

## Curriculum Vitae-Compact

**Forrest E. Ames, PhD, P.E.**  
**Professor of Mechanical Engineering**  
**University of North Dakota**  
**243 Centennial Drive, Stop 8359**  
**Grand Forks, ND 58202-8359**  
**(701) 777-2095**



### **Educational Background**

Ph.D. Mechanical Engineering, Stanford University, January, 1991.

*Thesis:* “Heat Transfer with High Intensity Large Scale Turbulence: The Flat Plate Turbulent Boundary Layer and the Cylindrical Stagnation Point”

M.S. Mechanical Engineering, Stanford University, June, 1983.

B.S. Mechanical Engineering, San Jose State University, December, 1981.

### **Professional Experience**

Professor of Mechanical Engineering, Univ. of North Dakota, 8/2007-Present

Interim Chair of Electrical Engineering, College of Engineering and Mines, 8/2012-6/2013

Associate Dean for Academic Affairs, School of Engineering and Mines, 7/2009-7/2012

Tenured Associate Professor of Mechanical Engineering, Univ. of North Dakota, 8/2003-8/2007

Associate Professor of Mechanical Engineering, University of North Dakota, 8/2001- 8/2007

Assistant Professor of Mechanical Engineering, University of North Dakota, 8/97-8/2001

*Teaching Areas:* Thermodynamics I & II, Gas Turbines, Compressible Fluid Flow, Fundamental and Convective Heat Transfer, Fluid Mechanics, Aerodynamics, Computational Fluid Dynamics, and Mechanical Measurements

*Research Areas:* Turbine gas path heat transfer, film cooling, and turbine aerodynamics; turbulence modeling; and turbine cooling.

Staff Research Scientist, Rolls Royce, Indianapolis, IN, 11/90-8/97, 8/83 – 8/86.

*Research Areas:* Turbine vane heat transfer, film cooling, and aerodynamics; turbulence modeling; turbine cooling; and coal water slurry combustion

*Responsibilities:* Proposed, planned, and conducted both internally supported and externally funded research in the area of turbine heat transfer and aerodynamics. Assessed film cooling design methods and designed cooling schemes for components in advanced engines.

*Work experience:* Responsible for the experimental assessment of advanced vane designs for cooling effectiveness and aerodynamics. Conducted a series of experiments, funded by NASA investigating the influence of turbulence on vane heat transfer, film cooling, and aerodynamics. Developed an advanced two-equation turbulence model with Dr. Okey Kwon. Experimentally determined the cooling effectiveness for a range of showerhead film cooling designs.

Experimentally assessed the influence of inlet boundary layer thickness effects on secondary losses in a vane cascade. Designed and analyzed internal and external cooling schemes for shrouded blades. Designed and analyzed internal and external cooling schemes for high pressure turbine vanes.

### **Research Highlights:**

- Attracted six major grants, including PI on four DOE/NETL sponsored grants totaling \$1,920,000 and co-PI on one NASA CAN grant totaling \$1,125,000 and PI on one NSF.
- NSF Sponsored UND Research on Physics of Pin Fin Flow and Heat Transfer was selected as a test case for the European Research Community on Flow, Turbulence and Combustion by their Special Interest Group on Refined Turbulence Modeling (SIG-15). This work was presented in Chatou, France on October 17<sup>th</sup> of 2011 at the Special Interest Group's (15) Workshop on Refined Turbulence Modeling.
- Kenote Speaker at 37<sup>th</sup> National and 4<sup>th</sup> International Conference on Fluid Mechanics and Fluid Power Conference at the Indian Institute of Technology Madras, Chennai, India, Dec. 16-18, 2010.
- Have made 27 presentations at the International Gas Turbine Congress and Exposition from 1995-2015.
- Outside collaborations include Dr. Sumanta Acharya, University of Memphis, Dr. Jeffrey Bons, Ohio State University, Dr. Philip Ligrani, University of Utah (Later Oxford University, now University of Alabama, Huntsville), Dr. Bora Suzen, NDSU, Dr. Edward Hall, Rolls Royce (Now GE).
- Have attracted over \$250,000 in private grants with industry involving local business partnerships.
- Have worked with over 30 MS and PhD students including major advisor to 24 MSME graduates.
- Heat transfer and fluid mechanic database generated at UND has been used for predictive comparisons by a number of researchers from industry, universities, and government research laboratories.

### **Service Highlights:**

#### *National Service Technical Community*

- Served as an ABET Program Evaluator for mechanical and general engineering programs from 1996-2008 visiting 7 campuses as the EAC team member. (Sponsored through the American Society of Mechanical Engineers, ASME)
- Served as session chair and organizer or session co-chair and co-organizer 17 times at the International Gas Turbine Institute Congress and Exposition. Also served as Vanguard Chair on the aerodynamics effects of film cooling.
- Served as special associate editor for ASME Journal of Turbomachinery 2004 and for ASME Journal of Heat Transfer 2011.
- Member of Gas Turbine Heat Transfer Committee since 1996 (ASME K-14 committee), yearly reviewer for IGTI Congress and Exposition and ASME Journal of Turbomachinery, member of Honors and Awards subcommittee, previous chair of K-14 Best Paper Committee.
- Reviewer for NSF and served on several review panels
- ASME Member for 34 years, Fellow Grade.
- Professional Engineer for 32 years, licensed in Indiana and North Dakota

### *Service to the UND Community*

- Chair, CEM Tenure and Promotion Committee (2014)
- Served as Interim Chair of Electrical Engineering
- Served as Associate Dean of Academic Affairs, School of Engr. & Mines (2009-2012)
- Served as ABET Coordinator for School of Engineering and Mines, 2008-2012, including the ABET Engineering Accreditation Visit 2009, including helping to address several significant shortcomings after accreditation visit.
- Served as Mechanical Engineering Program ABET Coordinator (2009-2010) while department was addressing some significant accreditation shortcomings.
- Organized mock visit for SEM in 2008 recruiting a team chair and evaluators for all SEM engineering programs.
- Served on University Assessment Committee (1999-2001), Chair (2000-2001)
- Served on Graduate Committee (2001-2004) led reviews of graduate programs for Social Work and Early Childhood Education
- Served on Search Committees for SEM Dean (2000-2001), (2007-2008), CIO (2006-2007), VPR (2008-2009)
- Past Member Associate Dean for Research Committee (2003-2009)
- Member North Dakota NASA EPSCoR Technical Advisory Committee
- Past Advisor, Society of Women Engineers (2000-2003)
- Past ND EPSCoR AURA and Science Bound Review Panel
- Past Chair, Academic Program Committee (2009-2012)
- Alice T. Clark Program Faculty Mentor, 5 times
- Chair, Faculty Seed Grant Committee (2013, 2014)
- Led FE Exam Reviews 1997-2007, Thermodynamics

### **Teaching Highlights**

- Developed and taught 4 new elective courses approved for graduate credit including ME 464 Computational Fluid Dynamics, ME 477 Compressible Fluid Flow, ME 466 Aerodynamics, and ME 576 Convective Heat Transfer.
- Taught full range of mechanical engineering thermal fluid science classes including ME 306 Fluid Mechanics, ME 341 Thermodynamics, ME 342 Intermediate Thermodynamics, ME 446 Gas Turbines, ME 474 Heat Transfer and ME 483 Mechanical Measurements.
- Classes taught represent a significant portion of current aerospace focus area and to UND's pending joint Aerospace/Mechanical Engineering Degree program.
- Developed lesson plans for all classes to help orient students and provide lesson by lesson reading and assignment plans.
- Have almost all classes via distance engineering degree program (DEDP).
- Have developed ongoing learning assessment methods for my classes which move classes in the direction of improved student learning and success.

### **Honors/Awards**

2015 ASME Best Paper Award, Turbo Expo, Shaped-hole Film Cooling

2014 Nominated for Chester Fritz Distinguished Professor

2011 UND Spirit Award, School of Engineering and Mines

2010 Elected Fellow Grade, ASME  
2006 ACCESS Champion, Disability Support Services  
2004 Olsen Research Professorship, School of Engineering and Mines  
2002 Outstanding Student Organization Advisor, UND  
2000 Outstanding Professor, ASME Student Section  
1999 New Faculty Scholar Award, UND  
1999 AGTSR Faculty Fellow  
Member: Sigma Xi, Stanford University, 1990  
Honeywell Futurist Essay Contest Winner, 1988, \$3000  
GM Fellowship to Stanford University, 1986-1990  
Dean's Service Award, Stanford University, 1983

### **Advisees**

#### *Undergraduate:*

Regularly advise one-third of Junior class in Mechanical Engineering (currently about 50)  
Advisor for about 28 two-semester senior design projects, (1997-present)  
Advised over 22 undergraduate research projects

#### *Graduate:*

Loren Soma, Pursing Ph.D.  
Maliha Yel Mali, Pursing MSME

#### *Past Graduate Students:*

Abdulqadir Sheikmohamed, MSME August 2018, Justin Varty, MSME, August 2016, Juli Pearson, MSME, August 2015, Joseph Kingery, MSME, May 2015, Jonathan Long, MSME, Dec. 2014, 2013 UTSR Summer Fellow, Leo Moualeu, MSME, Dec. 2013, 2012 UTSR Summer Fellow, Mitch Busche, MSME, June 2013, 2012 UTSR Summer Fellow, Md. Nafiz Chowdhury, MSME, December 2012, Matthew Mihelish, MSME, May 2012, 2011 UTSR Summer Fellow, Preethi Gandavarapu, MSME, May 2012, Prasanta Kumar Dey, was Pursuing PhD, Ethane Erickson, MSME, May 2009, Indrajit Jaswal, MSME, May 2008, Nathan Fiala, MSME, August 2007, Jake Johnson, MSME, August 2006, Chad Nordquist, MSME, August 2006, Weston Petryszyn, MSME, Spring 2005, Karl Spears, MSME, December 2004, Lindsay Dvorak, MSME, December 2004, Matt Argenziano, MSME, May 2004, 2003 NASA Glenn Summer Fellow Chao Wang, was pursuing a Ph.D. in Energy Engineering, Matthew Morrow, MSME, May 2003, Pierre Barbot, MSME, May 2003, , Paul Ray, MSME, May 2002, Rueben Gates, MSME, May 2002, Mike Davis, MSME May 2000

### **Books**

Ames, F.E., 2018, *An Introduction to Compressible Flow*, Momentum Press.

### **Book Chapters**

Ames, F.E., 2017, "Turbulence Effects on External Convective Heat Transfer," In F. A. Kulacki (Ed.), *Handbook of Thermal Science and Engineering* (pp 1-33), Switzerland: Springer International, ISBN 978-3-319-32003-8, DOI 10.1007/978-3-319-32003-8\_17-1.

## Journal Publications.

Kanani, Y, Acharya, A, and Ames, F., 2018, "Large Eddy Simulation of the Laminar Heat Transfer Augmentation on the Pressure Side of a Turbine Vane Under Freestream Turbulence," *ASME. J. Turbomach.* 2018;(0):. doi:10.1115/1.4041599.

Kanani, Y, Acharya, S, and Ames, F.E., 2018, "Simulations of Slot Film-Cooling with Freestream Acceleration and Turbulence," *ASME. J. Turbomach.* 2018;140(4):041005-041005-11. doi:10.1115/1.4038877.

Varty, J.W., Soma, L.W., Ames, F.E., and Acharya, S., 2017, "Vane Suction Surface Heat Transfer in Regions of Secondary Flows: The Influence of Turbulence Level, Reynolds number and the Endwall Boundary Condition," *ASME. J. Turbomach,* 140(2):021010-021010-9, doi: 10.1115/1.4038281.

Kingery, J., Ames, F., "Full Coverage Shaped Hole Film Cooling in an Accelerating Boundary Layer with High Free-Stream Turbulence," *ASME. J. Turbomach,* **138** (7), 071002 (Feb 17, 2016) (12 pages), doi10.1115/1.4031867. (*Earned Gas Turbine Heat Transfer Division Best Paper Award, 2016*)

Kingery, J.A., Ames, F.E., 2015, "Stagnation Region Heat Transfer Augmentation at Very High Turbulence Levels," *ASME. J. Turbomach,* **138** (8), 081005 (Mar 22, 2016) (10 pages), doi: 10.1115/1.4032677.

Busche, M.L., Moualeu, L.P., Tang, C., and Ames, F.E., 2013, "Heat Transfer and Pressure Drop Measurements in High Solidity Pin Fin Cooling Arrays with Incremental Replenishment," *ASME J. Turbomachinery,* **135**, pp. 041011-1-9.

Gandaparavu, P., and Ames, F.E., 2012 "The Influence of Leading Edge Diameter on Stagnation Region Heat Transfer Augmentation Including Effects of Turbulence Level, Scale, and Reynolds Number," *ASME Journal of Turbomachinery,* v. **135**, pp. 011008-1-8

Erickson, E., Ames, F.E., and Bons, J.P., "Effects of a realistically rough surface on vane heat transfer including the influence of turbulence condition and Reynolds number," *ASME J. Turbomachinery,* v. **134**, pp. 021013-1-8.

Fiala, N.J., Johnson, J.D. and Ames, F.E., 2008, "Aerodynamics of a Letterbox Trailing Edge – Effects of Blowing Rate, Reynolds Number and External Turbulence on Aerodynamic Losses and Pressure Distribution," *ASME J. Turbomachinery,* v. **132**, pp. 041011-1-11.

Fiala, N.J., Jaswal, I. and Ames, F.E., 2010, "Letterbox Trailing Edge Heat Transfer – Effects of Blowing Rate, Reynolds Number, and External Turbulence on Heat Transfer and Film Cooling Effectiveness," *ASME Journal of Turbomachinery,* v. **132**, pp. 011017-1-10.

Jaswal, I. and Ames, F.E., 2009, "Heat Transfer and Pressure Drop Measurements in Constant and Converging Section Pin and Diamond Pedestal Arrays," *ASME Journal of Thermal Science and Engineering Applications,* v. **1**, pp. 011006-1-7.

Johnson, J.D., Fiala, N.J., and Ames, F.E., 2008, "Gill Slot Trailing Edge Aerodynamics– Effects of Blowing Rate, Reynolds Number, and External Turbulence on Aerodynamics Losses and Pressure Distribution," *ASME J. Turbomachinery,* v. **131**, pp. 011016-1-11

Ames, F.E., and Dvorak, L.A., 2006, "Turbulent Transport in Pin Fin Arrays – Experimental Data and Predictions," *ASME Journal of Turbomachinery,* v. **128**, pp. 71-81.

Ames, F.E., Barbot, P.A., Wang, C., 2005, "Effects of Catalytic and Dry Low NOx Combustor Turbulence on Endwall Heat Transfer Distributions," *ASME Journal of Heat Transfer,* v. **127**, pp. 414-424.

Ames, F.E., Dvorak, L.A., and Morrow, M.J., 2005, "Turbulent Augmentation of Internal Convection off Pins in Staggered Pin Fin Arrays," *ASME Journal of Turbomachinery*, v. **127**, pp. 183-190.

Ames, F.E., Argenziano, M., Wang, C., 2004, "Measurement and Prediction of Heat Transfer Distributions on an Aft Loaded Vane Subjected to the Influence of Catalytic and Dry Low NO<sub>x</sub> Combustor Turbulence," *ASME Journal of Turbomachinery*, v. **126**, pp. 139-149.

Ames, F.E., Wang, C., and Barbot, P.A., 2003, "Measurement and prediction of the influence of catalytic and dry low NO<sub>x</sub> Combustor Turbulence on Vane Surface Heat Transfer," *ASME Journal of Turbomachinery*, v. **125**, pp. 210-220.

Ames, F.E., Barbot, P.A., Wang, C., 2003, "Effects of Aeroderivative Combustor Turbulence on Endwall Heat Transfer Distributions Acquired in a Linear Vane Cascade," *ASME Journal of Turbomachinery*, v. **125**, pp. 221-231.

Ames, F.E., 1998, "Aspects of Vane Film Cooling with High Turbulence: Part I - Heat Transfer," *ASME Journal of Turbomachinery*, v. **120**, pg. 768.

Ames, F.E., 1998, "Aspects of Vane Film Cooling with High Turbulence: Part II - Adiabatic Effectiveness," *ASME Journal of Turbomachinery*, v. **120**, pg. 777.

Ames, F.E. and Plesniak, M.W., 1997, "The Influence of Large Scale, High Intensity Turbulence on Vane Aerodynamic Losses, Wake Growth, and Exit Turbulence Parameters," *ASME J. Turbomachinery*, v. **119**, pp. 182.

Ames, F.E., 1997, "The Influence of Large Scale, High Intensity Turbulence on Vane Heat Transfer," *ASME Journal of Turbomachinery*, vol. 119, pp. 23.

Kwon, O., and Ames, F.E., 1996, "A Velocity and Length Scale Approach to k- $\epsilon$  Modeling," *ASME Journal of Heat Transfer*, Vol. 118, pp. 857.

### **Referred Conference Publications**

Soma, L.W., Ames, F.E., and Acharya, S., 2018, "Heat Transfer and Pressure Drop in a Converging Pedestal Array with Exit Area Variation," ASME Paper No. GT2018-75578.

Shiekhmohamed, A.A., Soma, L.W., Ames, F.E., and Acharya, S., 2017, "Heat Transfer and Pressure Drop Measurements in a High Solidity Pin Fin Array with Variable Hole Size Incremental Impingement," ASME Paper No. GT2017-65046.

Singh, S., Acharya, S., and Ames, F., 2017, "Simulation of Internal Cooling in a Pin-Finned Channel with Incremental Impingement," ASME Paper No. GT2017-65083.

Varty, J., and Ames, F.E., 2016, "Experimental heat transfer distributions over an aft loaded vane with a large leading edge at very high turbulence levels," ASME Paper No. IMECE2016-67029.

Kingery, J.A., Ames, F.E., Downs, J., Acharya, S., Barker, B.J., 2015, "An Analysis of a Deposition Tolerant Cooling Approach for Nozzle Guide Vanes," ASME Paper No. GT2015-42419.

Long, J.A., Moualeu, L.P.G., Hemming, N., Ames, F.E., and Suzen, Y.B., 2015, "Variable Speed Power Turbine Measurements at Low to Moderate Reynolds Numbers in a Transonic Turbine Cascade: Aerodynamic Loss Surveys," ASME Paper No. GT2015-42504.

Busche, M.L., Kingery, J.E., and Ames, F.E., 2014, "Slot film cooling in an accelerating boundary layer with high free-stream turbulence," ASME Paper No. GT2014-25360.

Mihelish, M. and Ames, F.E., 2013, "The development of a closed loop high speed cascade wind tunnel for cascade testing at moderate to low Reynolds numbers, ASME Paper No. GT2013-95048.

Mihelish, M. and Ames, F.E., 2013, "Aerodynamic loss measurements in a compressible flow vane cascade showing the influence of Reynolds number lapse, ASME Paper No. GT2013-95052.

Chowdhury, N.H.K. and Ames, F.E., 2013, "The response of high intensity turbulence in the presence of large stagnation regions," ASME Paper No. GT2013-95055.

Chowdhury, N.H.K., Dey, P.K., and Ames, F.E., "The Influence of Inlet Contraction on Vane Aerodynamic Losses and Secondary Flows with Variable Turbulence and Reynolds Number," ASME Paper No. GT2011-45737.

Erickson, E., Ames, F.E., and Bons, J.P., 2010, "Effects of a realistically rough surface on vane aerodynamic losses including the influence of turbulence condition and Reynolds number," ASME Paper No. GT2010-22173.

I. Jaswal, E. Erickson And F. E. Ames, 2009, "Aerodynamics of a Covered Trailing Edge Vane—Effects of Blowing Rate, Reynolds Number, And External Turbulence," ASME Paper No. GT2009-59836.

Ames, F.E., Fiala, N.J., and Johnson, J.D., 2007, "Gill Slot Trailing Edge Heat Transfer – Effects of Blowing Rate, Reynolds Number, and External Turbulence on Heat Transfer and Film Cooling Effectiveness, ASME Paper No. GT2007-27397.

Ames, F.E., Nordquist, C.A., and Klennert, L.A., 2007, "Endwall Heat Transfer Measurements in a Staggered Pin Fin Array with an Adiabatic Pin," ASME Paper No. GT2007-27432.

Ames, F.E., Johnson, J.D., and Fiala, N.J., 2006, "The influence of aero-derivative combustor turbulence and Reynolds number on vane aerodynamic losses, secondary flows, and wake growth," ASME Paper No. GT2006-90168.

Ames, F.E., Dvorak, L.A., 2006, "The influence of Reynolds number and row position on surface pressure distributions in staggered pin fin arrays," ASME Paper No. GT-2006-90170.

Boyle, R.J., Giel, P.W., and Ames, F.E., 2004, "Predictions for the Effects of Freestream Turbulence on Turbine Blade Heat Transfer," ASME Paper No. GT-2004-54332.

Ames, F.E., C.S. Solberg, M.D. Goman, D.J. Curtis, and B.T. Steinbrecker, 2001, "Experimental Measurements and Computations of Heat Transfer and Friction Factor in a Staggered Pin Fin Array," ASME Paper No. DETC 2001/CIE-21761

Ames, F.E., Zhang, L., Smart, R., and Owens, G., 2000, "Turbine vane surface heat transfer measurements in a compressible linear cascade," Proceedings of NHTC 2000, 34<sup>th</sup> National Heat Transfer Conference, August 21, 2000, Pittsburgh, Pennsylvania.

Ames, F.E., Kwon, O., and Moffat, R.J., 1999, "An algebraic model for high intensity large scale turbulence," ASME Paper No. 99-GT-160.

Ames, F.E., and Moffat, R.J., 1990, "Effects of Simulated Combustor Turbulence on Boundary Layer Heat Transfer," AIAA/ASME Joint Thermophysics and Heat Transfer Conf., Turbulent Flows Session, Seattle, Wash, HTD 138.

### **Non-referred Conference Publications**

Singh, S., Acharya, S., and Ames, F. E., 2016, Effect of Inlet Flow Conditions on Heat Transfer in Pin-Finned Cooling Configuration, AIAA Sci Tech 2016, San Diego, January 2016, AIAA Paper No.: 2329665

Flegel, A.B., Welch, G.E., Giel, P.W., Ames, F.E., Moualeu, L.P.G., and Long, J.A., 2015, "Complementary Aerodynamic Performance Datasets for Variable Speed Power Turbine

Blade Section from Two Independent Transonic Turbine Cascades,” 22<sup>nd</sup> International Symposium on Air Breathing Engines, Phoenix, AZ, 25-30 Oct. 2015, Paper 20163.

Stahl, K.A., Moualeu, L.P.G., Long, J.A., Ames, F.E., and Suzen, Y.B., 2014, “Heat Transfer Measurements in a Compressible Flow Vane Cascade Showing the Influence of Reynolds Number, Mach Number, and Turbulence Level on Transition and Augmentation of Laminar Heat Transfer by Free-Stream Turbulence,” AIAA Paper No. 2014-3936, 50th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Cleveland, OH.

Moualeu, L.P.G., Long, J.A., Stahl, K.A., Ames, F.E., and Suzen, Y.B., 2014, “Midline Heat Transfer and Pressure Measurements on an Incident Tolerant Blade Section for a Variable Speed Power Turbine at Low to Moderate Reynolds Numbers in a Transonic Turbine Cascade,” AIAA Paper No. 2014-3938, 50th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Cleveland, OH.

Ames, F.E., Klennert, L.A., Nordquist, C.A., and Morrow, M.J., 2011, “An Experimental and Analytical Investigation of Pin Fin Heat Transfer and Fluid Dynamics for Physics Based Code Development,” 15<sup>th</sup> ERCOFTAC-SIG15/IAHR Workshop on Refined Turbulence Modeling, 17-18 October 2011, EDF Chatou, France.

Ames, F.E., 2010, “Some Aspects of the Influence of Flow Field turbulence on Heat Transfer and Boundary Layer Development Related to Gas Turbines,” Keynote Lecture, Proceedings, Thirty Seventh National & Fourth International Conference on Fluid Mechanics and Fluid Power, Chennai, India, December 16-18, 2010.

Kingery, L.B. and Suzen, Y.B., and Ames, F.E., 2010, “Computations of Heat Transfer and Aerodynamic Loss in Transitional Low Pressure Turbine Flows,” AIAA Paper No. 2010-4325, 10th AIAA/ASME Joint Thermophysics and Heat Transfer Conference. Chicago, IL.

Ames, F.E., Peters, J.M., and Crook, B.A., 2010, “Effects of Incidence Angle on the Performance of Lightly Loaded Turbine Guide Vanes,” AIAA Paper No. 2010-408, 48th AIAA Aerospace Sciences Meeting, Orlando, FL.

Naima Kaabouch, Yi Chen, Wen-Chen Hu, Julie Anderson, Forrest Ames, and Rolf Paulson, “Early detection of foot ulcers through asymmetry analysis,” Proc. SPIE, DOI:10.1117/12.811676, vol. 7243, 72621L (2009); , February 2009.

Naima Kaabouch, Yi Chen, Julie Anderson, Forrest Ames, and Rolf Paulson “Asymmetry analysis based on Genetic Algorithms for the Prediction of Foot Ulcers,” Proc. SPIE, DOI:10.1117/12.805975, vol. 7243, pp., January 2009.

### **Contractor Reports and Thesis (Non-referred)**

Ames, F.E., 1996, “Experimental Study of Vane Heat Transfer and Film Cooling at Elevated levels of Turbulence,” NASA CR 198525.

Kwon, O., and Ames, F.E., 1995, “Advanced k- $\epsilon$  Modeling of Heat Transfer,” NASA CR 4679.

Ames, F.E., Nov., 1994, “The Influence of High Intensity, Large Scale Turbulence on Turbine Vane Heat Transfer and Aerodynamics,” NASA CR 4633.

Ames, F.E., Nov., 1990, “Heat Transfer with High Intensity, Large Scale Turbulence: The Flat Plate Turbulent Boundary Layer and the Cylindrical Stagnation Point,” HMT-44 (Ph.D. Thesis), Stanford University.