Effectiveness Measurements of Additively Manufactured Film Cooling Holes” *Journal of Turbomachinery*, vol. 140(1), pp. 011009.
- 117 Kirsch, K., and Thole, K. A., 2017 “Experimental Investigation of Numerically Optimized Wavy Microchannels Created Through Additive Manufacturing” *Journal of Turbomachinery*, vol. 140(2), pp. 021002.
- 116 Ferster, K., Kirsch, K., and Thole, K. A., 2017 “Effects of Geometry and Spacing in Additively Manufactured Microchannel Pin Fin Arrays” *Journal of Turbomachinery*, vol. 140(1), pp. 011007.
- 115 Kirsch, K. and Thole, K. A., 2017, “Pressure Loss and Heat Transfer Performance for Additively and Conventionally Manufactured Pin Fin Arrays,” *International Journal of Heat and Mass Transfer*, vol. 108, pp. 2502-2513.
- 114 Lynch, S., Thole, K. A., 2017, “Heat Transfer and Film Cooling on a Contoured Blade Endwall with Platform Gap Leakage,” *Journal of Turbomachinery*, vol. 139(5), pp. 051002.
- 113 Clark, K., Barringer, M., Thole, K., Clum, C., Hiester, P., Memory, C., Robak, C., 2016, “Effects of Purge Distribution and Flowrates on Vane Rim Sealing,” *Journal of Engineering for Gas Turbines and Power*, vol. 139(3), pp. 031904.
- 112 Schroeder, R., Thole, K. A., 2016, “Thermal Field Measurements for a Shaped Hole at Low and High Freestream Turbulence Intensity,” *Journal of Turbomachinery*, vol. 139(2), pp. 021012.
- 111 Schroeder, R., Thole, K. A., 2016, “Effect of In-Hole Roughness on Film Cooling from a Shaped Hole,” *Journal of Turbomachinery*, vol. 139(3), pp. 031004.
- 110 Kirsch, K. and Thole, K. A., 2016, “Heat transfer and Pressure Loss Measurements in Additively Manufactured Wavy Microchannels,” *Journal of Turbomachinery*, vol 139(1), pp. 011007 (2016 Best Paper Award for Gas Turbine Heat Transfer).
- 109 Stimpson, C., Snyder, J., Thole, K. A., and Mongillo, D., 2016, “Roughness Effects on Pressure Loss and Heat Transfer of Additively Manufactured Channels,” *Journal of Turbomachinery*, vol. 139(2), pp. 021003. Erratum: 2022, <https://doi.org/10.1115/1.4042129>.
- 108 Schroeder, R. P., and Thole, K. A., 2016, “Effect of High Freestream Turbulence on Flowfields of Shaped Film Cooling Holes,” *Journal of Turbomachinery*, vol. 138, pp 091001.

- 107 Lynch, S., Thole, K. A., 2016, "Comparison of the Three-Dimensional Boundary Layer on Flat Versus Contoured Endwall," *Journal of Turbomachinery*, vol. 138, pp 041008.
- 106 Snyder, J., Stimpson, C., Thole, K. A., and Mongillo, D., 2016, "Build Direction Effects on Additively Manufactured Channels," *Journal of Turbomachinery*, vol. 138, pp 051006.
- 105 Stimpson, C., Snyder, J., Thole, K. A., and Mongillo, D., 2016, "Roughness Effects on Flow and Heat Transfer for Additively Manufactured Channels," *Journal of Turbomachinery*, vol. 138, pp. 051008.
- 104 Mensch, A., Thole, K. A., 2016, "Effects of Non-axisymmetric Endwall Contouring and Film Cooling on the Passage Flowfield in a Linear Turbine Cascade," *Experiments in Fluids*, DOI 10.1007/s00348-015-2093-5, vol 57:1.
- 103 Mensch, A. and Thole, K. A., 2015, "Overall Effectiveness and Flowfield Measurements for an Endwall with Non-Axisymmetric Contouring," *Journal of Turbomachinery*, vol. 138, pp 031007.
- 102 Snyder, J. C., Stimpson, C. K., Thole, K. A., Mongillo, D. J., 2015, "Build Direction Effects on Micro-Channel Tolerance and Surface Roughness," *Journal of Mechanical Design*, vol. 137, pp. 111714.
- 101 Whitfield, C. A., Schroeder, R. P., Thole, K. A., Lewis, S. D., 2015, "Blockage Effects from Simulated Thermal Barrier Coatings for Cylindrical and Shaped Holes," *Journal of Turbomachinery*, vol. 137, pp 091004.
- 100 Mensch, A. and Thole, K., 2015, "Simulations of Multiphase Particle Deposition on a Gas Turbine Endwall with Impingement and Film Cooling," *Journal of Turbomachinery*, vol. 137, pp 111002.
- 99 Mensch, A. E. and Thole, K. A., 2015, "Conjugate Heat Transfer Analysis of the Effects of Impingement Channel Height for a Turbine Blade Endwall," *International Journal of Heat and Mass Transfer*, vol. 82C, pp. 66-77.
- 98 Kirsch, K. L. and Thole, K. A., 2015 "Heat Transfer Measurements of Oblong Pins," *Journal of Turbomachinery*, vol. 137, pp 071004.
- 97 Mensch, A. and Thole, K. A., Craven, B., 2014, Conjugate Heat Transfer Measurements and Predictions of a Blade Endwall with a Thermal Barrier Coating," *Journal of Turbomachinery*, vol. 136, pp. 121003.
- 96 Mensch, A. and Thole, K. A., 2014, "Overall Effectiveness of a Blade Endwall with Jet Impingement and Film Cooling," *Journal of Engineering for Gas Turbines and Power*, vol. 136, pp. 031901.
- 95 Eberly, M. K. and Thole, K. A., 2013, "Time-Resolved Film-Cooling Flows at High and Low Density Ratios," *Journal of Turbomachinery*, vol. 136, pp. 061003 (Best Paper Award for Gas Turbine Heat Transfer).
- 94 Kirsch, K.L., Ostanek, J. K., and Thole, K. A., 2013, "Comparison of Pin Surface Heat Transfer in Arrays of Oblong and Cylindrical Pin Fins," *Journal of Turbomachinery*, vol. 136, pp 041015.
- 93 Barringer, M., Thole, K. A., Krishnan, V., Landrum, E., 2013, "Manufacturing Influences on Pressure Losses of Channel Fed Holes," *Journal of Turbomachinery*, vol. 136, pp. 051012.

- 92 Thrift, A. A., Thole, K. A., Hada, S., 2013, "Impact of the Combustor-Turbine Interface Slot Orientation on the Durability of a Nozzle Guide Vane Endwall," *Journal of Turbomachinery*, vol. 135, pp. 041019.
- 91 Lawson, S., Lynch, S., and Thole, K. A., 2013, "Simulations of Multi-Phase Particle Deposition on a Non-Axisymmetric Contoured Endwall with Film-Cooling," *Journal of Turbomachinery*, vol. 135, pp. 031032.
- 90 Barringer, M.D., Thole, K. A., Breneman, D. L., Tham, K-M, and Laurello, V., 2013, "Effects of Centrifugal Forces on Particle Deposition for a Representative Seal Pin Between Two Blades," *Journal of Engineering for Gas Turbines and Power*, vol. 135, pp. 032601.
- 89 Musgrove, G. O., Thole, K. A., Grover, E., and Barker, J., 2012, "Performance Measurements of a Unique Louver Particle Separator for Gas Turbine Engines," *Journal of Engineering for Gas Turbines and Power*, vol. 135, pp. 012001.
- 88 Thrift, A. A., Thole, K. A., Hada, S., 2012, "Effects of Orientation and Position of the Combustor-Turbine Interface Gap on the Cooling of a Vane Endwall," *Journal of Turbomachinery*, vol. 123, pp 061019.
- 87 Ostanek, J., Thole, K. A., 2012, "Effect of Streamwise Spacing on Periodic and Random Unsteadiness in a Bundle of Short Cylinders Confined in a Channel," *Experiments in Fluids*, vol. 53, pp. 1779-1796.
- 86 Lawson, S. and Thole, K. A., 2012, "Simulations of Multi-Phase Particle Deposition on Endwall Film-Cooling Holes in Transverse Trenches, 2012," *Journal of Turbomachinery*, vol. 134, pp. 051040.
- 85 Lawson, S., Thole, K. A., Okita, Y. and Nakamata, C., 2012, "Simulations of Multi-Phase Particle Deposition on a Showerhead with Staggered Film-Cooling Holes," *Journal of Turbomachinery*, vol. 134, pp. 051041.
- 84 Thrift, A. A. and Thole, K. A., 2012, "Influence of Flow Injection Angle on a Leading-Edge Horseshoe Vortex," *International Journal of Heat and Mass Transfer*, vol. 55, pp 4651-4664.
- 83 Ostanek, J. K. and Thole, K. A., 2012, "Wake Development in Staggered Short Cylinder Arrays within a Channel," *Experiments in Fluids*, vol. 53, pp. 673-697.
- 82 Ostanek, J. and Thole, K. A., 2012, "Flowfield Measurements in a Single Row of Low Aspect Ratio Pin-Fins," *Journal of Turbomachinery*, vol. 134, pp 051034.
- 81 Lawson, S. A. and Thole, K. A., 2012, "Simulations of Multi-Phase Particle Deposition on Endwall Film-Cooling," *Journal of Turbomachinery*, vol. 134, pp. 011003.
- 80 Cardwell, N. D., Vlachos, P. P., and Thole, K. A., 2011, "A Multi-Parametric Particle Pairing Algorithm for Particle Tracking in Single and Multiphase Flows," *Measurement Science and Technology*, vol. 22, 105406.
- 79 Lawson, S. A., Thrift, A. A., Thole, K. A., Kohli, A., 2011 "Heat Transfer from Multiple Row Arrays of Low Aspect Ratio Pin Fins," *International Journal of Heat and Mass Transfer*, vol. 54, pp. 4099-4109.
- 78 Weaver, S., Barringer, M., Thole, K. A., 2011, "Micro Channels with Manufacturing Roughness Levels," *Journal of Turbomachinery*, vol. 134, pp. 041014.

- 77 Thrift, A. A., Thole, K. A., Hada, S., 2011, "Effects of an Axisymmetric Contoured Endwall on a Nozzle Guide Vane: Adiabatic Effectiveness Measurements," *Journal of Turbomachinery*, vol. 133, pp. 041007.
- 76 Thrift, A. A., Thole, K. A., Hada, S., 2011, "Effects of an Axisymmetric Contoured Endwall on a Nozzle Guide Vane: Heat Transfer Measurements," *Journal of Turbomachinery*, vol. 133, pp. 041008.
- 75 Lynch, S. and Thole, K. A., 2011, "The Effect of the Combustor-Turbine Slot and Mid-Passage Gap on Vane Endwall Heat Transfer," *Journal of Turbomachinery*, vol. 133, pp. 041002.
- 74 Lynch, S. P., Thole, K. A., Kohli, A., Lehane, C., 2011, "Computational Predictions of Heat Transfer and Film-Cooling for a Turbine Blade with Non-Axisymmetric Endwall Contouring," *Journal of Turbomachinery*, vol. 133, pp. 041003.
- 73 Cardwell, N. D., Vlachos, P. P., Thole, K. A., 2011, "A Method for Identifying and Visualizing Foreign Particle Motion Using Time Resolved Particle Tracking Velocimetry," *Journal of Turbomachinery*, vol. 133, pp. 021021.
- 72 Lawson, S. A. and Thole, K. A., 2011, "Effects of Simulated Particle Deposition on Film Cooling," *Journal of Turbomachinery*, vol. 133, pp. 021009 (Best Paper Award for Gas Turbine Heat Transfer).
- 71 Carullo, J., Nasir, S., Ng, W., Thole, K., Wu, H., Moon, H. K., 2011 "The Effects of Large Scale High Freestream Turbulence, and Exit Reynolds Number on Turbine Vane Heat Transfer in a Transonic Cascade," *Journal of Turbomachinery*, vol. 131, pp. 011030.
- 70 Hada, S. and Thole, K. A., 2011, "Computational Study of a Midpassage Gap and Upstream Slot on Vane Endwall Film-Cooling," *Journal of Turbomachinery*, vol. 133, pp. 011024.
- 69 Lynch, S. P., Sundaram, N., Thole, K. A., Kohli, A., Lehane, C., 2011, "Heat Transfer for a Turbine Blade with Non-Axisymmetric Endwall Contouring," *Journal of Turbomachinery*, vol. 133, pp. 011019.
- 68 Colban, W., Thole, K. A., Bogard, D., 2011, "A Film Cooling Correlation for Shaped Holes on a Flat-Plate Surface," *Journal of Turbomachinery*, vol. 133, pp. 011002.
- 67 Lyall, M. E., Thrift, A. A., Thole, K. A., and Kohli, A., 2011, "Heat Transfer from Low Aspect Ratio Pin Fins," *Journal of Turbomachinery*, vol. 133, pp. 011001.
- 66 Cardwell, N. D., Vlachos, P. P., Thole, K. A., 2011, "Developing and Fully Developed Turbulent Flow in Ribbed Channels," *Experiments in Fluids*, vol. 50, pp. 1357-1371.
- 65 Thrift, A. A., Brumbaugh, S., Thole, K. A., Kohli, A., 2010, "A Methodology to Measure Aerodynamic Forces on Cylinders in Channel Flow," *Journal of Fluids Engineering*, vol. 132, pp. 081401.
- 64 Ostanek, J., Thole, K. A., Prausa, J., and Van Suetendael, A., 2010, "Establishing a Methodology for Resolving Convective Heat Transfer from Complex Geometries," *Journal of Turbomachinery*, vol. 132, pp. 031014.
- 63 Land, C., Thole, K. A., Joe, C., 2010, "Considerations of a Double-Wall Cooling Design to Reduce Sand Blockage," *Journal of Turbomachinery*, vol. 132, pp. 031011.
- 62 Cardwell, N. D., Burd, S. W., Thole, K. A., 2010, "Investigation of Sand Blocking within Impingement and Film-Cooling Holes," *Journal of Turbomachinery*, vol. 132, pp. 021020.

- 61 Nasir, S., Carullo, J., Ng, W., Thole, K. A., Wu, H. Zhang, L., Moon, H., 2009, "Effects of Large Schale High Freestream Turbulence and Exit Reynolds Number on Turbine Vane Heat Transfer in a Transonic Rig," *Journal of Turbomachinery*, vol. 131, pp. 021021.
- 60 Sundaram, N. and Thole, K. A., 2009, "Film-Cooling Flowfields with Trenched Holes on an Endwall," *Journal of Turbomachinery*, vol. 131, pp. 041007.
- 59 Barringer, M., Thole, K. A., and Polanka, M. D., 2009, "Effects of Combustor Exit Profiles on High Pressure Turbine Vane Aerodynamics and Heat Transfer," *Journal of Turbomachinery*, vol. 131, pp. 021008.
- 58 Barringer, M. D., Thole, K. A., and Polanka, M.D., 2009, "An Experimental Study of Combustor Exit Profile Shapes on Endwall Heat Transfer in High Pressure Turbine Vanes," *Journal of Turbomachinery*, vol. 131, pp. 021009.
- 57 Barringer, M.D., Thole, K. A., Polanka, M. D., Clark, J. P., and Koch, P. J., 2009, "Migration of Combustor Exit Profiles Through High Pressure Turbine Vanes," *Journal of Turbomachinery*, vol. 131, pp. 021010.
- 56 Lynch, S. P. and Thole, K. A., 2008, "The Effect of Combustor-Turbine Interface Gap Leakage on the Endwall Heat Transfer for a Nozzle Guide Vane," *Journal of Turbomachinery*. vol. 130, pp. 041019.
- 55 Sundaram, N. and Thole, K. A., 2008, "Bump and Trench Modifications to Film-Cooling Holes at the Vane Endwall Junction," *Journal of Turbomachinery*. vol. 130, pp. 041013.
- 54 Sundaram, N., Barringer, M. D., and Thole, K. A., 2008, "Effects of Deposits on Film Cooling of a Vane Endwall Along the Pressure Side," *Journal of Turbomachinery*, vol. 130, pp. 0410006.
- 53 Colban, W., Thole, K. A., and Haendler, M., 2008, "A Comparison of Cylindrical and Fan-Shaped Film-Cooling Holes on a Vane Endwall at Low and High Freestream Turbulence Levels," *Journal of Turbomachinery*, vol. 130, pp. 031007.
- 52 Lawson, M. and Thole, K. A., 2008, "Heat Transfer Augmentation along the Tube Wall of a Louvered Fin Heat Exchanger Using Practical Delta Winglets," *International Journal of Heat and Mass Transfer*, vol. 51, pp. 2346-2360.
- 51 Cardwell, N., Sundaram, N., and Thole, K. A., 2007, "The Effects of Varying the Combustor-Turbine Gap," *Journal of Turbomachinery*, vol. 129, pp. 756-764. (Best Paper Award for Gas Turbine Heat Transfer)
- 50 Sundaram, N. and Thole, K. A., 2007, "Effects of Surface Deposition, Hole Blockage, and TBC Spallation on Vane Endwall Film-Cooling," *Journal of Turbomachinery*, vol. 129, pp. 599-607.
- 49 Scrittore, J., Thole, K. A., and Burd, S., 2007, "Investigation of Velocity Profiles for Effusion Cooling of Combustor Liners," *Journal of Turbomachinery*, vol. 129, pp. 518-526.
- 48 Colban, W., Thole, K. A., and Haendler, M., 2007, "Experimental and Computational Comparisons of Fan-Shaped Film-Cooling on a Turbine Vane Surface," *Journal of Turbomachinery*, vol. 129, pp. 23-31.
- 47 Barringer, M. D., Thole, K. A., and Polanka, M. D., 2007, "Experimental Evaluation of an Inlet Profile Generator for High-Pressure Turbine Tests," *Journal of Turbomachinery*, vol. 129, pp. 382-393.

- 46 Colban, W. and Thole, K. A., 2007, "Influence of Hole Shape on the Performance of a Turbine Vane Endwall Film-Cooling Scheme," *International Journal of Heat and Fluid Flow*, vol. 28, Issue 3, pp. 341-356.
- 45 Sanders, P. and Thole, K. A., 2006, "Effects of Winglets to Augment Tube Wall Heat Transfer in Louvered Fin Heat Exchangers," *International Journal of Heat and Mass Transfer*, vol. 49, Issue 21-22, pp. 4058-4069.
- 44 Sewall, E. A., Tafti, D. K., Graham, A., Thole, K. A., 2006, "Experimental Validation of Large Eddy Simulations of Flow and Heat Transfer in a Stationary Ribbed Duct," *International Journal of Heat and Fluid Flow*, vol. 27, Issue 2, pp. 243-258. (top 10 cited paper from 2005-2010 in the *International Journal of Heat and Fluid Flow*)
- 43 Bogard, D. G. and Thole, K. A., 2006, "Gas Turbine Film Cooling," *AIAA Journal of Propulsion* (invited review paper), vol. 22, pp. 249-271.
- 42 Colban, W., Gratton, A., Thole, K. A., and Haendler, M., 2006, "Heat Transfer and Film-Cooling Measurements on a Stator Vane with Fan-Shaped Cooling Holes," *Journal of Turbomachinery*, vol. 128, pp. 53-61.
- 41 Cardwell, N., Sundaram, N., and Thole, K. A., 2006, "Effects of Roughness and Mid-Passage Gap on Endwall Film Cooling," *Journal of Turbomachinery*, vol. 128, pp. 62-70.
- 40 Thole, K. A. and Knost, D., 2005, "Heat Transfer and Film-Cooling for the Endwall of a First Stage Turbine Vane," *International Journal of Heat and Mass Transfer*, vol. 48, issues 25-26, pp. 5255-5269.
- 39 Ranson, W., Thole, K. A., and Cunha, F., 2005, "Adiabatic Effectiveness Measurements and Predictions of Leakage Flows Along a Blade Endwall," *Journal of Turbomachinery*, vol. 127, pp. 609-618.
- 38 Pang, Y., Scott, E. P., Chen, J. Z., and Thole, K. A., 2005, "Electrical and Thermal Layout Design and Optimization Considerations for DPS Active IPEM," *Journal of Electronic Packaging*, vol. 127, pp. 59-66.
- 37 Christophel, J. R., Thole, K., and Cunha, F., 2005, "Cooling the Tip of a Turbine Blade Using Pressure Side Holes—Part 2: Heat Transfer Measurements," *Journal of Turbomachinery*, vol. 127, pp. 278-286.
- 36 Christophel, J. R., Thole, K., and Cunha, F., 2005, "Cooling the Tip of a Turbine Blade Using Pressure Side Holes—Part 1: Film Effectiveness Measurements," *Journal of Turbomachinery*, vol. 127, pp. 270-277.
- 35 Christophel, J. R., Couch, E., Thole, K., and Cunha, F., 2005, "Measured Adiabatic Effectiveness and Heat Transfer for Blowing from the Tip of a Turbine Blade," *Journal of Turbomachinery*, vol. 127, pp. 251-262.
- 34 Knost, D. G., and Thole, K. A., 2005, "Adiabatic Effectiveness Measurements of Endwall Film-Cooling for a First Stage Vane," *Journal of Turbomachinery*, vol. 127, pp. 297-305.
- 33 Couch, E., Christophel, J. R., Hohlfield, E., Thole, K. and Cunha, F., 2005, "Comparison of Measurements and Predictions for Blowing from the Tip of a Turbine Blade," *AIAA Journal of Propulsion and Power*, vol. 21, no. 2, pp. 335-343.
- 32 Stephan, R. and Thole, K. A., 2005, "Optimization Study Relevant to Louvered Fin Compact Heat Exchangers," *International Journal of Compact Heat Exchangers*, Vol. VI, no. 1, 73-92.

- 31 Hohlfeld, E., Couch, E., Christophel, J. and Thole, K. A., 2005, "Predictions of Cooling from Dirt Purge Holes Along the Tip of a Turbine Blade," *International Journal of Turbo and Jet Engines*, vol. 22, pp. 139-152.
- 30 Vakil, S. and Thole, K. A., 2005, "Flow and Thermal Field Measurements in a Combustor Simulator Relevant to a Gas Turbine Aero-Engine," *Journal of Engineering for Gas Turbines and Power*, vol. 127, pp. 257-26730.
- 29 Knost, D. and Thole, K. A., 2005, "Computational Predictions of Endwall Film-Cooling for a First Stage Vane," *International Journal of Turbo and Jet Engines*, vol. 22, pp. 41-58.
- 28 Lethander, A. and Thole, K. A., 2004, "Optimizing the Vane-Endwall Junction to Reduce Adiabatic Wall Temperatures in a Turbine Vane Passage," *AIAA Journal of Propulsion and Power*, vol. 20, pp. 1105-1116.
- 27 Ebeling, C., and Thole, K. A., 2004, "Measurements and Predictions of the Heat Transfer at the Tube-Fin Junction for Louvered Fin Heat Exchangers," *International Journal of Compact Heat Exchangers*, vol. V, pp. 265-286.
- 26 Stitzel, S. and Thole, K. A., 2004, "Flow Field Computations of Combustor-Turbine Interactions Relevant to a Gas Turbine Engine," *Journal of Turbomachinery*, vol. 126, pp.122-129.
- 25 Colban, W. F., Lethander, A. T., Thole, K. A., and Zess, G., 2002, "Combustor-Turbine Interface Studies: Part 2: Flow and Thermal Field Measurements," *Journal of Turbomachinery*, vol. 125, pp.203-209.
- 24 Colban, W. F., Thole, K. A., and Zess, G., 2002, "Combustor-Turbine Interface Studies: Part 1: Endwall Measurements," *Journal of Turbomachinery*, vol. 125, pp.193-202.
- 23 Hermanson, K. and Thole, K. A., 2002, "Effect on Non-Uniform Inlet Conditions on Endwall Secondary Flows," *Journal of Turbomachinery*, vol. 124, pp. 623-631.
- 22 Barringer, M. D., Richard, O. T., Walter, J. P., Stitzel, S. M., and Thole, K. A., 2002, "Flow Field Simulations of a Gas Turbine Combustor," *Journal of Turbomachinery*, vol. 124, pp. 508-516.
- 21 Lyman, A. C., Stephan, R. A., and Thole, K. A., Zhang, L., Memory, S., 2002 "Scaling of Heat Transfer Coefficients Along Louvered Fins," *Experimental Thermal Fluid Science*, vol. 26, no. 5 pp 547-563.
- 20 Zess, G. A. and Thole, K. A., 2002, "Computational Design and Experimental Evaluation of Using a Leading Edge Fillet on a Gas Turbine Vane," *Journal of Turbomachinery*, vol. 124, no. 2, pp. 167-175.
- 19 Thole, K. A., Radomsky, R., Kang, B., and Kohli, A., 2002, "Elevated Freestream Turbulence Effects on Heat Transfer for a Gas Turbine Vane," *International Journal of Heat and Fluid Flow*, vol. 23, pp. 137-147.
- 18 Radomsky, R. and Thole, K. A., 2002, "Detailed Boundary Layer Measurements on a Turbine Stator Vane at Elevated Freestream Turbulence Levels," *Journal of Turbomachinery*, vol. 124, pp. 107-118.
- 17 Harrington, M., McWaters, M., Bogard, D., Lemmon, C., and Thole, K. A., 2001, "Full-Coverage Film Cooling with Short Normal Injection Holes," *Journal of Turbomachinery*, vol. 123, pp. 798-805.
- 16 Radomsky, R., and Thole, K. A., 2000, "High Freestream Turbulence Effects in the Endwall Leading Edge Region," *Journal of Turbomachinery*, vol. 122, pp. 699-708.

- 15 Radomsky, R., and Thole, K. A., 2000, "Measurements and Predictions of a Highly Turbulent Flowfield in a Turbine Vane Passage," *Journal of Fluids Engineering*, vol. 122, pp. 666-676.
- 14 Hermanson, K., and Thole, K. A., 2000, "Effect of Mach Number on Secondary Flow Characteristics," *International Journal of Turbo and Jet Engines*, vol. 17, pp. 179-196.
- 13 Hermanson, K., and Thole, K.A., 2000, "Effect of Inlet Profiles on Endwall Secondary Flows," *Journal of Propulsion and Power*, vol. 16, no. 2, pp 286-296.
- 12 Kang, M., and Thole, K. A., 2000, "Flowfield Measurements in the Endwall Region of a Stator Vane," *Journal of Turbomachinery*, vol. 122, pp. 458-466.
- 11 Radomsky, R., and Thole, K. A., 2000, "Flowfield Measurements for a Highly Turbulent Flow in a Stator Vane Passage," *Journal of Turbomachinery*, vol. 122, no. 2, pp. 255-262.
- 10 Springer, M.E., and Thole, K. A., 1999, "Entry Region of Louvered Fin Heat Exchangers," *Experimental Thermal and Fluid Science*, vol. 19, pp. 223-232.
- 9 Kang, M., Kohli, A., and Thole, K. A., 1999, "Heat Transfer and Flowfield Measurements in the Leading Edge Region of a Stator Vane Endwall," *Journal of Turbomachinery*, vol. 121, pp. 558-568.
- 8 Springer, M., and Thole, K. A., 1998, "Experimental Design for Flowfield Studies of Louvered Fins," *Experimental Thermal and Fluid Science*, vol. 18, no. 3, pp. 258-269.
- 7 Thole, K. A., Gritsch, M., Schulz, A., and Wittig, S., 1998, "Flowfield Measurements for Cooling Holes with Expanded Exits," *Journal of Turbomachinery*, vol. 120, no. 2, pp. 327-336.
- 6 Thole, K. A., Gritsch, M., Schulz, A., Wittig, S., 1997, "Effects of a Crossflow at the Entrance to a Film-Cooling Hole," *Journal of Fluids Engineering*, vol. 119, no. 3, pp. 533-540.
- 5 Thole, K. A., and Bogard, D. G., 1996, "High Freestream Turbulence Effects on Turbulent Boundary Layers," *Journal of Fluids Engineering*, vol. 118, no. 2, pp. 276-284.
- 4 Laudon, M. F., Thole, K. A., Engelstad, R. L., Resnick, D. J., Cummings, K. D., and Dauksher, W. J., 1995, "Thermal Analysis of X-ray Membrane in a Plasma Environment," *Journal of Vacuum Science Technology B*, vol. 13, no. 6, pp. 3050-3054.
- 3 Thole, K. A., and Bogard, D. G., 1995, "Enhanced Heat Transfer and Skin Friction due to High Freestream Turbulence," *Journal of Turbomachinery*, vol. 117, no. 3, pp. 418-424.
- 2 Thole, K. A., and Bogard, D. G., 1994, "A Technique for Simultaneous Temperature and Velocity Measurements," *Measurement Science and Technology*, vol. 5, pp. 435-439.
- 1 Thole, K. A., Bogard, D. G. and Whan-Tong, J., 1994, "Generating High Freestream Turbulence Levels," *Experiments in Fluids*, vol. 17, pp. 375-380.

Publications Accepted/Under Review

- Knisely, B. F., Berdanier, R. A., Wagner, J. H., Thole, K. A., Arisi, A. N., and Haldeman, C. W., "Effects of Part-to-Part Flow Variations on Overall Effectiveness and Life of Rotating Turbine Blades," *Journal of Turbomachinery (accepted for publication)*
- Wildgoose, A. and Thole, K. A., "Heat Transfer and Pressure Loss of Additively Manufactured Internal Cooling Channels with Various Shapes," *Journal of Turbomachinery (under review)*

Wildgoose, A. and Thole, K. A., “Variability in Additively Manufactured Turbine Cooling Features,” *Journal for Global Propulsion and Power Society (Invited Review Paper under review)*

Peer Reviewed Conference Publications

(* Indicates also published in the Journal with a 20% acceptance rate to the Journal)

- 178 Atland, S., Yang, X., Thole, K. A., Kunz, R., McClain, S. “Application of a Distributed Element Roughness Model to Additively Manufactured Internal Cooling Channels,” GT2022-81218.
- 177 Corbett, T. M., Thole, K. A., Sudhakar, B., “Amplitude and Wavelength Effects for Wavy Channels”, GT2022-78356*.
- 176 Corbett, T. M., Thole, K. A., Sudhakar, B., “Impacts of Pin Fin Shape and Spacing on Heat Transfer and Pressure Losses,” GT2022-82673*.
- 175 DeShong, E. T., Berdanier, R. A., and Thole, K. A., “Predictive Modelling of Local Film-Cooling Flow on a Turbine Rotor Blade,” GT 2022-82507*.
- 174 Edelson, R. and Thole, K. A., “Impact of Ceramic Matrix Composite Topology on Overall Effectiveness,” GT 2022-82326*.
- 173 Furgeson, M. T., Veley, E. M., Yoon, C., Gutierrez, D., Bogard, D. G., and Thole, K. A., “Development and Evaluation of Shaped Film Cooling Holes Designed for Additive Manufacturing,” GT2022-83201.
- 172 Gutierrez, D., Yoon, C., Furgeson, M. T., Veley, E. M., Bogard, D. G., and Thole, K. A., “Evaluation of Adjoint Optimized Hole – Part I Baseline Performance,” GT2022-83436*.
- 171 Knisely, B. F., Berdanier, R. A., Wagner, J. H., Thole, K. A., Arisi, A. N., and Haldeman, C. W., “Effects of Part-to-Part Flow Variations on Overall Effectiveness and Life of Rotating Turbine Blades,” GT2022-83216*.
- 170 Monge-Concepcion, I., Berdanier, R. A., Barringer, M. D., Thole, K. A., “Use of Multiple Tracer Gases to Quantify Vane Trailing Edge Flow into Turbine Rim Seals,” GT2022-83247.*
- 169 Rozman, M., DeShong, E. T., Thole, K. A., Berdanier, R. A., Robak, C., “Characterizing Flow Instabilities During Transient Events in the Turbine Rim Seal Cavity,” GT2022-82664.
- 168 Veley, E., Thole, K. A., Furgeson, M. T., Bogard, D. G., “Printability and Overall Cooling Performance of Additive Manufactured Holes with Inlet and Exit Rounding,” GT2022-83313*.
- 167 Wildgoose, A. and Thole, K. A., “Heat Transfer and Pressure Loss of Additively Manufactured Internal Cooling Channels with Various Shapes,” GT2022-82298.
- 166 Wildgoose, A. J., Thole, K. A., Subramanian, R., Kersting, L., Kulkarni, A., “Impacts of the Additive Manufacturing Process on the Roughness of Engine Scale Vanes and Cooling Channels,” GT2022-84603*.
- 165 Wilkins, P. H., Lynch, S. P., Thole, K. A., Vincent, T., Quach, S., and Kaufman, E., “Experimental Investigation into the Effect of a Ceramic Matrix Composite Surface on Film Cooling,” GT2022-83109.*
- 164 Winegardner, A., Lemay, A., Lynch, S., Thole, K., and O’Connor, J., “Energy and the University: The Role of Gas Turbines in US Universities and Strategies for Enhancing Energy Literacy,” GT2022-83102.
- 163 Berdanier, R. A., Fishbone, S., Thole, K. A., Brogan, J., Mantese, J., Martin, T., Caldwell, D., Kulkarni, A., Subramanian, R., Emerson, B., Lieuwen, T., 2021, “Sensor Integration on

- Additively Manufactured Hot Section Components for Wireless Gas Turbine Prognostics,” AIAA Propulsion and Energy Conference, AIAA-2021-3474.
- 162 Thole, K. A., Barringer, M.D., Berdanier, R. A., Fishbone, S., Wagner, J. H., Dennis, R., Black, J., Burke, P., Straub, D., O’Neill, F., Stimpson, C. K., Riahi, A., Aggarwala, A., Bradshaw, S., Kohli, A., Mongillo, D., and Praisner, T., Rodriguez, J., Fox, M., and Kim, Y. W., 2021, “Defining a Testbed for the U.S. Turbine Industry: The National Experimental Turbine (NExT)”, AIAA Propulsion and Energy Conference, AIAA-2021-3489.
- 161 Leung, S. L., Marsh, E. R., Lynch, S., Brennan, S. N., Sommer, H. J., Cortes, D., Foley, B., Mongeau, J.-M., Wong, T. S., & Thole, K. A., 2021, “A New Approach to Equip Students to Solve 21st-Century Global Challenges: Integrated Problem-Based Mechanical Engineering Laboratory,” <https://peer.asee.org/36597>, ASEE Annual Conference & Exposition.
- 160 Gregg, A., Berdanier, C., and Thole, K. A., 2021, “Theoretical and Applied Perspectives on Online Graduate Engineering Education: Learning-Centered Vision, Administration, and Course Design,” <https://peer.asee.org/37907>, ASEE Annual Conference & Exposition, Long Beach, California.
- 159 Gregg, A., Marsh, E., and Thole, K. A., 2021, “Augmenting Traditional ME Curriculum with Digital Badge Microcredentials,” <https://peer.asee.org/36734>, ASEE Annual Conference & Exposition.
- 158 Winkelman, B., Kurz, R., Voss, D., and Thole, K. A., “Collaboration Between Academia and Industry to Advance Industrial Gas Turbines,” GT2021-14168.
- 157 Cory, T., Edelson, R., and Thole, K. A., “Impact of Ceramic Matrix Composite Topology on Friction Factor and Heat Transfer,” GT2021-59588*.
- 156 Creer, R. and Thole, K. A., “Influence of Opposing Dilution Jets on Effusion Cooling,” GT2021-59429.
- 155 DeShong, E., Siroka, S., Berdanier, R., Thole, K. A. “Evaluating the Influence of Rotor-Casing Eccentricity on Turbine Efficiency Including Time-Resolved Flow Field Measurements,” GT2021-59112*.
- 154 DeShong, E., Peters, B., Berdanier, R., Thole, K. A., Paynabar, K., and Gebraeel, N. “Correlating Time-Resolved Pressure Measurements with Rim Sealing Effectiveness for Real-Time Turbine Health Monitoring,” GT2021-59586*.
- 153 Ivan Monge-Concepcion, Shawn Siroka, Reid Berdanier, Michael Barringer, Thole, K., Chris Robak, 2021, Unsteady Turbine Rim Sealing and Vane Trailing Edge Flow Effects,” GT2021-59273.
- 152 Siroka, S., Monge-Concepcion, I., Berdanier, R., Barringer, M., Thole, K., Robak, C., Correlating Cavity Sealing Effectiveness to Time-Resolved Rim Seal Events in the Presence of Vane Trailing Edge Flow,” GT2021-59285.
- 151 Stafford, G., McClain, S., Hanson, D.R., Kunz, R. F., Thole, K. A., “Convection in Scaled Turbine Internal Cooling Passages with Additive Manufacturing Roughness,” GT2021-59684*.
- 150 Wilkins, P. H., Lynch, S. P., Thole, K. A., Quach, S., Vincent, T., and Mongillo, D., “Effect of Ceramic Matrix Composite Surface on Film Cooling,” GT2021-59602*.
- 149 Knisely, B. F., Berdanier, R. A., Thole, K. A., Haldeman, C. W., Markham, J. R., Cosgrove, J. E., Carlson, A. E., Scire, J. J., “Acquisition and Processing Considerations for Infrared Images of Rotating Turbine Blades,” International Gas Turbine and Aeroengine Congress and Exposition, GT2020-15522*.

- 148 Wildgoose, A. J., Thole, K. A., Sanders, P. Wang, L., “Impact of Additive Manufacturing on Internal Cooling Channels with Varying Diameters and Build Directions,” International Gas Turbine and Aeroengine Congress and Exposition, GT2020-15049*.
- 147 Huelsmann, N. C., Thole, K. A., “Effects of Jet Impingement on Convective Heat Transfer in Effusion Holes,” International Gas Turbine and Aeroengine Congress and Exposition, GT2020-15577*.
- 146 Wilkins, P. H., Lynch, S. P., Thole, K. A., Quach, S., Vincent, T., “Experimental Heat Transfer and Boundary Layer Measurements on a Ceramic Matrix Composite Surface,” International Gas Turbine and Aeroengine Congress and Exposition, GT2020-15053*.
- 145 McClain, S. T., Hanson, D. R., Cinnamon, E., Snyder, J. C., Kunz, R. F., Thole, K. A., “Flow in a Simulated Turbine Blade Cooling Channel with Spatially Varying Roughness Caused by Additive Manufacturing Orientation,” International Gas Turbine and Aeroengine Congress and Exposition, GT2020-14809*.
- 144 Siroka, S., Berdanier, R. A., Thole, K. A., Chana, K., Haldeman, C. W., and Anthony, R. J., 2019 “Comparison of Thin Film Heat Flux Gauge Technologies Emphasizing Continuous-Duration Operation,” International Gas Turbine and Aeroengine Congress and Exposition, Phoenix, AZ, GT2019-91817.*
- 143 Berdanier, R. A., DeShong, E. T., Thole, K. A. Robak, C., 2019 “Evaluating the Effects of Transient Purge Flow on Stator-Rotor Seal Performance,” International Gas Turbine and Aeroengine Congress and Exposition, Phoenix, AZ, GT2019-91654.
- 142 Monge-Concepcion, I., Berdanier, R. A., Barringer, M. D., Thole, K. A., Robak, C., 2019 “Evaluating the Effect of Vane Trailing Edge Flow on Turbine Rim Sealing” International Gas Turbine and Aeroengine Congress and Exposition, Phoenix, AZ, GT2019-91576.
- 141 Cory, Trevor, Kirsch, K. L., Thole, K. A., Lundgreen, R., Prenter, R., Kramer, S., 2019 “Impact of Dust Feed on Capture Efficiency and Deposition Patterns in a Double-Walled Liner” International Gas Turbine and Aeroengine Congress and Exposition, Phoenix, AZ, GT2019-90981.
- 140 Robak, C., Faghri, A. and Thole, K. A., 2019 “Analysis of Gas Turbine Rim Cavity Ingestion with Axial Purge Flow Injection” International Gas Turbine and Aeroengine Congress and Exposition, Phoenix, AZ, GT2019-91807.
- 139 Hanson, D. R., McClain, S. T., Snyder, J. C., Kunz, R. F., and Thole, K. A., 2019 “Flow in a Scaled Turbine Coolant Channel with Roughness Due to Additive Manufacturing” International Gas Turbine and Aeroengine Congress and Exposition, Phoenix, AZ, GT2019-90931.
- 138 Snyder, J. C. and Thole, K. A., 2019 “Performance of Public Film Cooling Geometries Produced through Additive Manufacturing” International Gas Turbine and Aeroengine Congress and Exposition, Phoenix, AZ, GT2019-90877.*
- 137 Snyder, J. C. and Thole, K. A., 2019 “Effect of Additive Manufacturing Process Parameters on Turbine Cooling” International Gas Turbine and Aeroengine Congress and Exposition, Phoenix, AZ, GT2019-90862.*
- 136 Stimpson, C. K., Snyder, J. C., Thole, K. A., and Mongillo, D., 2018 “Effects of Coolant Feed Direction on Additively Manufactured Film Cooling Holes” International Gas Turbine and Aeroengine Congress and Exposition, Oslo, Norway, GT2018-77287.*
- 135 Shrager, A. and Thole, K. A., 2018 “Effects of Effusion Cooling Pattern Near the Dilution Hole for a Double-Walled Combustor Liner—Part 2: Flowfield Measurements,”

- International Gas Turbine and Aeroengine Congress and Exposition, Oslo, Norway, GT2018-77290.*
- 134 Shrager, A. and Thole, K. A., 2018 “Effects of Effusion Cooling Pattern Near the Dilution Hole for a Double-Walled Combustor Liner—Part 1: Overall Effectiveness Measurements,” International Gas Turbine and Aeroengine Congress and Exposition, Oslo, Norway, GT2018-77288.*
- 133 Berdanier, R. A., Monge-Concepcion, I., Knisely, B. F., Barringer, M., Grover, E., 2018, “Scaling Sealing Effectiveness in a Stator-Rotor Cavity for Differing Blade Spans,” International Gas Turbine and Aeroengine Congress and Exposition, Oslo, Norway, GT2018-77105.*
- 132 Kirsch, K. and Thole, K. A., 2018 “Numerical Optimization, Characterization, and Experimental Investigation of Additively Manufactured Communicating Microchannels,” International Gas Turbine and Aeroengine Congress and Exposition, Oslo, Norway, GT2018-75429.*
- 131 Kirsch, K. L., Snyder, J. C., Stimpson, C. K., Thole, K. A., and Mongillo, D., 2017, “Repeatability in Performance of Micro Cooling Geometries Manufactured with Laser Powder Bed Fusion,” 53rd AIAA/SAE/ASME Joint Propulsion Conference, Atlanta, GA, pp. 1–14. (Best Paper Award)
- 130 Town, J., Straub, D. Black, J., Thole, K. A., and Shih, T., 2017 “State-of-the-Art Cooling Technology for a Turbine Rotor Blade,” International Gas Turbine and Aeroengine Congress and Exposition, Charlotte, S. C., GT2017-64728.*
- 129 Stimpson, C. K., Snyder, J. C., Thole, K. A., and Mongillo, D., 2017 “Effectiveness Measurements of Additively Manufactured Film Cooling Holes” International Gas Turbine and Aeroengine Congress and Exposition, Charlotte, S. C., GT2017-64903. *
- 128 Kirsch, K., and Thole, K. A., 2017 “Experimental Investigation of Numerically Optimized Wavy Microchannels Created Through Additive Manufacturing” International Gas Turbine and Aeroengine Congress and Exposition, Charlotte, S. C., GT2017-64943.*
- 127 Ferster, K., Kirsch, K., and Thole, K. A., 2017 “Effects of Geometry and Spacing in Additively Manufactured Microchannel Pin Fin Arrays” International Gas Turbine and Aeroengine Congress and Exposition, Charlotte, S. C., GT2017-63442.*
- 126 Clark, K., Barringer, M., Johnson, D., Thole, K. A., Grover, E., and Robak, C., 2017 “Effects of Purge Flow Configuration on Sealing Effectiveness in a Rotor-Stator Cavity” International Gas Turbine and Aeroengine Congress and Exposition, Charlotte, S. C., GT2017-63910.*
- 125 Michael Alley, Christine Haas, and Karen Thole, 2016, “Engineering Ambassadors Network: Progress in 2015 on Creating a National Network of Ambassadors,” *2016 ASEE National Conference* New Orleans, LA.
- 124 Kirsch, K. and Thole, K.A., “Heat transfer and Pressure Loss Measurements in Additively Manufactured Wavy Microchannels,” International Gas Turbine and Aeroengine Congress and Exposition, Seoul, S. Korea, GT2016-56510.*

- 123 Stimpson, C., Snyder, J., Thole, K. A., and Mongillo, D., "Scaling Roughness Effects on Pressure Loss and Heat Transfer of Additively Manufactured Channels," International Gas Turbine and Aeroengine Congress and Exposition, Seoul, S. Korea, GT2016-58093.*
- 122 Schroeder, R., Thole, K. A., "Effect of In-Hole Roughness on Film Cooling from a Shaped Hole," International Gas Turbine and Aeroengine Congress and Exposition, Seoul, S. Korea, GT2016-56978.*
- 121 Schroeder, R., Thole, K. A., "Thermal Field Measurements for a Shaped Hole at Low and High Freestream Turbulence Intensity," International Gas Turbine and Aeroengine Congress and Exposition, Seoul, S. Korea, GT2016-56967.*
- 120 Gibson, J., Thole, K. A., Christophel, J., Memory, C., Praisner, T., "Pressure Distortion Effects on Rim Seal Performance in a Linear Cascade," International Gas Turbine and Aeroengine Congress and Exposition, Seoul, S. Korea, GT2016-58098.
- 119 Clark, K., Barringer, M., Thole, K. A., Clum, C., Hiester, P., Memory, C., Robak, C., "Using a Tracer Gas to Quantify Sealing Effectiveness for Engine Realistic Rim Seals," International Gas Turbine and Aeroengine Congress and Exposition, Seoul, S. Korea, GT2016-58095.
- 118 Clark, K., Barringer, M., Thole, K., Clum, C., Hiester, P., Memory, C., Robak, C., "Effects of Purge Distribution and Flowrates on Vane Rim Sealing," International Gas Turbine and Aeroengine Congress and Exposition, Seoul, S. Korea, GT2016-58099.*
- 117 Michael Alley, Christine Haas, and Karen Thole, 2015, "Engineering Ambassadors Network: Progress in 2014 on Creating a National Network of Ambassadors," *2015 ASEE National Conference*. Seattle, WA.
- 116 Lynch, S., Thole, K. A., 2016, "Comparison of the Three-Dimensional Boundary Layer on Flat Versus Contoured Endwall," International Gas Turbine and Aeroengine Congress and Exposition, Montreal, Canada, GT2015-1245.*
- 115 Mensch, A. and Thole, K. A., "Overall Effectiveness and Flowfield Measurements for an Endwall with Non-Axisymmetric Contouring," International Gas Turbine and Aeroengine Congress and Exposition, Montreal, Canada, GT2015-42706.*
- 114 Schroeder, R. P., and Thole, K. A., "Effect of High Freestream Turbulence on Flowfields of Shaped Film Cooling Holes," International Gas Turbine and Aeroengine Congress and Exposition, Montreal Canada, GT2015-43339.*
- 113 Snyder, J., Stimpson, C., Thole, K. A., and Mongillo, D., "Build Direction Effects on Additively Manufactured Channels," International Gas Turbine and Aeroengine Congress and Exposition, Montreal Canada, GT2015-43935.*
- 112 Stimpson, C., Snyder, J., Thole, K. A., and Mongillo, D., "Roughness Effects on Flow and Heat Transfer for Additively Manufactured Channels," International Gas Turbine and Aeroengine Congress and Exposition, Montreal Canada, GT2015-43940.*
- 111 Gibson, J. and Thole, K. A., "Effects of the Main Gas Path Pressure Field on Rim Seal Flows in a Stationary Linear Cascade," International Gas Turbine and Aeroengine Congress and Exposition, Montreal Canada, GT2015-43517.
- 110 Michael Alley, Christine Haas, and Karen Thole, 2016, "Engineering Ambassadors Network: Progress in 2013 on Creating a National Network of Ambassadors," *2014 ASEE National Conference*. Indianapolis, IN.

- 109 Mensch, A. and Thole, K., "Simulations of Multiphase Particle Deposition on a Gas Turbine Endwall with Impingement and Film Cooling," IMECE2014-36682 (recipient of the W. M. Rohsenow Prize for Best Presentation for the Gas Turbine Heat Transfer Committee). *
- 108 Barringer, M. D., Coward, A. C, Clark, K., Thole, K. A., Schmitz, J., Wagner, J., Alvin, M. A., Burke, P., Dennis, R., "Development of a Steady Aero Thermal Research Turbine (START) for Studying Secondary Flow Leakages and Airfoil Heat Transfer," International Gas Turbine and Aeroengine Congress and Exposition, Dusseldorf, Germany, GT2014-25570.
- 107 Mensch, A., Thole, K. A., Craven, B. A., "Conjugate Heat Transfer Measurements and Predictions of a Blade Endwall with a Thermal Barrier Coating," International Gas Turbine and Aeroengine Congress and Exposition, Dusseldorf, Germany, GT2014-25436. *
- 106 Whitfield, C. A., Schroeder, R. P., Thole, K. A., Lewis, S. D., "Blockage Effects from Simulated Thermal Barrier Coatings for Cylindrical and Shaped Holes," International Gas Turbine and Aeroengine Congress and Exposition, Dusseldorf, Germany, GT2014-25576. *
- 105 Schroeder, R. P., and Thole, K. A., "Adiabatic Effectiveness Measurements for a Baseline Shaped Film Cooling Hole," International Gas Turbine and Aeroengine Congress and Exposition, Dusseldorf, Germany, GT2014-25992.
- 104 Kirsch, K. L. and Thole, K. A., "Heat Transfer Measurements of Oblong Pins," International Gas Turbine and Aeroengine Congress and Exposition, Dusseldorf, Germany, GT2014-25370. *
- 103 Kirsch, K. L., Ostanek, J. K., Thole, K. A., and Kaufman, E., "Heat Transfer Measurements for Pin Fin Arrays Row Removal," International Gas Turbine and Aeroengine Congress and Exposition, Dusseldorf, Germany, GT2014-25348.
- 102 Barringer, M., Thole, K. A., Krishnan, V., Landrum, E., Sanders, P., "Manufacturing Influences on Pressure Losses of Channel Fed Holes," International Gas Turbine and Aeroengine Congress and Exposition, San Antonio, Texas, GT 2013-95236. *
- 101 Eberly, M. K. and Thole, K. A., "Time-Resolved Film-Cooling Flows at High and Low Density Ratios," International Gas Turbine and Aeroengine Congress and Exposition, San Antonio, Texas, GT 2013-95031. *
- 100 Lynch, S. P., Thole, K. A., Kohli, A., and Lehane, C., "Endwall Heat Transfer for a Turbine Blade with an Upstream Cavity and Rim Seal Leakage," International Gas Turbine and Aeroengine Congress and Exposition, San Antonio, Texas, GT 2013-94942.
- 99 Lynch, S. P., Thole, K. A., Kohli, A., and Lehane, C., "Aerodynamic Loss for a Turbine Blade with Endwall Leakage Features and Contouring," International Gas Turbine and Aeroengine Congress and Exposition, San Antonio, Texas, GT 2013-94943.
- 98 Mensch, A. and Thole, K. A., "Overall Effectiveness of a Blade Endwall with Jet Impingement and Film Cooling," International Gas Turbine and Aeroengine Congress and Exposition, San Antonio, Texas, GT 2013-94165.
- 97 Kirsch, K.L., Ostanek, J. K., and Thole, K. A., "Comparison of Pin Surface Heat Transfer in Arrays of Oblong and Cylindrical Pin Fins," International Gas Turbine and Aeroengine Congress and Exposition, San Antonio, Texas, GT 2013-95146. *
- 96 Ostanek, J. K. and Thole, K.A., "Effects of Non-Uniform Streamwise Spacing in Low Aspect Ratio Pin Fin Arrays," International Gas Turbine and Aeroengine Congress and Exposition, San Antonio, Texas, GT 2013-95889. *

- 95 Hargather, M. J., and Thole, K. A., "Characterization of Flow Through Porous Metals," International Gas Turbine and Aeroengine Congress and Exposition, San Antonio, Texas, GT 2013-94945.
- 94 Hatzell, J., Marshall, M., Alley, M., Thole, K.A., Garner, J., Haas, C., Engel, R., 2013, "Engineering Ambassador Network: Professional Development Programs with an Outreach Focus," American Society of Engineering Education Conference, Atlanta, Georgia.
- 93 Thole, K. A., Marshall, M., Alley, M., Zappe, S., 2013, "Engineering Ambassador Network: Dissemination through an Inaugural National Workshop," American Society of Engineering Education Conference, Atlanta, Georgia.
- 92 Musgrove, G. O., Thole, K. A., Grover, E., and Barker, J., 2012, "Performance Measurements of a Unique Louver Particle Separator for Gas Turbine Engines," International Gas Turbine and Aeroengine Congress and Exposition, Copenhagen, GT2012-69670.*
- 91 Ostanek, J. and Thole, K. A., 2012, "Effects of Aspect Ratio and Spacing in Pin-Fin Arrays," International Gas Turbine and Aeroengine Congress and Exposition, Copenhagen, GT2012-68127.
- 90 Lawson, S., Lynch, S., and Thole, K. A., 2012, "Simulations of Multi-Phase Particle Deposition on a Non-Axisymmetric Contoured Endwall with Film-Cooling," International Gas Turbine and Aeroengine Congress and Exposition, Copenhagen, GT2012-68174.*
- 89 Thrift, A. A., Thole, K. A., Hada, S., 2012, "Impact of the Combustor-Turbine Interface Slot Orientation on the Durability of a Nozzle Guide Vane Endwall," International Gas Turbine and Aeroengine Congress and Exposition, Copenhagen, GT2012-68096.*
- 88 Barringer, M.D., Thole, K. A., Breneman, D. L., Tham, K-M, and Laurello, V., 2012, "Effects of Centrifugal Forces on Particle Deposition for a Representative Seal Pin Between Two Blades," International Gas Turbine and Aeroengine Congress and Exposition, Copenhagen, GT2012-68777.*
- 87 Ostanek, J. and Thole, K. A., 2011, "Flowfield Measurements in a Single Row of Low Aspect Ratio Pin-Fins," International Gas Turbine and Aeroengine Congress and Exposition, Vancouver, GT2011-45757.*
- 86 Thrift, A., Thole, K. A., and Hada, S., 2011, "Effects of Orientation and Position of the combustor-Turbine Interface Gap on the Cooling of a Vane Endwall," International Gas Turbine and Aeroengine Congress and Exposition, Vancouver, GT2011-45507.*
- 85 Lawson, S. and Thole, K. A., 2011, "Simulations of Multi-Phase Particle Deposition on a Showerhead with Staggered Film-Cooling Holes," International Gas Turbine and Aeroengine Congress and Exposition, Vancouver, GT2011-45191.*
- 84 Lawson, S. and Thole, K. A., 2011, "Simulations of Multi-Phase Particle Deposition on Endwall Film-Cooling Holes in Transverse Trenches," International Gas Turbine and Aeroengine Congress and Exposition, Vancouver, GT2011-45190.*
- 83 Marshall, M., Alley, M., Zappe, S., Thole, K., Frecker, M., Engel, R., 2010, "Ambassador Program for Recruiting Girls into Engineering-Appropriate Messages, Messengers, and Modes of Delivery," 40th ASEE/IEEE Frontiers in Engineering Conference, T1A, October 27-30, 2010, Washington, DC.
- 82 Weaver, S., Barringer, M., Thole, K. A., 2010, "Micro Channels with Manufacturing Roughness Levels," International Gas Turbine and Aeroengine Congress and Exposition, Glasgow, GT2010-22976.*

- 81 Thrift, A. A., Thole, K. A., Hada, S., 2010 "Effects of an Axisymmetric Contoured Endwall on a Nozzle Guide Vane: Heat Transfer Measurements," International Gas Turbine and Aeroengine Congress and Exposition, Glasgow, GT2010-22970.*
- 80 Thrift, A. A., Thole, K. A., Hada, S., 2010 "Effects of an Axisymmetric Contoured Endwall on a Nozzle Guide Vane: Adiabatic Effectiveness Measurements," International Gas Turbine and Aeroengine Congress and Exposition, Glasgow, GT2010-22968.*
- 79 Lawson, S. A. and Thole, K. A., 2010, "Simulations of Multi-Phase Particle Deposition on Endwall Film-Cooling," International Gas Turbine and Aeroengine Congress and Exposition, Glasgow, GT2010-22376.*
- 78 Lynch, S. P., Thole, K. A., Kohli, A., Lehane, C., 2010, "Computational Predictions of Heat Transfer and Film-Cooling for a Turbine Blade with Non-Axiymmetric Endwall Contouring," International Gas Turbine and Aeroengine Congress and Exposition, Glasgow, GT2010-22984.*
- 77 Lynch, S. and Thole, K. A., 2009, "The Effect of the Combustor-Turbine Slot and Mid-Passage Gap on Vane Endwall Heat Transfer," International Mechanical Engineering Conference, Orlando, IMECE2009-12847 (recipient of the W. M. Rohsenow Prize for Best Presentation for the Gas Turbine Heat Transfer Committee).*
- 76 Knost, D. G., Thole, K. A., and Duggleby, A., 2009, "Evaluating a Three-Dimensional Slot Design for the Combustor-Turbine Interface," International Gas Turbine and Aeroengine Congress and Exposition, Orlando, GT2009-60168.
- 75 Lawson, S. A. and Thole, K. A., 2009, "The Effects of Simulated Particle Deposition on Film Cooling," International Gas Turbine and Aeroengine Congress and Exposition, Orlando, GT2009-59109.*
- 74 Cardwell, N. D., Vlachos, P. P., Thole, K. A., 2009, "A Method for Identifying and Visualizing Foreign Particle Motion Using Time Resolved Particle Tracking Velocimetry," International Gas Turbine and Aeroengine Congress and Exposition, Orlando, GT2009-60273.*
- 73 Musgrove, G. O., Barringer, M.D., Thole, K. A., Grover, E., Barker, J., 2009, "Computational Design of a Louver Particle Separator for Gas Turbine Engines," International Gas Turbine and Aeroengine Congress and Exposition, Orlando, GT2009-60199.
- 72 Lynch, S. P., Sundaram, N., Thole, K. A., Kohli, A., Lehane, C., 2009, "Heat Transfer for a Turbine Blade with Non-Axisymmetric Endwall Contouring," International Gas Turbine and Aeroengine Congress and Exposition, Orlando, GT2009-60185.*
- 71 Cardwell, N., Vlachos, P., and Thole, K. A., 2008, "Developing and Fully Developed Turbulent Flow in Ribbed Channels," Fluids Engineering Conference, FEDSM2008-55190 (Best Paper).
- 70 Ostanek, J., Thole, K. A., Prausa, J., and Van Suetendael, A., "Establishing a Methodology for Resolving Convective Heat Transfer from Complex Geometries," International Gas Turbine and Aeroengine Congress and Exposition, Berlin, GT2008-51411.*
- 69 Sundaram, N. and Thole, K. A., "Film-Cooling Flowfields with Trenched Holes on an Endwall," International Gas Turbine and Aeroengine Congress and Exposition, Berlin, GT2008-50149.*

- 68 Colban, W., Thole, K. A., Bogard, D., "A Film Cooling Correlation for Shaped Holes on a Flat-Plate Surface," International Gas Turbine and Aeroengine Congress and Exposition, Berlin, GT2008-50121.*
- 67 Land, C., Thole, K. A., Joe, C., "Considerations of a Double-Wall Cooling Design to Reduce Sand Blockage," International Gas Turbine and Aeroengine Congress and Exposition, Berlin, GT2008-50160.*
- 66 Cardwell, N., Thole, K. A., Burd, S., "Investigation of Sand Blocking within Impingement and Film-Cooling Holes," International Gas Turbine and Aeroengine Congress and Exposition, Berlin, GT2008-51351.*
- 65 Nasir, S., Carullo, J., Ng, W., Thole, K., Wu, H., Moon, H. K., "Effects of Large Scale High Freestream Turbulence, and Exit Reynolds Number on Turbine Vane Heat Transfer in a Transonic Cascade," International Mechanical Engineering Congress, Seattle, IMECE 2007-44098.*
- 64 Barringer, M.D., Thole, K. A., Polanka, M. D., Clark, J. P., and Koch, P. J., "Migration of Combustor Exit Profiles Through High Pressure Turbine Vanes," International Gas Turbine and Aeroengine Congress and Exposition, Montreal, GT2007-27157.*
- 63 Barringer, M. D., Thole, K. A., and Polanka, M.D., "An Experimental Study of Combustor Exit Profile Shapes on Endwall Heat Transfer in High Pressure Turbine Vanes," International Gas Turbine and Aeroengine Congress and Exposition, Montreal, GT2007-27156.*
- 62 Sundaram, N. and Thole, K. A., "Bump and Trench Modifications to Film-Cooling Holes at the Vane Endwall Junction," International Gas Turbine and Aeroengine Congress and Exposition, Montreal, GT2007-27132.*
- 61 Sundaram, N., Barringer, M. D., and Thole, K. A., "Effects of Deposits on Film Cooling of a Vane Endwall Along the Pressure Side," International Gas Turbine and Aeroengine Congress and Exposition, Montreal, GT2007-27131.*
- 60 Lynch, S. P. and Thole, K. A., "The Effect of Combustor-Turbine Interface Gap Leakage on the Endwall Heat Transfer for a Nozzle Guide Vane," International Gas Turbine and Aeroengine Congress and Exposition, Montreal, GT2007-27867.*
- 59 Lyall, M. E., Thrift, A. A., Thole, K. A., and Kohli, A., "Heat Transfer from Low Aspect Ratio Pin Fins," International Gas Turbine and Aeroengine Congress and Exposition, Montreal, GT2007-27431.*
- 58 Hada, S. and Thole, K. A., "Effect of the Midpassage Gap Leakage on the Turbine Endwall," Eleventh International Symposium on Transport Phenomena and Dynamics of Rotating Machinery, Hawaii, March 2006.*
- 57 Hada, S. and Thole, K. A., "Computational Study of a Midpassage Gap and Upstream Slot on Vane Endwall Film-Cooling," International Gas Turbine and Aeroengine Congress and Exposition, Barcelona, GT2006-91067.*
- 56 Walsh, S., Thole, K. A., and Joe, C., "Effects of Sand Ingestion on the Blockage of Film-Cooling Holes," International Gas Turbine and Aeroengine Congress and Exposition, Barcelona, GT2006-90067.
- 55 Scrittore, J., Thole, K. A., and Burd, S., "Investigation of Velocity Profiles for Effusion Cooling of a Combustor Liner," International Gas Turbine and Aeroengine Congress and Exposition, Barcelona, GT2006-90532.*

- 54 Barringer, M., Thole, K. A., and Polanka, M., "Experimental Evaluation of an Inlet Profile Generator for High Pressure Turbine Tests," International Gas Turbine and Aeroengine Congress and Exposition, Barcelona, GT2006-90401.*
- 53 Barringer, M., Thole, K. A., and Polanka, M. D., "Effects of Combustor Exit Profiles on High Pressure Turbine Vane Aerodynamics and Heat Transfer," International Gas Turbine and Aeroengine Congress and Exposition, Barcelona, GT2006-90277.*
- 52 Kunze, V., Wolff, M., Barringer, M., Thole, K. A., Polanka, M., "Numerical Insight into Flow and Thermal Patterns within an Inlet Profile Generator Comparing to Experimental Results," International Gas Turbine and Aeroengine Congress and Exposition, Barcelona, GT2006-90276.
- 51 Cardwell, N., Narayan, S., and Thole, K. A. "The Effects of Varying the Combustor-Turbine Gap," International Gas Turbine and Aeroengine Congress and Exposition, Barcelona, GT2006-90089.*
- 50 Colban, W., Thole, K. A., and Haendler, M., "A Comparison of Cylindrical and Fan-Shaped Film-Cooling Holes on a Vane Endwall at Low and High Freestream Turbulence Levels," International Gas Turbine and Aeroengine Congress and Exposition, Barcelona, GT2006-90021.*
- 49 Narayan, S. and Thole, K. A. "Effects of Surface Deposition, Hole Blockage, and TBC Spallation on Vane Endwall Film-Cooling," GT2006-90379.*
- 48 Colban, W., Thole, K. A., and Haendler, M., "Experimental and Computational Comparisons of Fan-Shaped Film-Cooling on a Turbine Vane Surface," International Mechanical Engineering Congress, Orlando, IMECE2005-79596, recipient of the W. M. Rohsenow Prize for Best Presentation for the Gas Turbine Heat Transfer Committee.*
- 47 V. R. Kunze and M. Wolff M. D. Barringer and K. A. Thole M. D. Polanka, "Numerical Modeling of Flow and Thermal Patterns Within a Combustor Simulator," International Gas Turbine and Aeroengine Congress and Exposition, Reno, GT2005-68284.
- 46 Scrittore, J., Thole, K. A., and Burd, S., "Experimental Characterization of Film-Cooling Effectiveness Near Combustor Dilution Holes," International Gas Turbine and Aeroengine Congress and Exposition, Reno, GT2005-68704.*
- 45 Colban, W., Thole, K. A., and Haendler, M., "Heat Transfer and Film-Cooling Measurements on a Stator Vane with Fan-Shaped Cooling Holes," International Gas Turbine and Aeroengine Congress and Exposition, Reno, GT2005-68258.*
- 44 Cardwell, N., Sundaram, N., and Thole, K. A., "Effects of Roughness and Mid-Passage Gap on Endwall Film Cooling," International Gas Turbine and Aeroengine Congress and Exposition, Reno, GT2005-68704.*
- 43 Ranson, W., Thole, K. A., and Cunha, F. "Adiabatic Effectiveness Measurements and Predictions of Leakage Flows Along a Blade Endwall," International Mechanical Engineering Congress, Anaheim, IMECE2004-62021.*
- 42 Barringer, M., Thole, K., and Polanka, M., "Developing a Combustor Simulator for Investigating High Pressure Turbine Aerodynamics and Heat Transfer," International Gas Turbine and Aeroengine Congress and Exposition, Vienna, GT2004-53613.
- 41 Christophel, J. R., Thole, K., and Cunha, F., "Cooling the Tip of a Turbine Blade Using Pressure Side Holes-Part 2: Heat Transfer Measurements," International Gas Turbine and Aeroengine Congress and Exposition, Vienna, GT2004-53254.*

- 40 Christophel, J. R., Thole, K., and Cunha, F., "Cooling the Tip of a Turbine Blade Using Pressure Side Holes-Part 1: Film Effectiveness Measurements," International Gas Turbine and Aeroengine Congress and Exposition, Vienna, GT2004-53251.*
- 39 Christophel, J. R., Couch, E., Thole, K., and Cunha, F., "Measured Adiabatic Effectiveness and Heat Transfer for Blowing from the Tip of a Turbine Blade," International Gas Turbine and Aeroengine Congress and Exposition, Vienna, GT2004-53250.*
- 38 Knost, D. G., and Thole, K. A., "Adiabatic Effectiveness Measurements of Endwall Film-Cooling for a First Stage Vane," International Gas Turbine and Aeroengine Congress and Exposition, Vienna, GT2004-52236.
- 37 Graham, A., and Thole, K. A., "Flowfield Measurements in a Ribbed Channel Relevant to Internal Turbine Blade Cooling," International Gas Turbine and Aeroengine Congress and Exposition, International Gas Turbine and Aeroengine Congress and Exposition, Vienna, GT2004-53361.
- 36 Smith, A. C., Hatchett, J. H., Nix, A. C., Ng, W. F., and Thole, K. A., "Effectiveness of Normal and Angled Slot Cooling," International Gas Turbine and Aeroengine Congress and Exposition, Vienna, GT2004-53248.
- 35 Vakil, S. and Thole, K. A., 2003, "Flow and Thermal Field Measurements in a Combustor Simulator Relevant to a Gas Turbine Aero-Engine," International Gas Turbine and Aeroengine Congress and Exposition, Atlanta, GT-2003-38254.*
- 34 Lethander, A., Thole, K. A., Zess, G., and Wagner, J., "Optimizing the Vane-Endwall Junction to Reduce Adiabatic Wall Temperatures in a Turbine Vane Passage," International Gas Turbine and Aeroengine Congress and Exposition, Atlanta, GT-2003-38940.*
- 33 Stitzel, S. and Thole, K. A., 2003, "Flow Field Computations of Combustor-Turbine Interactions Relevant to a Gas Turbine Engine," International Gas Turbine and Aeroengine Congress and Exposition, Atlanta, GT-2003-38253.*
- 32 Knost, D. and Thole, K. A., 2003, "Computational Predictions of Endwall Film-Cooling for a First Stage Vane," International Gas Turbine and Aeroengine Congress and Exposition, Atlanta, GT-2003-38252.
- 31 Hohlfield, E., Couch, E., Christophel, J. and Thole, K. A., 2003, "Predictions of Cooling from Dirt Purge Holes Along the Tip of a Turbine Blade," International Gas Turbine and Aeroengine Congress and Exposition, Atlanta, GT-2003-38251.*
- 30 Pang, Y. F., Chen, J. Z., Scott, E. P., and Thole, K. A., 2002, "Electrical and Thermal Layout Design and Optimization Considerations for DPS Active IPEM," New Orleans, IMECE2002-33778.
- 29 Nix, A., Smith, A. C., Diller, T. E., Ng, W. F., and Thole, K. A., 2002, "High Intensity, Large Length Scale, Freestream Turbulence Generation in a Transonic Turbine Cascade," International Gas Turbine and Aeroengine Congress and Exposition, Amsterdam, ASME Paper GT-2002-30523.
- 28 Hermanson, K. and Thole, K. A., 2002, "Effect on Non-Uniform Inlet Conditions on Endwall Secondary Flows," International Gas Turbine and Aeroengine Congress and Exposition, Amsterdam, GT-2002-30188.*
- 27 Colban, W. F., Lethander, A., T., Thole, K. A., and Zess, G., 2002, "Combustor-Turbine Interface Studies: Part 2: Flow and Thermal Field Measurements," International Gas Turbine and Aeroengine Congress and Exposition, Amsterdam, GT-2002-30527.*

- 26 Colban, W. F., Thole, K. A., and Zess, G., 2002, "Combustor-Turbine Interface Studies: Part 1: Endwall Measurements," International Gas Turbine and Aeroengine Congress and Exposition, Amsterdam, GT-2002-30526.*
- 25 Harrington, M., McWaters, M., Bogard, D., Lemmon, C., and Thole, K. A. "Full-Coverage Film Cooling with Short Normal Injection Holes," International Gas Turbine and Aeroengine Congress and Exposition, New Orleans, 2001-GT-0130.*
- 24 Radomsky, R. and Thole, K. A., 2001, "Detailed Boundary Layer Measurements on a Turbine Stator Vane at Elevated Freestream Turbulence Levels," International Gas Turbine and Aeroengine Congress and Exposition, New Orleans, 2001-GT-0169.*
- 23 Barringer, M. D., Richard, O. T., Walter, J. P., Stitzel, S. M., and Thole, K. A., 2001, "Flow Field Simulations of a Gas Turbine Combustor," International Gas Turbine and Aeroengine Congress and Exposition, New Orleans, 2001-GT-0170.
- 22 Zess, G. A. and Thole, K. A., 2001, "Computational Design and Experimental Evaluation of Using a Leading Edge Fillet on a Gas Turbine Vane," International Gas Turbine and Aeroengine Congress and Exposition, New Orleans, 2001-GT-0404.*
- 21 Thole, K. A., Radomsky, R., Kang, M., and Kohli, A., 2001, "Elevated Freestream Turbulence Effects on Heat Transfer for a Gas Turbine Vane," Turbulent Heat Transfer Conference, Anchorage, AK, March.
- 20 Radomsky, R., and Thole, K. A., 2000, "High Freestream Turbulence Effects in the Endwall Leading Edge Region," International Gas Turbine and Aeroengine Congress and Exposition, Munich Germany, 2000-GT-201.*
- 19 Lemmon, C., Kohli, A., and Thole, K. A., 1999, "Formation of Counter-Rotating Vortices in Film-Cooling Flows," International Gas Turbine and Aeroengine Congress and Exposition, Indianapolis Indiana, 99-GT-161.
- 18 Radomsky, R. and Thole, K. A., 1999, "Highly Turbulent Flowfield Measurements Around a Stator Vane," International Gas Turbine and Aeroengine Congress and Exposition, Indianapolis Indiana, 99-GT-253.*
- 17 Kang, M., and Thole, K. A., 1999, "Flowfield Measurements in the Endwall Region of a Stator Vane," International Gas Turbine and Aeroengine Congress and Exposition, Indianapolis Indiana, 99-GT-188.*
- 16 Zhang, L. W., Memory, S. B., Wattelet, J. P., Springer, M.E., and Thole, K. A., 1999, "A Combined Experimental and Computational Study of Flowfields in a Louvered Fin Heat Exchanger," VTMS 4, ICE, London United Kingdom.
- 15 Hermanson, K. and Thole, K.A., 1999, "Effect of Inlet Conditions on Endwall Secondary Flows," AIAA Aerospace Meeting, Reno Nevada, AIAA Paper 99-0241.
- 14 Springer, M., and Thole, K. A., Zhang, L. W., Memory, S. B., and Wattelet, J. P., Modine Manufacturing, 1998, "A Combined CFD and LDV Study of Flowfields in Louvered Fin Heat Exchangers," ASME Fluids Engineering Division Meeting, Paper Number FEDSM98-4843.
- 13 Kohli, A., and Thole, K. A., 1998, "Entrance Effects on a Diffused Film-Cooling Hole," International Gas Turbine and Aeroengine Congress and Exposition, Stockholm Sweden, 98-GT-402.

- 12 Kang, M., Kohli, A., and Thole, K. A., 1998, "Heat Transfer and Flowfield Measurements in the Leading Edge Region of a Stator Vane Endwall," International Gas Turbine and Aeroengine Congress and Exposition, Stockholm Sweden, 98-GT-173.*
- 11 Radomsky, R., and Thole, K. A., 1998, "Effects of High Freestream Turbulence Levels and Length Scales on Stator Vane Heat Transfer," International Gas Turbine and Aeroengine Congress and Exposition, Stockholm Sweden, 98-GT-236.
- 10 Kohli, A., and Thole, K. A., 1997, "A CFD Investigation on the Effect of Entrance Flow Conditions in Discrete Film Cooling Holes," 32nd National Heat Transfer Conference, vol. 12, pp. 223-232, W. M. Rohsenow Prize for Best Presentation for the Gas Turbine Heat Transfer Committee.
- 9 Martin, C., and Thole, K. A., 1997, "A CFD Benchmark Study: Leading Edge Film Cooling with Compound Angle Injection," presented to The International Gas Turbine and Aeroengine Congress and Exposition, Orlando, Florida, 97-GT-297.
- 8 Bangert, B., Kohli, A., Sauer, J., and Thole, K. A., 1997, "High Freestream Turbulence Simulation in a Scaled-Up Turbine Vane Passage," International Gas Turbine and Aeroengine Congress and Exposition, Orlando, Florida, 97-GT-51.
- 7 Thole, K. A., Gritsch, M., Schulz, A., and Wittig, S., 1996, "Flowfield Measurements for Cooling Holes with Expanded Exits," International Gas Turbine and Aeroengine Congress and Exposition, Birmingham England, 96-GT-174.*
- 6 Wittig, S., Schulz, A., Gritsch, M., and Thole, K. A., 1996, "Transonic Film Cooling Investigations: Effects of Hole Shapes and Orientations," International Gas Turbine and Aeroengine Congress and Exposition, Birmingham England, 96-GT-222.*
- 5 Laudon, M. F., Engelstad, R. L., Thole, K. A., Dauksher, W. J., Resnick, D. J., Cummings, K. D., and Seese, P. and Johnson, W., 1995, "Modeling of In-Plane Distortions due to Variations in Absorber Stress," International Micro- and Nano- Engineering, Aix-en-Provence France.
- 4 Laudon, M. F., Thole, K. A., Engelstad, R. L., Resnick, D. J., Cummings, K. D., and Dauksher, W. J., 1995, "Thermal Analysis of X-ray Membrane in a Plasma Environment," 39th International Conference on Electron, Ion and Photon Beam Technology and Nanofabrication, Phoenix Arizona.
- 3 Thole, K. A., and Bogard, D. G., 1994, "Enhanced Heat Transfer and Skin Friction due to High Freestream Turbulence," International Gas Turbine and Aeroengine Congress and Exposition, The Hague Netherlands 94-GT-296.*
- 2 Thole, K. A., Whan-Tong, J., and Bogard, D. G., 1991, "Generation of Very High Freestream Turbulence Levels and the Effects on Heat Transfer," 27.5.1-27.5.7, Turbulent Shear Flow Conference, Munich, Germany.
- 1 Thole, K. A., Sinha, A., Bogard, D. G., and Crawford, M. E., 1990, "Mean Temperature Measurements of Jets with a Crossflow for Gas Turbine Film Cooling Application," Rotating Machinery Transport Phenomena, J. H. Kim and W. J. Yang, ed. Hemisphere Publishing Corporation, New York, New York.

Non-peer Reviewed Publications

Lieuwen, T. C. and Thole, K. A., “As industry makes large investments in gas turbine technology, advanced manufacturing will play an important role in improving performance and reducing costs” *At the Intersection*, ME Magazine, ASME, June 2016.

PROFESSIONAL SOCIETY MEMBERSHIPS

- American Society of Mechanical Engineers (ASME), Fellow
- American Institute of Aeronautics and Astronautics (AIAA), Fellow
- American Institute of Aeronautics and Astronautics (AIAA), Gas Turbine Engine Committee
- ASME Student Section, Penn State Faculty Advisor (2007-2012)
- ASME Gas Turbine Heat Transfer Committee (K-14), Member
- American Society of Engineering Education (ASEE), Member
- Society of Women Engineers, Member
- State of Wisconsin Professional Engineering License (License Number 30951)
- Pi Tau Sigma, Member and Virginia Tech Student Section Advisor (2000-2003)

EDITORIAL AND REVIEW ACTIVITIES

- Editorial Advisory Board, *Physics of Fluids* 2018-present
- Associate Editor, *AIAA Journal of Thermophysics*, January 2017-present
- Associate Editor, *ASME Journal of Turbomachinery*, July 2006-2013
- Associate Editor, *International Journal of Heat and Fluid Flow*, July 2006-09
- Associate Editor, *ASME Journal of Heat Transfer*, January 2003-July 2006
- Reviewer for the *Journal of Fluid Mechanics*, *Journal of Turbomachinery*, *Journal of Heat Transfer*, *International Journal of Heat and Mass Transfer*, *Journal of Fluids Engineering*, *Experiments in Fluids*, *Experimental Thermal Fluid Science*
- Panel reviewer for the National Science Foundation’s Chemical and Thermal Transport Division including several CAREER and unsolicited proposal panels
- Panel reviewer for the National Science Foundation Graduate Fellowship Program
- Reviewer for the National Science Foundation’s ADVANCE Program
- Reviewer for the National Science Foundation’s Graduate Research Fellowship Program

EDUCATIONAL AND INSTITUTIONAL CHANGE GRANTS

The Pennsylvania State University

REU Site: Lowering the Carbon Footprint through Research in Propulsion and Power Generation
National Science Foundation

Total amount \$419,487

PI: O’Connor; Co-PIs: K. Thole, C. Berdanier, and M. Alley
2022-2025

EAGER: Identifying and Disseminating Transformative Professional Development of STEM Undergraduates Who Perform Outreach

National Science Foundation

Total amount: \$299,999

PI: Thole; Co-PIs: M. Alley, and J. Garner (Old Dominion University)

2017-2020 (3 years)

Improvements to ME 340, Junior Level Design

Leonhard Center for Engineering Education

Total amount: \$50,000

PI: T. Simpson; Co-PI: K. Thole

2016-2017 (Two years)

Creating a National Network of Engineering Ambassadors: A Professional Development Program with an Outreach Mission

National Science Foundation

Total amount: \$600,000 with \$500,000 to Penn State

PI: Thole; Co-PIs: M. Alley, and J. Garner (Old Dominion University)

2013-2017 (4 years)

Forming a Successful Engineering Ambassador Program Workshop

National Science Foundation and Penn State's Electro Optics Center

Total amount: \$75,000

PI: Thole; Co-PI: R. Engel, Associate Dean, College of Engineering

2012-13 (1.5 years)

Communicating What Mechanical Engineers Do: A Strategy for Recruiting Women

National Science Foundation

Total amount: \$100,000

PI: Thole; Co-PI: Frecker, Alley, Zappe

2009-2011 (One year)

Mechanical and Nuclear Engineering Global, Non-Travel Based Capstone Design Projects

Leonhard Center for Engineering Education

Total amount: \$68,500

PI: M. Trethewey; Co-PI: Thole

2010-2011 (Two years)

Virginia Polytechnic Institute and State University

NSF Advance Institutional Transformation Award

National Science Foundation

Total amount: \$3.5M

PI: McNamee; Co-PIs: Hyer, Love, Thole

2003-2008 (Five years)

**RESEARCH GRANTS – FEDERAL EXTERNAL (LAST FIVE YEARS)
(Current portfolio \$25M / Total portfolio \$50M)**

Advancing Turbine Technologies for Relevant Inlet Temperature Profiles in the Steady Thermal Aero Research Turbine (START) Lab

Sponsor: DOE – NETL Fossil Energy and Carbon Management Program

Total amount: \$4,500,000 (plus \$4,500,000 cost match from PSU/Pratt & Whitney)

2023-26 (Five Years)

Advanced Two-Stage Turbine Rig Development

Sponsor: FAA ASCENT Program

Total amount: \$7,400,000 (plus \$7,400,000 cost match from PSU/Pratt & Whitney)

2023-26 (Five Years)

REU Site: Lowering the Carbon Footprint through Research in Propulsion and Power Generation

PI: J. O'Connor / Co-PI K. Thole

Sponsor: National Science Foundation \$419,107

2022-25 (Three Years)

Optical Heat Flux Measurements for Engine and Turbine Rigs to Accelerate Turbine Development

Sponsor: DURIP-Office of Naval Research/Air Force Office of Scientific Research

Award Amount: \$410,000

2022 (One Year)

Leading Advanced Turbine Research for Hybrid Electric Propulsion Systems

Sponsor: NASA-University Leadership Initiative

Award Amount: \$8,000,000

2021-25 (Four Years)

Hybrid Thermally Efficiency Core High Pressure Turbine Technologies

Sponsor: NASA

Award Amount: \$1,553,064

2022-2024 (Three Years)

Novel Hot Gas Path Components for Gas Turbine Engines Enabled by Materials Development

Sponsor: Department of Energy-Oak Ridge National Lab

Total amount: \$333,034

2020 (Three Years)

Combustor Wall Cooling with Dirt Mitigation

Sponsor: FAA ASCENT Program

Total amount: \$1,500,000 (plus \$450,000 cost match from Pratt & Whitney)

2020-22 (Three Years)

Turbine Cooling through Additive Manufacturing

Sponsor: FAA ASCENT Program
Total amount: \$1,200,000 (plus \$1,200,000 cost match from Pratt & Whitney)
2020-22 (Three Years)

Improving Turbine Efficiencies through Heat Transfer and Aerodynamic Research in the Steady Thermal Aero Research Turbine (START) – National Experimental Turbine (NExT)

Sponsor: Department of Energy-National Energy Technology Lab
Total amount: \$11,067,120
2015-23 (Eight Years)

Integration of Sensors through Additive Manufacturing Leading to Increased Efficiencies of Gas turbines for Power Generation and Propulsion

Sponsor: Advanced Research Projects Agency-Energy-Open Solicitation
Total amount: \$5,879,897
2019-22 (Three Years)

Integrated turbine component cooling designs facilitated by additive manufacturing and optimization

Sponsor: Department of Energy-National Energy Technology Lab: University Turbine Research Program

Total amount: \$400,000
2019-22 (Three Years)

Gas Turbine Fuel Reduction through Minimally Cooled Vanes and Blades

Sponsor: FAA CLEEN 2 Program / United Technologies Corporation-Pratt & Whitney
Total amount: \$2,631,460
2015-19 (Four Years)

Characterizing Coke Deposition in Additively Manufactured Parts

Sponsor: Air Force Research Laboratory (with Reaction Systems)
Total Amount: \$56,000
2019-20 (one year)

Conjugate Heat Transfer for LES of Gas Turbine Engines

Sponsor: U.S. Navy STTR Program (with Cascade Technologies)
Total Amount: \$330,000
2019-21 (three years)

Scalable Predictive Analytics for Real-Time Life Predictions of Critical Gas Turbine Components

Sponsor: Department of Energy – University Turbine Systems Research Program
Total Amount: \$700,000
2018 (three years)

NAVY SBIR: Micro-Plasma Blade Monitoring Sensor Testing
Innoveering, LLC

Total Amount: \$15,000
PI: K. A. Thole
2017 (one year)

Real-Time Health Monitoring of Gas Turbine Components Using Online Learning and High-Dimensional Data

U.S. Department of Energy – National Energy Technology Laboratory: University Turbine Systems Research (UTSR)
Total Amount: \$212,775
2017 (Three Years)

Addressing Turbine Durability Concerns Associated with Imposed Transient Propulsion Needs

Office of Naval Research – Defense University Research Instrumentation Program (DURIP)
Total amount: \$490,104
2017 (One year)

LABORATORY DEVELOPMENT

DESCRIPTION OF EXPERIMENTAL AND COMPUTATIONAL CONVECTION LAB

The Experimental and Computational Convection Laboratory (ExCCL) conducts studies of fundamental turbulence and applied convective heat transfer. Subjects being researched include freestream turbulence effects on gas turbine blade boundary layers, endwall secondary flow effects, turbine blade cooling techniques, and electronic cooling. These problems are approached both experimentally as well as computationally. Within the laboratory, experimental facilities include two wind tunnels and internal flow channels. Instrumentation includes time-resolved digital particle image velocimeter, laser Doppler velocimeter, hot-wire anemometer, and infrared thermography. Computational facilities include a cluster and many desktop computers. The research conducted within the laboratory is supported through federal agencies as well as industry. In 2007, the laboratory was given the distinction of being a Pratt & Whitney Center of Excellence for gas turbine heat transfer. In 2015, Dr. Thole stepped down as the Director to develop the START Lab whereby the new Director was changed to Associate Professor Stephen Lynch.

DESCRIPTION OF STEADY THERMAL AERO RESEARCH TURBINE (START) LAB

The Steady Thermal Aero Research Turbine Lab houses a unique, state-of-the-art one stage turbine in which blade Reynolds numbers and rotational Reynolds numbers are matched to that of an engine. The primary goals for this turbine facility include: developing novel cooling methods for turbine airfoils; developing improved sealing mechanisms for inter-stage gaps; validating sensors in rotating environments; and advancing additive manufacturing for turbine airfoil cooling and for sensor integration. In addition to the turbine, the START lab houses a benchtop facilities that evaluate the heat transfer and pressure loss in true-scale heat transfer coupons made through the use of additive manufacturing. The development of Penn State's START Lab occurred through an initial and continuing partnership between Penn State, the

Department of Energy-National Energy Technology Lab, and Pratt & Whitney. The START Lab leads the Pratt & Whitney Center of Excellence and the Solar Turbines Center of Excellence.