

UTSR Project Publications

Updated January 8, 2008

[SR007](#)

University of California, Berkeley
Principal Investigator: Robert Dibble

Project Title: Ultra Low Gas Turbine Emissions Using Catalytic and Non Catalytic Porous Combustors, October 1993

- **Catalytic Oxidation of Gas Over Supported Platinum: Flow Reactor Experiments and Detailed Numerical Modeling** - Conference Presentation-26th International Symposium on Combustion, Naples, Italy, 1996
- **A Comparison of the Influence of Fuel/Air Unmixedness on NOx Emissions in Lean Premixed, Non-Catalytic and Catalytically Stabilized Combustion** - Journal Publication-The American Society of Mechanical Engineers
- **Gas Temperature Above a Porous Radiant Burner: Comparison of Measurements and Model Predictions** - Conference Presentation, 26th International Symposium on Combustion, Naples, Italy 1996
- **An Experimental and Numerical Comparison of Extractive and In-Situ Laser Measurements of Non Equilibrium Carbon Monoxide in Lean-Premixed Natural Gas Combustion** - Journal Publication-Combustion and Flame

[SR008](#)

Vanderbilt University
Principal Investigator: Arthur Mellor

Project Title: NOx and CO Emissions Models for Gas-Fired, Lean Premixed Combustion Turbines

- **Effects of Unmixedness in Piloted-Lean Premixed Gas Turbine Combustors** - Abstract for Publication and Presentation at the 1997 International Gas Turbine Institute Meeting, Orlando, FL
- **Quantifying Unmixedness in Lean Premixed Combustors Operating at High Pressure, Fired Conditions** - Abstract for Publication and Presentation at the 1997 International Gas Turbine Institute Meeting, Orlando, FL
- **Characteristic Time Modeling of NOx Emissions and Lean Blow Off for Piloted-Lean Combustors** - Abstract for Publication and Presentation at the 1997 International Gas Turbine Institute Meeting, Orlando, FL
- **Design of Inlet Conditions for High Pressure NOx Measurements in Lean Premixed Combustors** - Conference Presentation-1995 IGTI Turbo Expo, Houston, TX
- **Engineering Analysis for Lean Premixed Combustor Design** - Technical Paper/Journal Publications-AIAA joint Propulsion and Power/Conference Paper-1995 AIAA Joint Propulsion Conference, San Diego, CA
- **NOx, CO, and Lean Blow off in a Piloted-Lean Premixed Combustor** - Abstract
- **Preliminary Study of NOx, CO, and Lean Blow Off in a Polited-Lean Premixed Combustor Part I: Experimental** - Technical Paper/Conference Presentation
- **Preliminary Study of NOx, CO, and Lean Blow Off in a Polited-Lean Premixed Combustor Part II: - Modeling** Journal Publication, Combustion Science and Technology Journal
- **Behavior on NOx in Lean Premixed Pre-mixed Prevaporized Combustion: Effects of Fuel Composition and Inlet Jet Size** - Journal Publications-Transaction of ASME,

Conference Presentation-June 1997, ASME Gas Turbine and Aero Engine Congress, Orlando, FL

- **Chemical Reactor Modeling Applied to the Prediction of Pollutant Emissions an LP Combustor** - Conference Presentation-33rd AIAA/ASME/SAE/ASEE/Joint Propulsion Conference, July 1997, Seattle WA
- **Effects of Incomplete Premixing or NOx Formation at Gas Turbine Engine Conditions** - Journal Publication, and Conference Presentation-42nd ASME Gas Turbine and Aero Engine Congress June 1997, Orlando, FL
- **Characterization of NOx, N2O, and CO for Lean Premixed Combustion in High-Pressure Jet-Stirred Reactor** - Journal Publication-ASME Journal of Engineering for Gas Turbine and Power Conference Presentation-1996
- **NoxEI Sensitivity to Inlet Conditions for Lean Premixed Turbine Combustors** - International Gas Turbine and Aero Engine Congress, Central States Combustion Institute Meeting, June 1994 (Abstract)
- **Simplified Models for NOx Production Rates in Lean-Premixed Combustion** - Conference Presentation
- **NOx and N2O In Lean Premixed Jet Stirred Flames** - Conference Presentation
- **Measurements of Turbulent Premixed Methane Flames by Raman Scattering And Fluorescence: Plans and Progress** - Conference Presentation
- **NOx Kinetics and Mechanism for Lean Premixed Combustion: Part I- One Atmosphere Experimental Results** - Conference Presentation
- **NOx Kinetics and Mechanism for Lean Premixed Combustion: Part II-Engineering Modeling Considerations** - Conference Presentation
- **LP NOx Characteristic Time Model Validation Tests at METC** - Conference Presentation
- **NOx Emissions for Lean-Premixed Combustion** - Conference Presentation-Pacific Rim International Conference on Environmental Control of Combustion Processes
- **Raman Measurements of Mixing and Finite-Rate Chemistry in a Supersonic Hydrogen/Air Diffusion Flame** - Journal Publication-Submitted to Combustion Flame, 1993

[SR009](#)

Purdue University

Principal Investigator: Paul E. Sojka

Project Title: NOx Abatement in Advanced Gas Turbines

- **Background Corrections of LIF Measurements of NO in Lean, High-Pressure, Premixed Methane Flames** - Journal Publication
- **Laser-Induced Fluorescence Measurements of Nitric Oxide Formation in High-Pressure Premixed Methane Flames** - Journal Publication
- **Discreet Probability Function Method for a Turbulence Mixing Layer** - Journal Publication

[SR010](#)

Lehigh University

Principal Investigator: Arnold Marder

Project Title: Functionally Graded Material for Thermal Barrier Coatings in Advanced Gas Turbine Systems

- **Processing of Layered Metal Matrix Composite and Ceramic Coatings by Electrochemical Methods** - Journal Publication, Conference Presentation
- **Structure of Electrodeposited Graded Composite Coatings of Ni-A1-A1203**- Journal of Microscopy, Vol. 185, Pp. 2, February 1997

- **Electrodeposited Functionally Graded Composite Coatings** - Microscopy of Composite Materials III Conference, St. Johns College, Oxford, England, April 1-3 1996 (abstract)
- **Characterization of Single and Discretely-Stepped Electro-Composite Coatings of Nickel-Alumina** - Conference Presentation
- **Microstructural Characterization and Hardness of Electrodeposited Nickel Coatings From a Sulfate Bate** - Conference Presentation

SR011

Texas A&M University

Principal Investigator: J.C. Han

Project Title: Advanced Turbine Cooling, Heat Transfer, and Aerodynamic Studies

- **Effect of Channel Orientation in a Rotating Two-Pass Coolant Passage Heat Transfer** - ASME Journal of Heat Transfer, Vol. 118, No.3 Pp. 578-584, August 1996
- **Detailed Heat Transfer Measurements in a Non-Rotating Two-Pass Channel With and Without Bleed Holes Using Transient Liquid Crystal Technique** - International Journal of Heat Mass Transfer, Vol. 40, No. 11, Pp. 2525-2537, 1997 - Conference Proceedings; HTD-Vol. 330, National Heat Transfer Conference, Vol. 8, ASME 1996, Pp. 133-140
- **Heat Transfer Inside and Downstream of Cavities Using Transient Liquid Crystal** - Method Journal of Thermophysics and Heat Transfer, Vol. 10, No. 3 July-September 1996
- **Detailed Heat Transfer Distributions on a Cylindrical Model With Simulated TBC Spallation-AIAA 97-0595** - 35th Aerospace Meeting & Exhibit January 6-10 1997 Reno, NV

SR012

Pennsylvania State University

Principal Investigator: Sam Zamrick

Project Title: Life Prediction of Advanced Materials for Gas Turbine Application: The Effects of Thermomechanical Strain/Temperature Cycling on Fatigue Life and Crack Growth of Coated in 738LC Material

- **The Use of Viscoplastic Model for Time-Dependent Stress-Strain Life Cycle** - Inelasticity and Damage in Solids Conference, St. John's, Newfoundland, Canada, September, 1996
- **Thermomechanical Fatigue Life Prediction Model for Advanced Gas Turbine Materials** - Poster Presentation

SR013

Virginia Polytechnic Institute and State University

Principal Investigator: Uri Vandsburger

Project Title: Advanced Combustion Technologies for Gas Turbine Power Plants

- **Flow Actuation, Controller, and Materials Development for Gas Turbine Systems** - DOE Advanced Gas Turbine Systems Research-Combustion Technology Workshop IV, Atlanta, GA, March 5-7, 1997
- **Coupled Multiple Jet Excitation, AIAA-97-0075** - Paper Presented at the 35th Aerospace Sciences Meeting and Exhibit, Reno, NV, 1997
- **Neural Network Estimation of the Flow Field Structure of Spatially Excited Jets, AIAA-97-0073** - Paper Presented at the 35th Aerospace Sciences Meeting and Exhibit, Reno, NV 1997
- **Actuation Methodologies and Actuator Materials for Combustion Control** - DOE Advanced Turbine Systems-Annual Program Review, Washington, DC, November 7-8, 1996
- **Flow and Combustion Control: Actuation Methodologies and High Temperature Actuator Materials** - DOE Advanced Gas Turbines Systems Research-Combustion Technology Workshop III, Lake Arrowhead, CA, March 19-22, 1996
- **Actuation Methodologies and Actuator Materials for Combustion Control** - DOE Advanced Turbine Systems-Annual Program Review, Morgantown, WV, October 17-18, 1995
- **Active Combustion Devices** - DOE Advanced Turbine Systems Research-Combustion Technology Workshop II, Indianapolis, IN, March 26-29, 1995
- **Actuators for Combustion Control-New Approaches and Materials** - DOE Advanced Turbine Systems-Annual Program Review, Arlington, VA, November 9-11, 1994
- **Advanced Combustion Technologies for Gas Turbine Power Plants** - DOE Advanced Turbine Systems-Combustion Technology Workshop, Nashville, TN, February 23-25, 1994
- **Advanced Combustion Technologies for Gas Turbine Power Plants** - U.S. Dept. of Energy Joint Contractors Meeting-Advanced Turbine Systems Conference, Morgantown, WV, August 3-5, 1993

[SR014](#)

Brigham Young University

Principal Investigator: Paul O. Hedman

Project Title: Combustion Modeling in Advanced Gas Turbine Systems

- **Simultaneous Measurements of Temperature and Species Concentration on Premixed Natural Gas Flames Using a Dual Dye, Single-Strokes CARS System** - Paper Presented at the 1996 Fall Meeting of Western States Section/Combustion Institute Meeting at the University of Southern California, Los Angeles October 28-29, 1996
- **CARS Temperature and LDA Velocity Measurements in a Turbulent, Swirling, Premixed Propane/Air Fueled Model Gas Turbine Combustor** - Paper Presented at the 1995 Annual Meeting of ASME International Gas Turbine And Aeroengine Congress and Exposition Houston, TX, June 5-8, 1995
- **Evaluation of CH₄/NO_x Reduced Mechanisms Used for Modeling Lean Premixed Turbulent Combustion of Natural Gas** - Submitted to ASME Journal Of Engineering for Gas Turbines and Power October 1997
- **Numerical Method for Predicting Fluid Flow in Practical, Industrial Geometries** - International Journal for Numerical Methods in Fluid In Review, 1998
- **Modeling of Lean Premixed Combustion in Stationary Gas Turbines** - Progress in Energy and Combustion Science, In Press, 1998
- **Stochastic Modeling of CO and NO in Premixed Methane Combustion** - Combustion and Flame 113, 135-146, 1998
- **Comprehensive Model for Lean Premixed Combustion in Industrial Gas Turbines- Part I Validation - Paper No. 97S041** - Paper Presented at the 1997 Spring Meeting of the Western States Section/Combustion Institute Meeting at the University of Southern California, Los Angeles, April 1997

- **Chemical Kinetic Modeling of Bluff-Body Lean Premixed Combustor** - Submitted Full Length Article to Combustion and Flame January 1998
- **Comprehensive Model for Lean, Premixed Combustion in Industrial Gas Turbines: Part II-Application** - Paper Presented at the 1997 Spring Meeting Of the Western States Section/Combustion Institute Meeting at the South Coast Air Quality Management District Headquarters, Diamond Bar, CA, April 1997

SR015

Louisiana State University

Principal Investigator: Samanta Acharya

Project Title: Vortex-Generator Induced Enhanced Heat Transfer in Gas Turbine Blade Coolant Channels With Rotation

- **Mass Heat Transfer in a Ribbed Blade Coolant Passage With Cylindrical Vortex Generators: The Effect of Generator-Rib Spacing** - Journal Publication and Conference-ASME Conference
- **An Efficient 3D Poisson Solver in Cylindrical Coordinates for SIMD Architectures** - Journal Publication-Computer Physics Communications
- **A Parallel Direct D3 Poisson Solver in Cylindrical Coordinates** - Conference Presentation-Proceedings of Supercombustion '95
- **Detailed Heat Mass Transfer Distribution in a Ribbed Coolant Passage** - Journal Publication and Conference Presentation- 1996 Turbo Expo ASME/IGTI Meeting, Birmingham, England
- **Heat Transfer in a Two Pass Internally Ribbed Turbine Blade Coolant Channel with Cylindrical Vortex Generators** - Conference Presentation-1996 Turbo Expo ASME/IGTI Meeting, Birmingham, England
- **Heat/Mass Transfer in a Two Pass Rotating Smooth and Ribbed Channel** - Conference Presentation-ASME National Heat Transfer Conference, Houston, August 1996
- **Heat Transfer Enhancements in Internally Ribbed Coolant Channels of Gas Turbine Blades** - Conference Presentation-ASME National Heat Transfer Conference, Houston, August 1996
- **Detailed Mass Transfer Distribution in Rotating Two Pass Coolant Channel With Profiled Ribs** - Conference Presentation, IGTI 2000 (Sub)
- **Detailed Measurements of Enhanced Heat Transfer in a Two Pass Coolant Channel for Two Profiled Rib Configurations** - Conference Presentation, IGTI 2000 (Sub)
- **Heat Mass Transfer in an Internally Ribbed Turbine Blade Coolant With Vortex Generators** - Conference Presentation

SR016

Clarkson University

Principal Investigator: Ronald LaFleur

Project Title: Reduction of Turbine Endwall Total Pressure Loss and Heat Transfer Using the Ice Formation Design Method

- **Review and Theory of Four and Five Hole Pressure Probes Calibrations** - Conference Presentation-ASME/AIAA Journal Publications

SR017

Massachusetts Institute of Technology

Principal Investigator: Gerald Guenette

Project Title: The Effects of Rotation on the Internal Heat Transfer in Turbine Blades

- no publications reported

SR018

Cornell University

Principal Investigator: Stephen B. Pope

Project Title: Manifold Methods for Methane Combustion

- **Treating Chemistry in Combustion With Detailed Mechanisms-In Situ Adaptive Tabulation in Principal Direction** - Combustion Flame 1996
- **An Investigation of the Accuracy of Manifold Methods and Splitting Schemes in the Computational Implementation of Combustion Chemistry** - Combustion Flame 1996
- **Treating Chemistry in Combustion With Detailed Mechanisms-In Situ Adaptive Tabulation in Principal Direction, B. Yang & S..B. Pope** - Combustion & Flame, 112, 85-112 (1998)
- **An Investigation of the Accuracy of Manifold Methods and Splitting Schemes in the Computational Implementation of Combustion Chemistry, B. Yang & S..B. Pope**- Combustion & Flame, 112, 16-32 (1998)
- **PDF Simulations of Turbulent Combustion Incorporating Detailed Chemistry, V. Saxena and S.B. Pope** - Combustion & Flame, 117, 340-350 (1999)
- **PDF Calculations of Turbulent Nonpremixed Flames With Local Extinction, J. Xu and S.B.Pope** - Combustion & Flame, 123, 281-307 (2000)
- **In Situ Detailed Chemistry Calculations in Combustor Flow Analyses, S. James, M.S. Anand, M.K. Razdan and S.B. Pope** - Journal of Engineering for Gas Turbines and Power, 123, 747-756 (2001)

SR019

Purdue University

Principal Investigator: Sanford Fleeter

Project Title: Advanced Multistage Turbine Blade Aerodynamics, Performance, Cooling and Heat Transfer

- **Advanced Multistage Turbine Blade Aerodynamics, Performance, Cooling and Heat Transfer** - Poster Session

SR020

University of California, Irvine

Principal Investigator: Scott Samuelsen

Project Title: The Role of Mixedness and Length Scale on Performance and Emissions in a GTE Can Combustor

- **The Role of Reactant Unmixedness, Strain Rate, and Length Scale on Premixed Combustor Performance** - Poster Presentation

[SR021](#)

University of Minnesota

Principal Investigator: Richard Goldstein

Project Title: Experimental and Computational Studies of Film Cooling with Compound Angle Injection

- **Computations of Inverse Phase Change Using a New Enthalpy Method** - Numerical Methods in Thermal Problems, Vol. IX, Part 2
- **A Numerical Study of Discrete Hole Film Cooling** - ASME Paper, 96-WA/HT/-8, Atlanta, GA
- **Computation of Discrete Hole Film Cooling: Hydrodynamic Study** - ASME Paper, 97-GT-80, Orlando, FL
- **A Numerical Study of Discrete-Hole Film Cooling** - Submitted to Numerical Heat Transfer, February 1998
- **Curvature Effects on Discrete-Hole Film Cooling** - Presented at the 1998 ASME Turbo Expo in Stockholm, Sweden, June 1998
- **Investigation of Discrete-Hole Film Cooling Parameters Using Curved-Plate Models** - Presented at the 1998 ASME Turbo Expo in Stockholm, Sweden, June 1998
- **Measurements in Film Cooling Flows: Hole L/D and Turbulence Intensity Effects** - ASME Paper 96-WA/HT/7, To Be Published in Trans ASME Journal of Turbomachinery
- **Measurements of Aerodynamics Penalties Associated with Film Cooling** - Submitted to 1998 ASME IMECE, Anaheim, CA
- **Influence of Coolant Supply Plenum Geometry on Film Coolant Surface Adiabatic Effectiveness** - ASME Paper 97-GT-25
- **Measurements of Discharge Coefficients in Film Cooling** - Accepted to 1998 ASME IGTC/ Turbo Expo, Stockholm, Sweden, and Recommended for Publication in ASME Transactions J. Turbomachinery-ASME Paper 98-GT-009
- **Turbulence Spectra and Length Scales Measured in Film Coolant Flows Emerging from Discrete Holes** - Accepted to 1998 ASME IGTC/Turbo Expo, Stockholm, Sweden, and Recommended for Publication in ASME Transactions J. Turbomachinery
- **Total-Coverage Discrete Hole Wall Cooling** - Journal of Turbomachinery, Vol. 119, No. 2, Pp. 329-338, 1997
- **Experimental Mass (Heat) Transfer in and Near a Circular Hole in a Flat Plate** - International Journal of Heat and Mass Transfer, Vol. 40, Pp. 2431-2441, 1997
- **Exploration of the Influence of Heat Conduction on Temperature Distribution in Turbine Blades** - HTD-Vol. 350, National Heat Transfer Conference, Vol. 12
- **Heat (Mass) Transfer and Film Cooling Effectiveness With Injection Through Discrete Holes, Part I: Within Holes and on the Back Surface** - Journal of Turbomachinery, Vol. 117, Pp.440-450, 1995
- **Heat (Mass) Transfer and Film Cooling Effectiveness With Injection Through Discrete Holes, Part II: On Exposed Surface** - Journal of Turbomachinery, Vol. 117, Pp. 451-460, 1995
- **The Influence of Secondary Flows Near the Endwall and Boundary Layer Disturbance on Convective Transport From a Turbine Blade** - Journal of Turbomachinery, Vol. 117, Pp. 675-665, 1995
- **Effect of Plenum Cross-Flow on Heat (Mass) Transfer Near and Within the Entrance of Film Cooling Holes** - Journal of Turbomachinery, Vol. 119, No. 4 Pp. 761-769, 1997
- **Row-of-Holes Film Cooling of a Convex and a Concave Wall at Low Injection Angles** - Journal of Turbomachinery Vol. 119 No.3, Pp. 574-579, 1997
- **Film Cooling Effectiveness and Mass/Heat Transfer Coefficient Downstream of One Row of Discrete Holes** - Presented at the 43rd ASME Gas Turbine and Aeroengine Congress, Stockholm, Sweden, June 2-5, 1998. Recommended for Publication in the Journal of Turbomachinery, ASME Paper 98-GT-174
- **Effects of Blade Profile on Turbine Blade Heat (Mass) Transfer** - Symposium on Process, Enhanced and Multiphase Heat Transfer in Honor of Professor Author E. Bergles, Georgia Institute of Technology, Atlanta, Georgia, November 16, 1996

- **Influence of High Free Stream Turbulence on Mass/Heat Transfer in a Simulated High Performance Turbine Blade Cascade** - Accepted for Presentation at the XVI UIT National Heat Transfer Conference, Siena, Italy, June 17-19, 1998
- **Film Cooling of Gas Turbine Endwall With Discrete-Hole Injection** - Journal of Turbomachinery, Vol. 118, Pp. 278-284, 1996
- **Flow Measurements in Film Cooling Flows With Lateral Injection** - Presented at the 1998 ASME Turbo Expo in Stockholm, Sweden, June 1998, ASME Paper 98-GT-054
- **Film Cooling of Gas Turbine Endwall With Discrete-Hole Injection** - Journal of Turbomachinery, Vol. 118, Pp. 278-284, 1996
- **Measurements in Film Cooling With Lateral Injection: Adiabatic Effectiveness Values and Temperature Fields** - Submitted to the 1998 ASME IMECE Conference, Anaheim, CA, November 1998
- **A Study of Film Cooling Injection Geometry's: Measured Flow and Thermal Fields With Lateral, Compound, and In-Line Injection** - Submitted to the 1998 ASME IMECE Conference, Anaheim, CA, November 1998
- **Flow and Heat Transfer Measurements in Gas Turbine Film Cooling** - Presented at the Energy Sources Technology Conference and Exhibition, 1998
- **In Search of a Blowing Parameter for Correlating Film Cooling Effectiveness Data** - 2nd European Thermal Sciences and 14th UIT National Heat Transfer Conference, Rome, Italy, Pp. 647-653, May 1996
- **Effect Endwall Boundary Conditions on Turbine Blade Mass Transfer in Presence of High Freestream Turbulence** - Accepted for Presentation at the 11th International Heat Transfer Conference, Seoul, Korea, August 23-28, 1998
- **Effect of High Free Stream Turbulence with Large Length Scale on Blade Heat/Mass Transfer** - Presented at the 43rd ASME Gas Turbine and Aeroengine Congress, Stockholm, Sweden, June 2-5 1998, Recommended for Publication in the Journal of Turbomachinery, ASME Paper 98-GT-107
- **Secondary Flows in the Blade/Endwall Region of a Turbine Cascade** - Symposium on Thermal Science and Engineering in Honor of Chancellor Chang-Lin Tie, University of California, Berkeley, California, November 14, 1995
- **Flow Visualization in a Linear Cascade of High Performance Turbine Blades** - Journal of Turbomachinery, Vol. 119, No. 1 Pp. 1-8, 1997
- **Measurements of Mean Flow and Eddy Transport Over a Film Cooling Surface** - HTD-Vol. 327, National Heat Transfer Conference, Vol. 5.
- **Film Cooling Effectiveness and Mass/Heat Transfer Coefficient Downstream of a Row of Holes with Compound Angle Injection** - Submitted to the 44th ASME Gas Turbine and Aeroengine Congress, Indianapolis, Indiana, June 1999
- **Effect of Wake-Distributed Flow on Heat (Mass) Transfer to a Turbine Blade** - Submitted to the 44th ASME Gas Turbine and Aeroengine Congress, Indianapolis, Indiana, June 1999
- **Effect of Edge Roughness on the Development of Taylor-Gortler Vortices on Pressure Surface of a Turbine Blade** - Submitted to Experiments of Fluids
- **Mass Transfer From a Simulated Gas Turbine Blade in the Presence of Taylor-Gortler Vortices** - Submitted to International Journal of Heat and Mass Transfer
- **A Numerical Study of Discrete-Hole Film Cooling** - Thesis, University of Minnesota, MN
- **Experiments in Film With Various Coolant Delivery Geometries** - Master of Science Thesis in Mechanical Engineering, University of Minnesota, Minneapolis, Minnesota, December 1996
- **Film Cooling Effectiveness and Mass/Heat Transfer Coefficients Downstream of One Row of Discrete Holes With 45 Degree Compound Angle** - Master of Science Thesis in Mechanical Engineering, University of Minnesota, Minneapolis, Minnesota, March 1998
- **Measurements in Film Cooling Flows With Lateral Injection** - Master of Science Thesis in Mechanical Engineering, University of Minnesota, Minneapolis, Minnesota, January 1998
- **Prediction of Three-Dimensional Film Cooling Situations** - Ph.D. Dissertation, University of Minnesota, Minneapolis, Minnesota, June 1997
- **Film Cooling Effectiveness and Heat (Mass) Transfer Coefficient for a Single Row**

of Discrete Film Cooling Holes - Master of Science Thesis in Mechanical Engineering, University of Minnesota, Minneapolis, Minnesota, May 1996

- **Effects of High Turbulence and Wakes on Heat (Mass) Transfer from Gas Turbine Blades** - Ph.D. Dissertation, University of Minnesota, Minneapolis, Minnesota, June 1998
- **Local Mass Transfer Measurement From a Turbine Blade: Influence of High Turbulence With Large Length Scale on Heat/Mass Transfer** - Ph.D. Dissertation, University of Minnesota, Minneapolis, Minnesota, October 1997

[SR022](#)

University of Central Florida

Principal Investigator: Vimal Desai

Project Title: Compatibility of Gas Turbine Materials With Steam Cooling

- **Influence of Steam Cooling on Hot Corrosion** - Poster Session

[SR023](#)

Carnegie Mellon University

Principal Investigator: Minking Chyu

Project Title: Development and Application of a Novel Optical Temperature/Heat Cooling Flux Sensor for Advanced Blade Cooling Research and Engine Thermal Diagnostics

- **Film Cooling Studies With Thermographic Phosphor Imaging** - Technical Paper for the 1996 International Gas Turbine Conference in Birmingham, UK

[SR024](#)

Clemson University

Principal Investigator: James Leylek

Project Title: Advanced Design Methodology Using Combined Computational Experimental Techniques for Gas Turbine Film Cooling

- **Effect of Geometry on Slot-Jet Film-Cooling Performance** - Conference Presentation- 1996 Turbo Expo ASME/IGTI, Birmingham, England, June 10-13, 1996
- **Computational Methodology for Gas Turbine Film Cooling Design-Part 1,2 and 3** - Conference Presentation-1995 ASME Turbo Expo, Houston, TX, June 1995
- **A Systematic Computational Methodology Applied to a Three-Dimensional Film Cooling Flowfield** - Conference Publication, 1996 Turbo-Expo ASME/IGTI, Birmingham, England, June 10-13, 1996
- **A Detailed Analysis of Film Cooling Flow Physics-Part 1,2,3 and 4** - ASME/IGTI Turbo Expo, 1997, Orlando, FL, June 1997 (4 Abstracts)
- **Film Cooling Heat Transfer: Shaped and Compound Angle Hole Injection** - Conference Presentation-ASME IGTI Turbo Expo, June 1998

[SR025](#)

University of Wyoming

Principal Investigator: Paul Dellenback

Project Title: The Impact of Turbulence on Heat Transfer in Internal Flows

- no publications reported

[SR026/SR040](#)

Michigan State University

Principal Investigator: Abraham Engeda

Project Title: Steam Cooled Gas Turbine Blade

- no publications reported

[SR027](#)

Georgia Institute of Technology

Principal Investigator: W.B. Carter

Project Title: Combustion Chemical Vapor Deposited Coatings For Thermal Barrier Coating Systems

- **Aerosol Size Effects in Combustion CVD** - Conference Presentation
- **Combustion CVD-Deposited Oxidation Resistant Coatings** - International Symposium on Chemical Vapor Deposition: CVD XIV and EUROCVDP Paris, France August 1997
- **Combustion CVD of Magnesium Spinel and Nickel Spinel** - Conference Presentation
- **Silica Thin Films Applied to Ni-20Cr Alloy via Combustion Chemical Vapor Deposition** - Conference San Diego, CA, April 21-25, 1999
- **Aerosol Size Effects in Combustion CVD** - Conference Presentation
- **High Temperature Oxidation of an Alumina-Coated Ni-Based Alloy** - Conference Presentation
- **The Effects of Alumina Coatings on the Oxidation of Ni-20Cr** - Conference-1996 Electrochemical Society (ECS) Conference
- **Mechanical Properties of YSZ-Alumina Thin Films Deposited via Combustion CVD** - Conference-1996 Electrochemical Society (ECS) Conference
- **Combustion Chemical Vapor Deposition of CeO₂ Films** - Conference-1996 Electrochemical Society (ECS) Conference
- **Hot Corrosion and Thermal Fatigue Behavior of Modified Thermal Barrier Coatings** - Conference Presentation/Research Presentation-CIMTEC '98, Florence, Italy, June 1998
- **The Combustion Chemical Vapor Deposition of High Temperature Materials** - Journal Publication
- **Combustion Chemical Vapor Deposited Coatings for Thermal Barrier Coating Systems** - Poster Session

[SR028](#)

University of Maryland

Principal Investigator: Ashwani Gupta

Project Title: Advanced Concepts for High Efficiency and Low NO_x Gas Turbine Combustor Development

- **Premixed Burner Experiments: Burner Geometry, Mixing And Flames Structure Issues** - Abstract-Conference Presentation
- **Analysis of Gaseous Fuel and Air Mixing** - Journal Publication- Combustion Science and Technology, Vol.141, 1999
- **Effects of Swirl on Combustion Characteristics in Premixed Flames** - Journal Publication- Journal of Engineering for Gas Turbine and Power, Trans ASME, Vol. 120, July 1998 and Conference Presentation-IGTI Conference, Orlando, FL , June 1997
- **Analysis of Gaseous Fuel and Air Mixing in Flames and Flame Quenching** - Journal Publication- Journal of Propulsion and Power, Vol. 15, No.6, January/February 2000
- **Effects of Swirl on Temperature Distribution in Premixed Flames** - Conference Presentation-33rd AIAA Aerospace Sciences Meeting, Reno, NV, January 1997
- **Maximum Mixing Times of Methane and Air under Non-Reacting and Reacting Conditions** - Accepted for Journal Publication- Propulsion and Power, 2000
- **Analysis of Propane- Air Mixing under Reacting and Non-Reacting Conditions** - Conference Presentation-35th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Los Angeles, CA, June 1999
- **Effects of Swirl and Momentum Distribution on Thermal Non-uniformities and Emissions in Premixed Flames** - Poster Presentation

SR029

University of Oklahoma

Principal Investigator: Ajay Agrawal

Project Title: Improving Aerodynamics of the Intercooler Flow Path for the Development of High Efficiency Gas Turbines

- **Flow Development in an Annular Contraction** - Conference Presentation at 1998 ASME IGTI Turbo Expo, Stockholm Sweden and Journal ASME Paper 98-GT-306
- **Flow Characteristics of an Annular Intercooler Diffuser for Gas Turbine** - Conference Presentation at 1998 ASME IGTI Turbo Expo, Stockholm, Sweden ASME Paper 98-GT-283
- **Flow Measurements in a Curved Wall Annular Contraction** - Published in Journal of Gas Turbines For Engineering and Power, Vol. 121 444-450

SR030

University of Connecticut

Principal Investigator: Maurice Gell

Project Title: Bond Strength and Stress Measurements in Thermal Barrier Coatings

- **Mechanism of Spallation in Platinum Aluminide/Electron Beam Vapor Deposited Thermal Barrier Coatings** - Journal Publication-Metallurgical Transactions
- **Assessment of Damage Accumulation in Thermal Barrier Coatings Using Florescent Dye Infiltration Technique** - Journal Publication -Journal of Thermal Spray, Vol. 8, No. 1, March 1999
- **Thermal/Residual Stress in a Thermal Barrier Coating System** - Journal Publication-ACTA Materialia, Vol. 46, No. 16, October 1998
- **Measurement of Interfacial Fracture Toughness of Thermal Barrier Coatings** - Journal Publication-Script Met, Vol. 39, No. 10, 1998
- **Bond Strength, Bond Stress and Spallation Mechanisms of Thermal Barrier Coatings** - Journal Publication-Surface and Coatings Technology-In press
- **Bond Strength and Stress Measurements in Thermal Barrier Coatings-1997**

Status - Poster Session

SR031

**Georgia Institute of Technology
Principal Investigator: Ben Zinn**

Project Title: Active Control of Combustion Instabilities in Low NOx Gas Turbines

- **Application of Boundary Element Methods in Modeling Multidimensional Flame-Acoustic** - Conference Presentation: 20th World Conference on the Boundary Element Method, Orlando, FL, August 1998
- **The Role of Unmixedness in Driving Combustion Instabilities in Low Nox Gas Turbine** - Journal Publications: Combustion Science and Technology 1998, Vol. 135, pp.193-211, Presentation/Proceedings: 27th Symposium (International) on Combustion, Boulder, CO, August 1998
- **Combustion Instabilities in Low NOx Gas Turbines and Their Active Control** - Conference Presentation and Proceedings Publication: AGARD-AVT Gas Turbine Engine Combustion Symposium in Lisbon, Portugal, October 1998
- **Theoretical Investigation of Combustion Instability Mechanisms in Lean Premixed Gas Turbines** - Conference Presentation/Publication-AIAA 98-0641, 36th Aerospace Sciences Meeting, Reno, NV, January 1998
- **Theoretical Investigation of Unsteady Flow** - Conference Presentation/Publication-AIAA 98-0641, 36th Aerospace Sciences Meeting, Reno, NV, January 1998
- **Interactions with a Planar Flame** - Conference Presentation/Publication- AIAA 99-0324, 37th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 11-14, 1999
- **Experimental Investigation of Combustion Instabilities in a Gas Turbine Combustor Simulator** - Conference Presentation/Publication- AIAA 99-0324, 37th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 11-14, 1999
- **The Application of Multiple Expansions to Unsteady Combustion**, Conference Presentation/Publication- AIAA 99-0324, 37th AIAA, Aerospace Sciences Meeting and Exhibit, Reno NV, January 11-14, 1999
- **A Mechanism of Combustion Instability in Lean Premixed Gas Turbines Combustors** - Conference Presentation: ASME Turbo Expo' 99, Indianapolis, IN, June 1999
- **Online Identification Approach for Adaptive Control of Combustion Instabilities** - Conference Presentation: AIAA 99-2125, 35th AIAA/ASME/SAE/ASEE/Joint Propulsion Conference, Los Angeles, CA June 1999
- **Determination of Unsteady Heat Release Distribution in Unstable Combustor From Acoustic Pressure Measurements** - Journal Publications: Technical Note- J. Propulsion and Power, Vol. 15, No. 4, July-August 1999
- **The Role of Equivalence Ratio Oscillations in Driving Combustion Instabilities In Low NOx Gas Turbines** - Conference Presentation- 27th Symposium (International) On Combustion, Boulder, CO
- **Active Control of Combustion Instabilities of Low Nox Gas Turbines** - Poster Presentation

SR032

**Pennsylvania State University
Principal Investigator: Robert J. Santoro**

Project Title: Combustion Instability Studies for Application In Low Emissions, High Performance Land-Based Gas Turbine Combustors

- **An Experimental Study Of Combustion Dynamics of Premixed Swirl Injector** - Conference Presentation-27th International Symposium on Combustion, August 1998
- **Combustion Instability Studies for Application to Land-Based Gas Turbine Combustors** - Poster Presentation

[SR033](#)

Arizona State University

Principal Investigator: Ramendra Roy

Project Title: Flow and Heat Transfer in Gas Turbine Disk Cavities Subject to Non-Uniform External Pressure Field

- **A Study of the Flow Field in a Model Rotor-Stator Cavity** - R. P. Roy, S. Devasenathipathy, G. Xu, and Y. Zhao - Paper 99-GT-246, Indianapolis, IN
- **Study of Mainstream Gas Ingestion in a Rotor-Stator Disk Cavity** - R. P. Roy, G. Xu, and J. Feng - Paper AIAA-2000-3372, Huntsville, AL
- **A Study of Convective Heat Transfer in a Rotor-Stator Cavity** - R. P. Roy, G. Xu, and J. Fen - ASME Journal of Turbomachinery, Vol. 123, pp. 621-632
- **Pressure Field and Mainstream Gas Ingestion in a Rotor-Stator Disk Cavity** - R. P. Roy, G. Xu, J. Feng, and S. Kan - Paper 2001-GT-0564, New Orleans, LA

[SR034](#)

Clemson University

Principal Investigator: Ting Wang

Project Title: Innovative Schemes for Closed-Loop Air/Stream Cooling of Advanced Gas Turbine Systems

- **Mist/Steam Cooling in a Heated Horizontal Tube, Part 1: Development of the Experimental Program** - Accepted for Publication on the ASME Journal of Turbomachinery, 2000
- **Mist/Steam Cooling in a Heated Horizontal Tube, Part 2: Results Modeling** - Accepted for Publication on the ASME Journal of Turbomachinery, 2000
- **Mist/Steam Cooling in 180 Degree Tube Bend** - Accepted for Publication in the ASME Journal of Heat Transfer, 2000
- **Modeling of Heat Transfer in a Mist/Steam Impingement Jet** - ASME Paper NHTC2000-12044, to be presented at the National Heat Transfer Conference, 2000
- **Mist/Steam Heat Transfer of Confined Slot Jet Impingement** - ASME Paper 2000-GT-221, Presented at the ASME Turbo 2000, 1999
- **Mist/Steam Cooling in 180 Degree Bend** - ASME Paper NHTC 99-196, Presented at the 1999 National Heat Transfer Conference, Albuquerque, August, 1999
- **Mist/Steam Cooling in a Heated Horizontal Tube, Part 1: Development of the Experimental Program** - ASME Paper 99-GT-144, Presented at the ASME Turbo Expo 99, Indianapolis, IN, June 1999
- **Mist/Steam Cooling in a Heated Horizontal Tube, Part 2: Results and Modeling** - ASME Paper 99-GT-145 Presented at the ASME Turbo Expo 99, Indianapolis, IN, June 1999
- **Modeling of Heat Transfer in a Mist/Steam Impinging Jet** - X. Li, J. L. Gaddis, and T. Wang - ASME Journal of Heat Transfer, Vol 123, 6, pp 1086-1092, 2001
- **Mist/Steam Heat Transfer of Confined Slot Jet Impingement** - ASME Paper 2000-GT-221, Presented at the ASME Turbo 2000, 1999
- **Mist/Steam Heat Transfer in Confined Slot Jet Impingement** - X. Li, J. L. Gaddis, T. Wang, - J. Turbomachin. 123,1, pp. 161-167 (2001)

[SR035](#)

University of Connecticut
Principal Investigator: Amir Faghri

Project Title: Heat Pipe Turbine Vane Cooling

- no publications reported

[SR036](#)

Pennsylvania State University
Principal Investigator: Bud Lakshminarayana

Project Title: Improved Modeling Techniques for Turbomachinery Flow Fields

- **Steady and Unsteady Three-Dimensional Flow Field Downstream of an Embedded Stator in a Multistage Axial Flow Compressor, Part 1: Unsteady Velocity Field** - Conference Presentation-ASME International Gas Turbine and Aeroengine Congress and Exhibition, Stockholm, Sweden, June 1998
- **Steady and Unsteady Three-Dimensional Flow Field Downstream of an Embedded Stator in a Multistage Axial Flow Compressor, Part 2: Composite Flow Field** - Conference Presentation-ASME International Gas Turbine and Aeroengine Congress and Exhibition, Stockholm, Sweden, June 1998
- **Steady and Unsteady Three-Dimensional Flow Field Downstream of an Embedded Stator in a Multistage Axial Flow Compressor, Part 3: Deterministic Stress and Heat-Flux Distribution and Average Passage Equation System** - Conference Presentation-ASME International Gas Turbine and Aeroengine Congress and Exhibition, Stockholm, Sweden, June 1998
- **Aerodynamic Modeling of Multistage Compressor Flowfields- Part 1: Analysis of Rotor/Stator/Rotor Aerodynamic Interaction** - Published Proceedings of Institute of Mechanical Engineering, Vol. 212 Part G.
- **Aerodynamic Modeling of Multistage Compressor Flowfields- Part 2: Modeling Deterministic Stresses** - Published Proceedings of Institute of Mechanical Engineering, Vol. 212 Part G
- **Improving Modeling Techniques for Turbomachinery Flow Fields** - Poster Session

[SR037](#)

Syracuse University
Principal Investigator: Thong Dang

Project Title: Development of an Advanced Three-Dimensional And Viscous Aerodynamic Design Method For Turbomachine Components in Utility and Industrial Gas Turbine Applications

- **Practical Use 3D Inverse Viscous Method for Design of Compressor Balding** - Conference Presentation-1998 ASME IGTI Gas Turbine Conference (Abstract) Journal of Turbomachinery, Vol. 121 April 1999

[SR038](#)

Massachusetts Institute of Technology
Principal Investigator: Gerald Guenette

Project Title: The Effects of Rotation on the Fluid Mechanics Of Internal Turbine Blade Cooling

- no publications reported

[SR039](#)

University of Central Florida
Principal Investigator: Vimal Desai

Project Title: Compatibility of Gas Turbine Materials With Steam Cooling

- no publications reported

[SR040](#)

Michigan State University
Principal Investigator: Abraham Engeda

Project Title: Steam Cooled Gas Turbine Blade

- no publications reported

[SR042](#)

Cleveland State University
Principal Investigator: Kang Lee

Project Title: Development of Refractory Oxide and Glass Ceramic-YSZ Dual Layer TBC Top Coats For Advanced Land Based Gas Turbines

- **Durability of TBCs With a Surface Environmental Barrier Layer Under Thermal Cycling in Air and in Molten Salt** - C. Ramachandra, K. N. Lee and S. N. Tewari - (to be published in Surface and Coatings Technology 2003)
- **Development of Refractory Silicate-YSZ Dual Layer TBC's** - Y. He, K. N. Lee, R. A. Miller and S. Tewari - NASA/TM-1999-209079 (1999); J. Thermal Spray Technology, 9 [1] 59-67 (2000)
- **Development of Refractory Oxide and Glass Ceramic-YSZ Dual Layer TBC's** - Oral Presentation, TMS Conference (Fall 1999)

[SR043](#)

University of Wisconsin, Madison
Principal Investigator: Karen Thole

Project Title: Detailed Flow and Thermal Field Measurements on a Scaled-Up Stator Vane

- **High Freestream Turbulence Simulation in a Scaled-Up Turbine Vane Passage** - 97-GT-51
- **Heat Transfer and Flowfield Measurements in the Leading Edge Region of a Stator Vane Endwall** - Journal of Turbomachinery, Vol. 121 No. 3, Pp. 558-568
- **Effects of High Freestream Turbulence Levels and Length Scales on Stator Vane Heat Transfer** - 98-GT-236
- **Flowfield Measurements for a Highly Turbulent Flow in a Stator Vane Passage** - Journal of Turbomachinery, Vol. 122 pp. 255-262 (also presented as ASME Paper 99-

GT-253)

- **Flowfield Measurements in the Endwall Region of a Stator Vane** - Journal of Turbomachinery, Vol. 122, pp. 458-466 (98-GT-188)
- **High Freestream Turbulence Effects in the Endwall Leading Edge Region** - Journal of Turbomachinery, Vol. 122, pp. 699-708 (2000-GT-201)
- **Measurements and Predictions of a Highly Turbulent Flowfield in a Turbine Vane Passage** - Journal of Fluids Engineering, Vol. 122. Pp.666-676
- **High Freestream Turbulent Effects on Turbine Vane Boundary Layer Development** - ASME Paper 2001-GT-0404 (Recommended by reviewers for the Journal of Turbomachinery)
- **Film Cooling Effectiveness in the Showerhead Region of a Gas Turbine Vane Part 1: Stagnation Region and Near Pressure Side** - 99-GT-048
- **Film Cooling Effectiveness in the Showerhead Region of a Gas Turbine Vane Part2: Stagnation Region and Near Suction Side** - 99-GT-049
- **Effects of Showerhead Injection on Film Cooling Effectiveness for a Downstream Row of Holes** - 2000-GT-240
- **Scaling of Performance for Varying Density Ratio Coolants on an Airfoil With Strong Curvature and Pressure Gradients** - Accepted to the Journal of Turbomachinery (2000-GT-239)
- **Effects of Showerhead Cooling on Turbine Vane Suction Side Film Cooling Effectiveness** - Accepted for Presentation at the ASME 2000 IMECE, 2000
- **Three Component Velocity Field Measurements in the Stagnation Region of a Film Cooled Turbine Vane** - Submitted to ASME Gas Turbine and Aeroengine Congress, 2001
- **Thermal Field and Flow Visualization Within the Stagnation Region of a Film Cooled Turbine Vane** - Submitted to ASME Gas Turbine and Aeroengine Congress, 2001
- **The SUDI Turbulence Generator-A Method to Generate High Freestream Turbulence Levels and a Range of Length Scale** - Thesis & Dissertations- Mechanical Engineering Department, University of Wisconsin
- **Development and Testing of a Scaled-Up Turbine Vane Cascade** - M.S. Thesis, Mechanical Engineering Department, University of Wisconsin
- **Detailed Measurements in the Endwall Region of a Gas Turbine Stator Vane** - M.S. Thesis, Mechanical Engineering Department, University of Wisconsin
- **High Freestream Turbulence Studies on a Scaled-Up Stator Vane** - Ph.D. Dissertation, Mechanical Engineering Department, University of Wisconsin
- **Detailed Film Cooling Effectiveness and Three Component Velocity Field Measurements in a First Stage Turbine Vane Subject to High Mainstream Turbulence** - Ph.D. Dissertation, The University of Texas at Austin
- **Film Cooling Effectiveness in the Showerhead Region of a Gas Turbine Stator Vane Under High Mainstream Turbulence** - MS Thesis, The University of Texas at Austin
- **Suction Side Film Cooling of a First Stage Gas Turbine Vane** - MS Thesis, The University of Texas at Austin
- **Turbulence and Three-Dimensional Effects on a Film Cooled Turbine Vane** - Ph.D. Dissertation, The University of Texas at Austin

[SR044](#)

Purdue University

Principal Investigator: Jay Gore

Project Title: Miniature Infrared Emission Based Temperature Sensor and Light-Off Detector

- **Laminar Flamelet Calculations of Piloted Jet Diffusion Flame** - Conference Presentation
- **Miniature Infrared Emission Based Temperature Sensor and Light-Off Detector** -

Poster Presentation

SR045

**Massachusetts Institute of Technology
Principal Investigator: Choon S. Tan**

Project Title: Impact of Endwall Flow and Wakes on Multistage Compressor Performance and Design

- **Effect of Upstream Unsteady Flow Conditions on Rotor Tip Leakage Flow -**
(Abstract)-MIT Gas Turbine Laboratory, Cambridge, Massachusetts

SR046

**University of Pittsburgh
Principal Investigator: Fred Pettit**

Project Title: Chemical and Mechanical Instabilities at Thermal Barrier Coating Interfaces

- **Mechanisms for Failure of Electron Beam Physical Vapor Deposited Coatings Induced by High Temperature Oxidation in Elevated Temperature Coatings -** TMS, 1999, p.51.
- **Thermal Barrier Coatings for 21st Century -** Metallkunde, 90,1069 (1999)
- **The Effects of High Temperature Exposure on Durability of Thermal Barrier Coatings -** Key Engineering Material, 197,145 (2001)
- **Measurement of Interfacial Toughness in Thermal Barrier Coating Systems By Indentation -** Accepted to Engineering Fracture Mechanics
- **Mechanisms for Interfacial Toughness Loss in Thermal Barrier Coating Systems -** Key Engineering Materials, 197,165 (2001)
- **The Effects of Oxidation on Thermal Barrier Coating Failures -** Proc. International Metallurgy and Materials Congress, May 2001, Istanbul, Turkey, Vol. II, p.711.
- **Processing Effects on the Failure of EBPVD TBC's on MCrAlY and Platinum Aluminate Bond Coats -** in Super alloys 2000, TMS, 2000. P.621.
- **Accelerated Durability Testing of Coatings For Gas Turbine -** Elevated Temperature Coatings: Science and Technology IV, TMS, 2001, P.1

SR047

**Northwestern University
Principal Investigator: Katherine Faber**

Project Title: SPPS for Advanced Thermal Barrier Coatings

- **Small Particle Plasma Spray Apparatus, Method and Coated Article -** Patents Issued Patent # 5,744,777(1998) and 5,858,470 (1999)
- **Microstructural Characterization of Small Particle Plasma Spray Coatings -** J. Am. Ceramic Society, 82 [8] 2204-208-1999
- **The Role of NZP Additions in Plasma-Sprayed YSZ: Microstructure, Thermal Conductivity and Phase Stability Effects -** Material Science Engineering A, A272, 284-91, 1999
- **The Dissociation of NZP During Plasma Spraying -** Scripta Materialia, 42, 855-60, 2000
- **Deformation Mechanism in Compression Loaded Stand-Alone Plasma-Sprayed Coatings -** J. Am. Ceramic Society, 83 [12] 3057-64, 2000

- **Comparative Study of TEM Sample Preparation Techniques for Plasma Sprayed Ceramic Coatings** - Bol. Soc. Esp.Ceramic Vidrio, 39 [6] 735-40, 2000
- **Thermal Conductivity and Phase Evolution of Plasma-Sprayed Multilayer Coatings** - Journal Material Science,36 3511-18, 2001
- **The Role of Starting Powder Size on the Compressive Response of Stand-Alone Plasma-Sprayed Coatings** - Journal Material Science, 37 [3] 629-36, 2002
- **In-Situ Characterization of Small Particle Plasma-Sprayed Powders** - Journal of Thermal Spray Technology, In Press
- **Effects of Heat-Treatment on Phase Stability, Microstructure, and Thermal Conductivity of Plasma-Sprayed YSZ** - Journal Material Science, In Press
- **Yttrium-Aluminum-Garnet Oxygen Barriers in Zirconia-Based Thermal Barrier Systems** - J. American Ceramic Society
- **The Effects of Spraying Parameters on the Sub-Micron Pores and Microcracks in Plasma-Sprayed YSZ Coatings as Revealed by Small-Angle X-ray Scattering** - In Preparation
- **The Effect of Processing Parameters on Properties of Zirconia Thermal Barrier Coatings Fabricated Using Small Particle Plasma Technology** - 100th Annual Meeting of American Ceramic Society, Cincinnati, OH, May 5, 1998
- **Processing and Characterization of A12O3/YSZ Multi-Layer Coatings Made by Small Particle Plasma Spray** - 100th Annual Meeting of American Ceramic Society, Cincinnati, OH, May 5, 1998
- **The Effect of Processing Parameters on Properties of Zirconia Coatings Fabricated Using Small Particle Plasma Spray** - ASM International Materials Solutions - Conference, Rosemont, IL, October 12, 1998
- **Statistical Design on Experiments of A12O3/YSZ Multilayer Coating Made by Small Particle Plasma Spray** - ASM International Materials Solutions Conference, Rosemont, IL, October 14, 1998
- **The Role of Particle Substrate Interaction on the Roughness of Small Particle Plasma-Spray Coatings** - Fall Meeting of Basic Science Division of the American Ceramic Society, Irvine, CA, October 23, 1998
- **Small Particle Plasma-Sprayed Coatings for Corrosion on Thermal Protection** - Material Science and Engineering Colloquium, Lehigh University, Bethlehem, PA, April 6, 1999
- **Small Particle Plasma Sprayed Ytria-Stabilized Coatings with Zirconium Phosphate Additions** - 101st Annual Meeting of the American Ceramic Society, Indianapolis, IN, April 26, 1999
- **Thermal Conductivity and Microstructural Stability of Microlaminate Plasma Spayed Coatings** - 101st Annual Meeting of the American Ceramic Society, Indianapolis, IN, April 26, 1999
- **The Relationship Between Spray Parameters, Splat Geometry, and Properties of Zirconia Thermal Barrier Coatings** - 101st Annual Meeting of the American Ceramic Society, Indianapolis, IN, April 26, 1999
- **Mechanical Properties of Small Particle Plasma Spray Coatings** - ASM International Thermal Spray Symposium, Cincinnati, OH, November 1, 1999
- **Thermal and Microstructural Characterization of YSZ-Based Microlaminate Thermal Barrier Coatings** - ASM International Thermal Spray Symposium, Cincinnati, OH, November 3, 1999
- **The Effects of Spray Parameters on the Splat Morphology, Porosity and Properties of Zirconia Thermal Barrier Coatings** - ASM International Thermal Spray Symposium, Cincinnati, OH, November 3, 1999
- **Small-Particle Plasma Spray Coatings for Thermal Barriers and Corrosion Protection and Damage Mechanism in Plasma Sprayed Alumina Coatings** - Undergraduate and Graduate Seminars, Alfred University, March 16, 2000
- **Oxidation and Thermal Resistance of Plasma-Sprayed YAG-YSZ Coatings** - Annual Meeting of American Ceramic Society, St. Louis, MO, May 2, 2000
- **Compressive Loading of Stand-Alone Plasma Sprayed Alumina Coatings: Deformation Mechanisms and Lamella Side Effects** - Annual Meeting of the American Ceramic Society, St. Louis MO, May 2, 2000
- **The Effects of Spraying Conditions on the Porosity in Zirconia Thermal Barrier Coatings** - Annual Meeting of the American Ceramic Society, St. Louis MO, May 3,

2000

- **Microscopy Investigation of Plasma Sprayed NZP(Ca_{0.5}Sr_{0.5}Zr₄P₆O₂₄)** - Annual Meeting of the American Ceramic Society, St. Louis MO, May 3, 2000
- **Damage Mechanism in Plasma-Sprayed Alumina Coatings** - ASME Annual Meeting, Orlando, FL, November 8, 2000
- **Damage Mechanism in Plasma-Sprayed Alumina Coatings** - Materials Science and Engineering Colloquium, The Ohio State University , February 9, 2001
- **The Role of Starting Powder Size on the Compressive Response of Stand- Alone Plasma Sprayed Alumina Coatings** - Annual Meeting of the American Ceramic Society, Indianapolis, IN, April 23, 2001
- **In-Situ Characterization of Small-Particle Plasma Sprayed Powder** - Annual Meeting of the American Ceramic Society, Indianapolis, IN, April 23, 2001
- **Oxidation Behavior of Plasma-Sprayed YAG/YSZ Coatings** - Annual Meeting of the American Ceramic Society, Indianapolis, IN, April 23, 2001
- **Effects of Heat Treatment on Phase Stability, Lamella and Grain Morphology and Thermal Conductivity on Plasma Sprayed YSZ** - Annual Meeting of American Ceramic Society, Indianapolis, IN, April 24, 2001
- **Multilayer Thermal Barrier Coatings for Enhanced Oxidation Resistance** - Fall Meeting of the Canadian Ceramic Society, Toronto, Canada, September 24, 2001
- **Plasma-Sprayed YAG/YSZ Coatings** - ASM International Materials Solutions Conference, Indianapolis, IN, November 7, 2001
- **Small Particle Plasma Spray Coatings for Thermal Barriers** - Section of ASM International, Skokie, IL, January 8, 2002

[SR048](#)

University of California, Davis

Principal Investigator: Vincent Capece

Project Title: An Experimental Investigation of the Three Dimensional Flow in the Clearance Region of Cantilevered Stator Vanes With and Without Hub Rotation

- no publications reported

[SR049](#)

Cornell University

Principal Investigator: Stephen B. Pope

Project Title: Development and Implementation of Accurate and Efficient Combustion Chemistry for Gas Turbine Combustor Simulations

- **In Situ Detailed Chemistry Calculations in Combustor Flow Analysis** - In Proceedings of 44th ASME Gas Turbine and AeroEngine Technical Congress, Indianapolis, IN
- **PDF Simulations of Turbulent Combustion Incorporating Detailed Chemistry** - Combustion and Flame, 117, 340-350
- **Implementation of Radiation in ISAT** - Cornell University Report FDA 99-05
- **PDF Calculations of Local Extinction and NO Production in Piloted-Jet Turbulent Methane/Air Flames** - Twenty-Eighth Symposium International on Combustion
- **PDF Calculations of Turbulent Nonpremixed Flames With Local Extinction** - Combustion and Flame

SR050

**Pennsylvania State University
Principal Investigator: Domenic Santavicca**

Project Title: Sensors for Measuring Primary Zone Equivalence Ratio In Lean Premixed Combustors

- no publications reported

SR062

**University of California, Irvine
Principal Investigator: Scott Samuelsen**

Project Title: Mechanistic Study of Critical Technology Issues in Natural-Gas Fired Gas Turbine Combustion

- **Impact of Ethane and Propane Variation in Natural Gas on The Performance of a Model Gas Turbine Combustor** - 2001 Turbo Expo 2002
- **Response of a Model Gas Turbine Combustor to Variation in Gaseous Fuel Composition 2001 Vol. 123, No. 4** - ASME J. Eng. Gas Turbines and Power, Pp.824-831, Paper 00-GT-0141, Presented at Turbo Expo 2000
- **Rapid Liquid Fuel Mixing for Lean Burning Combustors: Low Power Performance** - 2001-ASME Gas Turbines and Power, Vol.123 Pp. 574-579, Paper 00-GT-0116, Presented at Turbo Expo 2000
- **Active Optimization of the Performance of Gas Turbine Combustor** - 2000 RTO Symposium on Active Control Technology for Enhanced Performance Operational Capabilities of Military Aircraft, Land Vehicles and Sea Vehicles Braunschweig, Germany, May 8-11
- **Active Optimization of Model Gas Turbine Combustor** - Presented at the Spring 2000 Meeting of the Western States Section, The Combustion Institute, WSS/CI OOS-41
- **Effect of Fuel Composition on The Performance of a Model Gas Turbine Combustor** - 1999 Presented at the Fall 1999 Meeting of Western States Section, The Combustion Institute, WSS/CI 99F-69

SR063

**California Institute of Technology
Principal Investigator: Fred Culick**

Project Title: Nonuniformities of Mixture Ratio as a Mechanism of Combustion Instabilities in Lean Pre-Mixed Combustors

- **Dynamics of Combustion Systems: Fundamentals, Acoustics, and Control** - 1st Version of Course was completed on June 1999, in revised form the course was given in September 2001 at the NASA Glenn Research Center. Access to the viewgraphs posted on the web can be had upon request: fecfly@caltech.edu

SR064

**Purdue University
Principal Investigator: Satish Raymadhyani**

Project Title: Airfoil Trailing Edge Cooling

- no publications reported

[SR065](#)

Virginia Polytechnic Institute and State University

Principal Investigator: Uri Vandsburger

Project Title: Development of Modular, Reduced -Order Models For Prediction of Combustion Instabilities

- **Experimental Validation of One-Dimensional Acoustic Modeling Techniques for Gas Turbine Combustors** - submitted to Journal of the Acoustic Society of America (JASA), July 2001
- **Measurement of Dynamic Flame Response in a Lean Premixed Single Can Combustor** - Paper 2001-GT-38 of the International Gas Turbine & Aeroengine Congress, New Orleans, LA , June 4-7
- **Control of Combustor Instabilities Using an Artificial Neural Network-Paper No. 2000-GT-0529** - Proceedings the ASME Turbo Expo, Munich, Germany, May, 2000
- **An Examination of The Relationship Between Chemiluminescent Light Emissions and Heat Release Rate under Non-Adiabatic Conditions** - Proceedings of ASME Turbo Expo, Paper No. 2000-GT-0121, Munich, Germany, May, 2000
- **Part I: Laminar Premixed Flame** - Proceedings of the American Flame Research Committee International Symposium, Newport Beach, CA, September 2000: Presentation
- **Part II: Effects of Fuel Composition** - 2nd Joint US Sections of Combustion Institute Meeting, Oakland, CA , March 2001:Presentation
- **An Experimental Examination of the Relationship Between Chemiluminescent Light Emission and Heat Release Rate Under Non-Adiabatic Conditions** - Proceedings of the RTO/AVT Symposium, Braunschweig, Germany, May 2000
- **Diagnostics and Modeling of Acoustic Signatures in a Tube Combustor** - Accepted for publication in the Proceedings of the 6th Int. Cong. Of Sound and Vibration, Copenhagen, Denmark, July, 1999

[SR066](#)

Georgia Institute of Technology

Principal Investigator: Janet Hampikian

Project Title: Improvements in Thermal Barrier Coating Durability Via Combustion Chemical Vapor Deposition

- **The Combustion Chemical Vapor Deposition of High Temperature Materials** - Materials Science and Engineering A, A267,7-18, (1999)
- **Mechanical Properties of YSZ-Alumina Thin Films Deposited via Combustion CVD - In Elevated Temperature Coatings** - Science and Technology III, Feb. 28-March 4, 1999 Pp. 161-172, TMS (1999)
- **The Effect of Alumina Coatings on Oxidation Behavior of Nickel-Base Alloys** - M.S. Thesis in Materials Science and Engineering, Georgia Institute of Technology, May 1998
- **Nanoindentation of YSZ-Alumina Ceramic thin Film Grown by Combustion Chemical Vapor Deposition** - Ph.D. Thesis in Materials Science and Engineering, Georgia Institute of Technology, May 2000
- **Combustion Chemical Vapor Deposition of Alumina, YSZ, and Multilayer Alumina/YSZ Films** - M.S. Thesis in Materials Science and Engineering, Georgia Institute of Technology, May 2001
- **Flame Structure Effects on the Deposition of Alumina Via Combustion CVD** - M.S. Thesis in Materials Science and Engineering, Georgia Institute of Technology,

December, 2002

SR067

University of Central Florida

Principal Investigator: Vimal Desai

Project Title: Non-Destructive Evaluation and Monitoring of TBC By Electrochemical Impedance Spectroscopy

- no publications reported

SR068

University of California, Santa Barbara

Principal Investigator: Carlos G. Levi

Project Title: A Mechanism-Based Approach to Life Prediction and Non-Destructive Evaluation for Thermal Barrier Coatings

- **The Influence of Imperfections on the Nucleation and Propagation of Buckling Driven Delaminations** - Journal of the Mechanics and Physics of Solids 48 (2000) 709-734
- **Micromechanics Model for the Detachment of Residually Compressed Brittle Films and Coatings** - Acta Mater, Vol. 47, No. 5, Pp. 1513-1522, 1999
- **The Ratcheting of Compressed Thermally Grown Thin Films on Ductile Substrates** - Acta Mater, 48 (2000) 2593-2601
- **Mechanics-Based Scaling Laws for the Durability of Thermal Barrier Coatings** - Progress in Materials Science 46 (2001) 249-271
- **Mechanisms Controlling the Durability of Thermal Barrier Coatings** - Progress in Materials Science 46 (2001) 505-553
- **Precursor to TBC Failure Caused by Constrained Phase Transformation in the Thermally Grown Oxide** - Journal Publication-The Minerals and Materials Society, 1999
- **Microstructural Study of the Theta-Alpha Transformation in Alumina Scales Formed on Nickel-Aluminides** - Materials at High Temperatures 17 (1) 59-70
- **Spalling Failure of a Thermal Barrier Coating Associated With Aluminum Depletion in the Bond-Coat** - Acta Mater, Vol. 47 No.4, Pp. 1297-1305, 1999
- **Surfacing Rumping of a (Ni, Pt) A1 Bond Coat Induced by Cycle Oxidation** - Acta Mater, 48 (2000) Pp. 3283-3293
- **Piezospectroscopic Analysis of Interface Debonding in Thermal Barrier Coatings** - Journal Publication- J. Am. Ceramic Society 83 (5) Pp. 1165-70 (2000)
- **Evolution of Porosity and Texture in Thermal Barrier Coatings Grown by EB-PVD** - Journal Publication-The Minerals, Metals and Materials Society, 1999, Pp. 13-26

SR069

Purdue University

Principal Investigator: Sanford Fleeter

Project Title: Turbine Blade Tip, Endwall and Platform Heat Transfer Including Rotation Effects

- no publications reported

[SR071](#)

University of Minnesota

Principal Investigator: Richard Goldstein

Project Title: Edge Cooling Heat Transfer on Turbine Blades

- **Effects of Tip Geometry and Tip Clearance on the Mass/Heat Transfer From a Large Scale Gas Turbine Blade** - Presentation at the 2002 ASME IGTI Conference
- **Local Mass/Heat Transfer on Turbine Blade Near-Tip Surfaces** - Presentation at the 2002 ASME IGTI Conference

[SR073](#)

University of Connecticut

Principal Investigator: Eric Jordan

Project Title: Development of Laser Fluorescence as a Non-Destructive Inspection Technique for Thermal Barrier Coatings

- **Surface Geometry and Strain Energy Effects in the Failure of Ni (Pt,A1)/EB-PVD Thermal Barrier Coatings** - To be Published in ACTA Materialia
- **Failure Mechanisms of Dense Vertically Cracked Thermal Barrier Coatings and Damaged Evolution in an Electron Beam Physical Vapor Deposited Thermal Barrier Coatings as a Function of Cycle Temperature and Time** - Journal Publication
- **Photoluminescence Piezospectroscopy: A Multi-Purpose Quality Control And NDI Technique For Thermal Barrier Coatings** - Journal Publication

[SR074](#)

University of California, Berkeley

Principal Investigator: Robert Dibble

Project Title: Fuel-Air Mixing Explored with optical Probes, Tomography, and Large Eddy Simulations

- **The Application of Laser Diagnostics, Light Emitting Diodes and Computer Modeling to the Characterization of Fuel-Air Mixing in High Pressure Lean Premixed Combustion Systems** - PhD Thesis, James Girard

[SR075](#)

Georgia Institute of Technology

Principal Investigator: Ben Zinn

Project Title: Extending the Lean Blowout Limits of Low Nox Gas Turbines by Control of Combustion Instabilities

- no publications reported

SR076

Mississippi State University

Principal Investigator: B.K. Hodge

Project Title: Real Surface Effects on Turbine Heat Transfer and Aerodynamic Performance

- **Predicting Skin Friction and Heat Transfer for Turbulent Flow Over Real Gas-Turbine Surface Roughness Using the Discrete-Element Method** - Submitted for Presentation at the 2003 ASME Turbo Conference in Atlanta, June 2003 and possible journal publication
- **Real Surfaces Effects on Turbine Heat Transfer and Aerodynamic Performance** - Submitted for Presentation at the 6th ASME-JSME Thermal Engineering Joint Conference and possible journal publication
- **St and Cf Augmentation for Real Turbine Roughness With Elevated Freestream Turbulence** - Submitted for presentation at 2002 ASME IGTI Conference and possible journal publication
- **The Many Faces of Turbine Surface Roughness** - Submitted for Presentation at the June 2001 IGTI Conference and also for Publication in the ASME Journals
- **Predicting Skin Friction for Turbulent Flow Over Random Rough Surfaces Using the Discrete-Element Method: Part I-Surface Characterization** - Submitted for publication and conference presentation
- **Predicting Skin Friction for Turbulent Flow Over Randomly-Rough Surfaces Using Discrete-Element Method: Part II-Skin Friction Validation** - Paper GT-2003-45411, Proceedings of FEDSM'03, 4th ASME-JSME Joint Fluids Engineering Conference, 6-11 July, Honolulu, HI

SR077

University of Pittsburgh

Principal Investigator: Fred Pettit

Project Title: Interaction of Steam/Air Mixtures with Turbine Airfoil Alloys and Coatings

- **Water Vapor Effects on the Cyclic Oxidation Resistance of Alumina-Forming Alloys** - Proceeding of Microscopy of Oxidation V - In Press

SR078

Pennsylvania State University

Principal Investigator: Robert J. Santoro

Project Title: Dual Fuel Issues Related to Performance, Emissions and Combustion Instability in Gas Turbine Systems

- **Combustion Instability Studies in a High-Pressure Lean Premixed Model Combustor Under Liquid Fuel Operation** - Conference Presentation -JPGC '01 June 4-7, 2001 - New Orleans, LA

SR079

Pennsylvania State University

Principal Investigator: Bud Lakshminarayana

Project Title: Turbine Tip Clearance Region Desensitization

- **Aerodynamics Character of Partial Squealer Tip Arrangements in an Axial Flow Turbine, Part 1, Part 2, and Part 3** - Submitted for Presentation at the 2002 ASME IGTI Conference and Possible Journal Publication
- **Methods for Desensitizing Tip Clearance Effects in Turbines** - Presentation at the 2001 ASME IGTI Conference
- **Variable Property and Temperature Ratio Effects on Nusselt Numbers in a Rectangular Channel With 45 Degrees Angled Rib Turbulators** - Submitted for Possible Journal Publication
- **Tips Leakage Flows Near Partial Squealer Rims in an Axial Flow Turbine Stage** - Submitted for Conference Presentation
- **Flow and Heat Transfer in Internally Ribbed Ducts With Rotation: An Assessment of LES and URANS** - Submitted for Publication
- **Heat/Mass Transfer in 1:4 Rectangular Passages With Rotation** - Submitted for Publication

SR080

University of Central Florida

Principal Investigator: Jay Kapat

Project Title: Tip Clearance Heat Transfer and Desensitization in High Pressure Turbines

- no publications reported

SR081

University of Connecticut

Principal Investigator: Nitin Padture

Project Title: Advanced Thermal Barrier Coating for Industrial Gas Turbine Engines

- **Low Thermal Conductivity Rare-Earth Zirconates for Potential Thermal-Barrier-Coatings Applications** - J. Wu, X. Wei, N. P. Padture , P. G. Klemens, M. Gell, E. Garcia, P. Miranzo and M. I. Osendi - Journal of the American Ceramic Society , 85 [12] 3031-3035 (2002)
- **Thermal Conductivity of Ceramics in the ZrO₂-GdO 1.5 System** - J. Wu, N.P. Padture , P. G. Klemens, M. Gell, E. Garcia, P. Miranzo and M. I. Osendi - Journal of Materials Research, 17 [12] 3193-3200 (2002)
- **Thermal Barrier Coatings for Gas-Turbine Engine Application** - N. P. Padture , M. Gell and E. H. Jordan, Science, 296 [5566] 280-284 (2002)
- **High Temperature Chemical Stability of Low Thermal Conductivity ZrO₂-GdO_{1.5} Thermal-Barrier Beramics in Contact with cx-Al₂O₃** - Journal Publication
- **Photoluminescence Piezospectroscopy: A Multi-Purpose Quality Control And NDI Technique For Thermal Barrier Coatings** - Journal Publication

SR082

Texas A&M University

Principal Investigator: J.C Han

Project Title: Rotating and Stationary Rectangular Cooling Passages Heat Transfer and Friction and Turbulators and Dimples

- **Nusselt Number Behavior on Deep Dimpled Surfaces Within a Channel** - Presented at 2002 IMECE, November 17-22, 2002, New Orleans , LA
- **Effect of Rotation on Heat Transfer in Narrow Rectangular Cooling Channels (AR=8:1 and 4:1) With Pin-Fins** - Submitted for Presentation at the 2003 ASME Turbo Conference in Atlanta, June 2003
- **Variable Property Nusselt Numbers in a Channel With Pin-Fins** - Submitted for Possible Journal Publication
- **Variable Property and Temperature Ratio Effects on Nusselt Numbers in a Rectangular Channel with 45 Degree Angled Rib Turbulators** - Submitted for Possible Journal Publication
- **Flow Structure and Local Nusselt Number Variations in a Channel With Angled Rib Turbulators** - Submitted for Possible Journal Publication
- **Heat Transfer in Rotating Rectangular Cooling Channels (AR=4) With Dimples**
- **A Numerical Study of Flow and Heat Transfer in Rotating Rectangular Channels (AR=4) With Rib Turbulators by Reynolds Stress Turbulators by Reynolds Stress Turbulence Model** - ASME Turbo Expo 2002 June 3-6, 2002, Amsterdam, The Netherlands
- **Spatially-Resolved Heat Transfer and Flow Structure in a Rectangular Channel With 45 degree Angled Rib Turbulators** - Presented at 2002 ASME IGTI Conference and Possible Journal Publication
- **Spatially-Resolved Heat Transfer and Flow Structure in a Rectangular Channel With Pin Fins** - Submitted for Presentation at the 2003 ASME Turbo Conference in Atlanta, GA, and Possible Journal Publication
- **Spatially-Resolved Surface Heat Transfer for Parallel Rib Turbulators With 45 Degree Orientations Including Test Surface Conduction Analysis** - Submitted for Journal Publication

SR083

Virginia Commonwealth University
Principal Investigator: Eric Sandgren

Project Title: Improved Performance and Durability in Gas Turbines Through Airfoil Clocking and Hot Streak Management

- no publications reported

SR084

University of California, Irvine
Principal Investigator: Scott Samuelson

Project Title: Correlation of Ignition Delay with Fuel Composition and State for Application to Gas Turbine Combustion

- no publications reported

SR085

Purdue University
Principal Investigator: Jay Gore

Project Title: Measurements for Improved Understanding of Combustion Dynamics in Lean Premixed Gas Turbine Combustor Flames

- **Combustion Instabilities in an Advanced Turbine System Premixer** - AIAA 2001
- **Phase-Locked Flow Structure and CH Chemiluminescence Measurements in Swirling Combustion** - Proceedings of the Third Joint Meeting of the US Section of the Combustion Institute, Chicago, IL
- **Flow Structure in Lean Premixed Swirling Combustion** - Proceedings of the Combustion Institute, Vol. 29 and the Proceedings of the 2002 Technical Meeting of the Central States Section of the Combustion Institute, Knoxville, TN
- **Measurements for Improved Understanding of Combustion Dynamics in Lean Premixed Gas Turbine Combustor Flames** - AGTSR Combustion Workshop IX/HEET Program Regional Meeting and the AGTSR Combustion Workshop VII
- **Combustion Research Needs for Helping Development of Next-Generation Advanced Combustors** - AIAA 2001-3853, 37th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Salt Lake City, UT
- **Combustion Instabilities in an Advanced Turbine System Premixer** - AIAA 2001-3852 AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Salt Lake City, UT and the AGTSR Combustion Workshop VIII

[SR086](#)

University of North Dakota

Principal Investigator: Forrest Ames

Project Title: Characterization of Catalytic Combustor Turbulence and Its Influence on Vane and Endwall Heat Transfer and Endwall Film Cooling

- **Effects of Catalytic and Dry Low Nox Combustor Turbulence on Endwall Heat Transfer Distributions** - Submitted for Presentation at the 2003 ASME Turbo Conference in Atlanta, June 2003, Possible Journal Publication
- **Measurements and Prediction of the Influence of Catalytic and Dry Low Nox Combustor Turbulence on Vane Surface Heat Transfer**
- **Effects of Aeroderivative Combustor Turbulence on Endwall Heat Transfer Distributions Acquired in a Linear Vane Cascade** - Submitted for Presentation at the 2002 ASME IGTI Conference and Possible Journal Publication
- **Measurement and Prediction of Heat Transfer Distributions on an Aft Loaded Vane Subjected to the Influence of Catalytic and Dry Low Nox Combustor Turbulence** - Submitted for Presentation at the 2003 ASME Turbo Conference in Atlanta, June 2003 and Possible Journal Publication

[SR087](#)

University of Washington

Principal Investigator: Philip Malte

Project Title: The Staged Pre-vaporizing Premixing Injector: High Pressure Evaluation

- **no publications reported**

[SR088](#)

University of Pittsburgh

Principal Investigator: Minking Chyu

Project Title: Experimental and Computational Studies of the Nozzle Endwall Region of Advanced Gas Turbines

- **Film Cooling Experiments With Flow Introduced Upstream of a First Stage Nozzle Guide Vane through Slots of Various Geometries** - Submitted for Presentation at the 2002 ASME IGTI Conference
- **Measurements Over a Film-Cooled, Contoured Endwall With Various Coolant Injection Rates** - Submitted for Presentation at the 2001 ASME IGTI Conference

SR089

Louisiana State University

Principal Investigator: Sumanta Acharya

Project Title: Internal Cooling in leading and Trailing Edge Passages With Rotational and Buoyancy

- **Large Eddy Simulations of Flow and Heat Transfer in a Ribbed Coolant Passage With Rotation and Buoyancy Effects** - In Preparation
- **LES of Flow and Heat Transfer in a Rotating Ribbed Duct: Flow Physic** - In preparation
- **Aspects Ratio Effects in Rotating Ribbed Ducts** - In preparation

SR090

Pennsylvania State University

Principal Investigator: Domenic Santavicca

Project Title: Optimization of the Injector Fuel Distribution for Stable, Low Emissions Combustion in Lean Premixed Gas Turbine Combustors

- **no publications reported**

SR091

University of Connecticut

Principal Investigator: Maurice Gell

Project Title: Thermal Barrier Coatings and Metallic Coatings with Improved Durability

- **Failure Mechanisms of Dense Vertically Cracked Thermal Barrier Coatings and Damaged Evolution in an Electron Beam Physical Vapor Deposited Thermal Barrier Coatings as a Function of Cycle Temperature and Time** - Journal Publication
- **Photoluminescence Piezospectroscopy: A Multi-Purpose Quality Control And NDI Technique For Thermal Barrier Coatings** - Journal Publication

SR092

University of Texas, Austin

Principal Investigator: David Bogard

Project Title: Attenuation of Hot Streaks With the Nozzle Guide Vane and Endwall

- **Effects of Coolant Density Ratio on Film Cooling Performance on a Vane** - Submitted for Presentation at the 2003 ASME Turbo Conference in Atlanta, June 2003
- **The Effects of High Turbulence and Turbine Vane Film Cooling on the Dispersion of a Simulated Hot Streak** - Submitted for Presentation at the 2003 ASME Turbo Conference in Atlanta, June 2003
- **Computational Predictions of Endwall Film-Cooling for a First Stage Vane** - Submitted for Presentation at the 2003 ASME Turbo Conference in Atlanta, June 2003
- **Effects of Hot Streaks on Adiabatic Effectiveness for a Film Cooled Turbine Vane** - Submitted for Approval for Conference Presentation at IGTI 2004, Vienna
- **The Effects of the Vane and Mainstream Turbulence Level on Hot Streak Attenuation** - Submitted for Approval for Conference Presentation at IGTI 2004, Vienna

SR093

University of California, Santa Barbara
Principal Investigator: David R. Clarke

Project Title: A Science Based Approach to Enhanced Zirconia Based Coatings for Advanced Gas Turbine Application

- no publications reported

SR094

Texas A&M University
Principal Investigator: J.C. Han

Project Title: Rotating Heat Transfer in High Aspect Ratio Rectangular Cooling Passages with Shaped Turbulators

- **Computation of Flow and Heat Transfer in Rotating Rectangular Channels (AR=4) With V-Shaped Ribs by Reynolds Stress Turbulence Model** - Submitted for Presentation at the 2003 ASME Turbo Conference in Atlanta, June 2003
- **Heat Transfer and Pressure Drop in Two-Pass Rotation of Rectangular Channel (AR=2) With Discrete Angled Rib Turbulators** - Submitted for Presentation at the 2003 ASME Turbo Conference in Atlanta, June 2003
- **Heat Transfer in Rotating Rectangular Channels (AR=4:1) with V-shaped and Angled Rib Turbulators With and Without Gaps** - Submitted for Presentation at the 2003 ASME Turbo Conference in Atlanta, June 2003
- **Thermal Performance of Angled, V-Shaped, and W-Shaped Rib Turbulators in Rotating, Rectangular (AR=4:1) Cooling Channels** - Submitted for Approval for Presentation at the ASME Turbo Expo Conference, June 14-17, 2004, Vienna
- **Computation of Flow and Heat Transfer in Two-Pass Rotating Rectangular Channels (AR=1:1), (AR=1:2), (AR=1:4) With 45-Degree Angled Ribs by Reynolds Stress Turbulence Model** - Submitted for approval for presentation at the ASME Turbo Expo Conference, June 14-17, 2004, Vienna
- **Heat Transfer in Two-Pass Rotating Rectangular Channels (AR=1:2 and AR= 1:4) With 45 Degree Angled Rib Turbulators** - Submitted for Approval for Presentation at the ASME Turbo Expo Conference, June 14-17, 2004 , Vienna

SR095

Georgia Institute of Technology
Principal Investigator: Ben Zinn

Project Title: Understanding and Control of Combustion Dynamics in Gas Turbine Combustors

- **Modeling Response of Premixed Flames to Mixture Ratio Perturbations -**
Submitted for Presentation at the 2003 ASME Turbo Conference Atlanta, June 2003

SR096

University of Minnesota

Principal Investigator: Terrence Simon

Project Title: Aerothermal Effects of Interfacial Leakage and Film Cooling Schemes with Endwall and Leading Edge Contouring

- **Turbine Endwall Aerodynamics and Heat Transfer -** Journal Article
- **Flow Measurements in a First Stage Nozzle Cascade Having Endwall Contouring, Leakage and Assembly Features -** Proceedings of 2005 ASME Turbo Expo, Power for Land, Sea & Air, June 6-9, 2005, Reno/Taho, Nevada, USA
- **Heat Transfer Measurements in a First Stage Nozzle Cascade Having Endwall Contouring, Leakage and Assembly Features -** Proceedings of HT2005, 2005 ASME Summer Heat Transfer Conference, July 17-22, 2005, San Francisco, California, USA
- **Flow Measurements in a First Stage Nozzle Cascade having Leakage and Assembly Features: Effects of Endwall Steps and Leakage on Aerodynamic Losses -** Conference Presentation at the 2005 ASME International Mechanical Engineering Congress and Exposition, November 5-11, 2005, Orlando, Florida
- **Heat Transfer Measurements in a First Stage Nozzle Cascade Having Endwall Contouring: Misalignment and Leakage Studies -** Proceedings of GT2006 ASME Turbo Expo 2006: Power for Land, Sea and Air, May 8-11, 2006, Barcelona, Spain
- **Adiabatic Effectiveness Measurements in a First Stage Nozzle Cascade Having Endwall Contouring, Leakage and Assembly Features -** Proceedings of GT2006 ASME Turbo Expo 2006: Power for Land, Sea and Air, May 8-11, 2006, Barcelona, Spain

SR097

University of Connecticut

Principal Investigator: Eric Jordan

Project Title: Measurement of Three Critical Parameters as a Basis for a Simple Life Prediction Method

- **Thermally Grown Oxide Stress Evolution as a Function of Thermal Cycling in an Electron Beam Physical Vapor Deposit TBC -** Journal Article
- **Failure Mechanisms of Dense Vertically Cracked Thermal Barrier Coatings -** Journal Publication
- **Damaged Evolution in an Electron Beam Physical Vapor Deposited Thermal Barrier Coatings as a Function of Cycle Temperature and Time -** Journal Publication
- **Photoluminescence Piezospectroscopy: A Multi-Purpose Quality Control And NDI Technique For Thermal Barrier Coatings -** Journal Publication
- **Evolution of Photo-Simulated Luminescence of EB-PVD/Pt-A1 Thermal Barrier Coating -** Submitted for Approval for Journal Publication
- **Remaining Life Prediction of Thermal Barrier Coatings Based on Photoluminescence Piezo-Spectroscopy Measurement -** Submitted for Approval for Journal Publication
- **Analysis of Localized Damage of EB-PVD/Pt-Al Thermal Barrier Coatings -** Being

Submitted for Journal Publication

- **Effect of Temperature on Rumppling and Thermally Grown Oxide Stress in an EB-PVD Thermal Barrier Coating** - Submitted for Approval for journal publication - "Surface and Coatings Technology"

[SR098](#)

Louisiana State University

Principal Investigator: Sumanta Acharya

Project Title: Experiments and Computations on Film Cooled End Wall with Contouring

- **Experimental Investigation of Flow Structure and Nusselt Number in a Low Speed Linear Blade Passage With and Without Leading Edge Fillets** - Journal Publication
- **Unsteady RANS Simulation of Turbulent Flow and Heat Transfer in Ribbed Coolant Passages of Different Aspect Ratios** - Journal Publication
- **Large Eddy Simulations of Flow and Heat Transfer in Rotating Ribbed Duct Flows** - Journal Publication
- **Flow and Heat Transfer in an Internally Ribbed Duct With Rotation: An Assessment of LES and URANS** - Journal Publication
- **Turbulent Heat Transfer in Ribbed Coolant Passages of Different Aspect Ratios: Parametric Effects** - Journal Publication
- **Experimental Investigation of Secondary Flow Structure in a Blade Passage with and Without Leading Edge Fillets** - Journal Publication
- **The Role of Leading-Edge Contouring on End-Wall Flow and Heat Transfer: Computations and Experiments** - Proceedings of GT2006 ASME Turbo Expo 2006: Power for Land, Sea and Air, May 8-11, 2006, Barcelona, Spain
- **Heat Transfer at High Rotation Numbers in a Two-Pass 4:1 AR Rectangular Channel With 45-Degree Skewed Ribs** - Proceedings of GT2006 ASME Turbo Expo 2006: Power for Land, Sea and Air, May 8-11, 2006, Barcelona, Spain

[SR099](#)

Virginia Polytechnic Institute and State University

Principal Investigator: Uri Vandsburger

Project Title: Modeling and Control of Ultra-Lean Premixed Combustion Dynamics for Gas Turbines

- **Thesis:** Paul Black, M.S.
Title: "Acoustic Transfer Functions Derived from Finite Element Modeling for Thermoacoustic Stability Predictions of Gas Turbine Engines"
- **Thesis:** Christopher Reed Martin: MS.
Title: "Systematic Prediction and Parametric Characterization of Thermo-Acoustic Instabilities in Premixed Gas Turbine Combustors"
- **Thesis:** David, James Losh: MS.
Title: "Linear Stability Analysis of a Rijke Tube and Modeling of Turbulent Combustion using Dynamic Well-Stirred Reactors (Electronic Resource)"
- **Thesis:** Alok Dhagat, MS.
Title: "Three-Dimensional Acoustic Finite element Models for Thermoacoustic Stability Predictions for Gas Turbine Engines"
- **Thesis:** Joseph Ranalli, PhD.
Title: "Dynamic Characterization of LP, Hydrocarbon, Hydrogen, and Syngas Combustors"

SR100

Virginia Polytechnic Institute and State University

Principal Investigator: Danesh Tafti

Project Title: Enhanced Prediction Techniques Based on Time Accurate Simulations for Turbine Blade Internal Cooling

- **Investigation of Detached Eddy Simulations in Capturing the Effects of Coriolis Forces and Centrifugal Buoyancy in Ribbed Ducts** - Submitted ASME J. Heat Transfer , September 2006, accepted
- **Capturing the Effects of Rotation in Sudden Expansion Ducts Using Detached Eddy Simulations** - Submitted AIAA J., September 2006
- **Simulation of Flow and Heat Transfer in the Developing Flow Region of a Rotating Gas Turbine Blade Internal Cooling Duct with Coriolis and Buoyancy Forces** - ASME J. Turbomachinery 129, pp. 1-7, 2007
- **A Comparative Study of DES and URANS for Flow Prediction in a Two-Pass Internal Cooling Duct** - ASME J. Fluids Engineering , 128(6), pp. 1336-1345, November 2006
- **Detached Eddy Simulation of Flow and Heat Transfer in Fully-Developed Rotating Internal Cooling Channel With Normal Ribs** - Int. J. Heat and Fluid Flow 27(3), pp. 351-370, 2006
- **Large Eddy Simulation of Flow and Heat Transfer in the 180° Bend Region of a Stationary Ribbed Gas Turbine Blade Internal Cooling Duct** - ASME J. Turbomachinery (128), pp.763-771, 2006
- **Detached Eddy Simulation of Turbulent Flow and Heat Transfer in a Two-Pass Internal Cooling Duct** - Int. J. Heat and Fluid Flow 27(1), pp. 1-20, 2006
- **Experimental Validation of Large Eddy Simulations of Flow and Heat Transfer in a Stationary Ribbed Duct** - Int. J. Heat and Fluid Flow 27 (2), pp. 243-258, 2006
- **Detached Eddy Simulation of Turbulent Flow and Heat Transfer in a Ribbed Duct** - ASME J. Fluids Engineering 127(5), pp. 888-896, 2005
- **Evaluating the Role of Subgrid Stress Modeling in a Ribbed Duct for the Internal Cooling of Turbine Blades** - Int. J Heat and Fluid Flow 26(1), pp. 92-104, 2005
- **Large Eddy Simulations of Flow and Heat Transfer in a 90° Ribbed Duct With Rotation - Effect of Coriolis and Centrifugal Buoyancy Forces** - J. Turbomachinery 126(4), pp. 627-636, 2004
- **Large Eddy Simulation of the Fully Developed Flow and Heat Transfer in a Rotating Duct With 45° Ribs** - GT 2006-90229, ASME Turbo Expo 2006, 8- 11 May 2006, Barcelona, Spain
- **A Comparative Study of DES and URANS in a Two-pass Internal Cooling Duct With Normal Ribs** - IMECE2005-79288, 2005 ASME International Mechanical Engineering Congress and Exposition, November 5-11, 2005 , Orlando , Florida
- **Large Eddy Simulation of Flow and Heat Transfer in an Internal Cooling Duct with High Blockage Ratio 45 o staggered Ribs** - GT 2005-68086, Proceedings of ASME Turbo Expo 2005, June 6-9, Reno-Tahoe , USA
- **Large Eddy Simulation of Flow and Heat Transfer in a Ribbed Duct With Skewed Ribs of Rounded Cross-section** - GT 2005-68117, Proceedings of ASME Turbo Expo 2005, June 6-9, Reno-Tahoe, USA
- **Detached Eddy Simulation of Flow and Heat Transfer in a Stationary Internal Cooling Duct with Skewed Ribs** - GT 2005-68118, Proceedings of ASME Turbo Expo 2005, June 6-9, Reno-Tahoe , USA
- **Large Eddy Simulation of Flow and Heat Transfer in the 180° Bend Region of a Stationary Ribed Gas Turbine Blade Internal Cooling Duct** - Proceedings of the ASME Turbo Expo 2005, Reno-Tahoe, Nevada, ASME Paper No. GT2005-68518
- **Large Eddy Simulation of Flow and Heat Transfer in the Developing Flow Region of a Rotating Gas Turbine Blade Internal Cooling Duct With Coriolis**

and Buoyancy Forces - Proceedings of the ASME Turbo Expo 2005, Reno-Tahoe, Nevada, ASME Paper No. GT2005-68519

- **Flowfield Measurements in a Ribbed Channel Relevant to Internal Turbine Blade Cooling** - GT2004-53361, ASME Turbo Expo 2004, Vienna, Austria
- **Detached Eddy Simulation of Turbulent Flow and Heat Transfer in a Duct** - HT- FED 2004-56152, 2004 ASME Heat Transfer/Fluids Engineering Summer Conference, July 11-15, Charlotte
- **Large Eddy Simulation of Flow and Heat Transfer in a Staggered 45° Ribbed Duct** - GT2004-53800, ASME Turbo Expo: 2004, Vienna , Austria
- **Large Eddy Simulations of Flow and Heat Transfer in a 90° Ribbed Duct with Rotation – Effect of Coriolis Forces** - GT2004-53796, ASME Turbo Expo 2004, Vienna , Austria
- **Large Eddy Simulations of Flow and Heat Transfer in a 90° Ribbed Duct with Rotation - Effect of Coriolis and Centrifugal Buoyancy Forces** - GT2004-53799, ASME Turbo Expo 2004, Vienna , Austria
- **Large Eddy Simulation of the Developing Region of a Stationary Ribbed Internal Turbine Blade Cooling Channel** - GT2004-53832, ASME Turbo Expo 2004, Vienna, Austria
- **Large Eddy Simulation of the Developing Region of a Rotating Ribbed Internal Turbine Blade Cooling Channel** - GT2004-53833, ASME Turbo Expo 2004, Vienna, Austria
- **Large Eddy Simulations of Heat Transfer in A Ribbed Channel for Internal Cooling of Turbine Blades** - Paper No. GT2003-38122, Proceedings of ASME/IGTI Turbo Expo, Atlanta, Georgia , June 16-19, 2003
- **Large Eddy Simulation of Flow and Heat Transfer in an Internal Cooling Duct with High Blockage Ration 45° Staggered Ribs GT 2005-68086** - Proceedings of ASME Turbo Expo 2005, June 6-9, 2005, Reno, Nevada

[SR101](#)

University of Pittsburgh

Principal Investigator: Fred Pettit

Project Title: Mechanism-Based Testing Methodology for Improving the Oxidation, Hot Corrosion and Impact Resistance of High Temperature Coatings for Advanced Gas Turbines

- **Accelerated Cyclic Oxidation Testing Protocols for Thermal Barrier Coatings and Alumina-Forming Alloys and Coatings** - Materials and Corrosion, in press
- **Use of Indentation Fracture Tests to Investigate Toughness Loss Mechanisms in Thermal Barrier Coating Systems** - submitted to Materials Science & Technology 2005 Conference

[SR102](#)

Georgia Institute of Technology

Principal Investigator: Jerry Seitzman

Project Title: Advanced Sensor Approaches for Monitoring and Control of Gas Turbine Combustors

- **Acoustic Characterization of Piloted, Premixed Flames Under Near Blowout Conditions** - Submitted for Journal Publication
- **Acoustic Detection of Imminent Blowout in Pilot and Swirl Stabilized Combustors** - Submitted for Presentation at the 2003 ASME/IGTI Turbo Expo in Atlanta, June 2003

[SR103](#)

University of Central Florida
Principal Investigator: Y. H. Sohn

Project Title: Assessments of Failure Mechanisms for Thermal Barrier Coatings by Photoluminescence, Electrochemical Impedance and Focused Ion Beam

- **Effects of Phase Constituents and Microstructure in Thermally Grown Oxide on The Thermal Cycling Lifetime and Failure of Thermal Barrier Coatings** - Surface and Coatings Technology, Accepted for Publication, in Press, 2005
- **Non-Destructive Evaluation of Degradation in Multi-Layered Thermal Barrier Coatings by Electrochemical Impedance Spectroscopy** - Materials Science and Engineering A, Accepted for Publication, in Press, 2005
- **Non-Destructive and Microstructural Characterization of Thermal Barrier Coatings** - Journal of Metals, Vol. 56 (2004) 53-56
- **An Observation of Nearly Failed Electron Beam Physical Vapor Deposited Thermal Barrier Coating with Grit Blasted (Ni,Pt)Al Bond Coat: Photostimulated Luminescence and Transmission Electron Microscopy** - Thin Solid Films, Vol. 466 (2004) pp. 128-136
- **Electrochemical Impedance Spectroscopy of Porous ZrO₂ – 8 wt.% Y₂O₃ and Thermally Grown Oxide on Nickel Aluminide** - Materials Science and Engineering A, Vol. A372 (2004) pp. 278-286
- **Electrochemical Impedance Spectroscopy of Thermal Barrier Coatings as a Function of Isothermal and Cyclic Thermal Exposure** - Surface and Coatings Technology, Vol. 177-178 (2004) pp. 140-151
- **Microstructure of As-Coated Thermal Barrier Coatings with Varying Lifetimes** - Surface and Coatings Technology, Vol. 177-178 (2004) pp. 89-96
- **Phase Transformation of Thermally Grown Oxide on (Ni,Pt)Al Bond Coat During Electron Beam Physical Vapor Deposition and Subsequent Oxidation** - Surface and Coatings Technology, Vol. 177-178 (2004) pp. 121-130

[SR104](#)

Brigham Young University
Principal Investigator: Jeffrey Bons

Project Title: Turbine Surface Degradation With Services and Its Effects on Performance

- **Simulated Land-Based Turbine Deposits Generated in an Accelerated Deposition Facility** - Submitted for Approval for Conference Presentation at the ASME Turbo Expo June 14-17, 2004, Vienna, Austria
- **Direct Simulation of Surface Roughness Effects With RANS and DES on Viscous Adaptive Cartesian Grids** - Presented at the AIAA Fluid Dynamics Conference, June 28- July 1, 2004, Portland, Oregon
- **High Pressure Turbine Deposition in Land Based Gas Turbines from Various Synfuels** - Presented at the 2005 IGTI Turbo Expo, Reno, NV (Paper # GT2005-68479) and also accepted for archival journal publication in the ASME Journal of Turbomachinery
- **Turbine Blade Surface Deterioration by Erosion** - Presented at the 2004 IGTI in Vienna, Austria (Paper # GT 2004-54328) in June, 2004, also published in the ASME Journal of Gas Turbines for Power and Propulsion and was awarded the 2005 Aircraft Engine Committee award for best paper
- **Effects of Strong Irregular Roughness on the Turbulent Boundary Layer** - accepted for publication in Flow, Turbulence and Combustion Journal
- **Flow and Heat Transfer over Rough Surfaces: Usefulness of 2- D Roughness-Resolved Simulations** - Presented at the AIAA 44th Aerospace Sciences Meeting and

Exhibit in Reno, NV, 9-12 Jan 2006 (paper #AIAA 2006-0025)

- **A Comparison of Approximate vs. Exact Geometrical Representations of Roughness for CFD Calculations of c_f and St** - Presented at IMECE 2005 in Orlando, FL, Nov. 2005. Submitted for publication in ASME Journal of Turbomachinery June 2005. Accepted for publication – January 2006
- **Evolution of Surface Deposits on a High Pressure Turbine Blade, Part : Physical Characteristics** - Presented at the 2006 IGTI, Barcelona, Spain and published in the ASME Journal of Turbomachinery
- **Evolution of Surface Deposits on a High Pressure Turbine Blade, Part 2: Convective Heat Transfer** - Presented at the 2006 IGTI, Barcelona, Spain and published in the ASME Journal of Turbomachinery

[SR105](#)

University of Wisconsin, Madison
Principal Investigator: Scott Sanders

Project Title: Advanced Optical Sensor for Monitoring and Control of Multiple Gas and Turbine-Blade Properties

- no publications reported

[SR106](#)

Cleveland State University
Principal Investigator: Surendra N. Tewari

Project Title: Spectroscopic In-Situ Non-Destructive Evaluation to Monitor the Health of Thermal Barrier Coatings

- no publications reported

[SR107](#)

University of Connecticut
Principal Investigator: Eric Jordan

Project Title: Superior Thermal Barrier Coatings for Industrial Gas Turbine Engines Using a Novel Solution Plasma Spray Process

- no publications reported

[SR108](#)

Clemson University
Principal Investigator: John Wagner

Project Title: An Advanced Diagnostic and Prognostic System for Gas Turbine Generator Sets With Experimental Validation

- no publications reported

[SR109](#)

Pennsylvania State University
Principal Investigator: Domenic Santavicca

Project Title: The Effects of Fuel Distribution, Velocity Distribution, and Fuel Composition on Static and Dynamic Instabilities and NOx Emissions in Lean Premixed Combustors

- no publications reported

[SR110](#)

Virginia Polytechnic Institute and State University
Principal Investigator: Karen Thole

Project Title: Improved Film Cooling Performance for Turbine Vanes and Endwalls with Realistic Surface Condition

Virginia Tech - Publications

- **Effects of Mid-Passage Gap, Endwall Misalignment, and Roughness on Endwall Film-Cooling** - Journal of Turbomachinery , vol. 128, pp. 62-70, ASME Turbo Expo, Reno, (GT2005-68900) – Awarded the Heat Transfer Committee Best Paper Award for 2005
- **The Effects of Varying the Combustor- Turbine Gap** - Accepted to the Journal of Turbomachinery, ASME Turbo Expo, Barcelona , (GT2006-90089)
- **Effects of Surface Deposition, Hole Blockage, and TBC Spallation on Vane Endwall Film Cooling** - Accepted to the Journal of Turbomachinery, ASME Turbo Expo, Barcelona, (GT2006-90379)
- **Effects of Deposits on Film Cooling of a Vane Endwall Along the Pressure Side - Recommended to the Journal of Turbomachinery** - ASME Turbo, Montreal, (GT2007-27131)
- **Bump and Trench Modifications to Film Cooling Holes at the Vane Endwall Junction** - Recommended to the Journal of Turbomachinery, ASME Turbo Expo, Montreal, (GT2007-27132)
- **Flowfield Measurements of the Endwall Leading Edge With Film-Cooling - ASME Turbo Expo 2008: Power for Land, Sea and Air**, June 2008, Berlin, Germany

Virginia Tech - Theses

- **Effects of Realistic First-Stage Turbine Endwall Features** - M.S. Thesis, Cardwell, N. D., 2005, Virginia Tech
- **Effects of Surface Conditions on Endwall Film-Cooling** - Ph.D. Dissertation, Sundaram, N., 2007, Virginia Tech (to be published)

University of Texas at Austin - Publications

- **Degradation of Film Cooling Performance on a Turbine Vane Suction Side Due to Surface Roughness** - ASME Gas Turbine Expo, Reno, Nevada, ASME Paper GT2005-69045
- **The Effects of Obstructions on Film Cooling Effectiveness on the Suction side of a Gas Turbine Vane** - ASME Turbo Expo, Barcelona, Spain, ASME Paper GT-2006-90577
- **High Resolution Film Cooling Effectiveness Measurements of Axial Holes Embedded in a Transverse Trench with Various Trench Configurations** -

- ASME Turbo Expo, Barcelona, Spain , ASME Paper GT-2006-90226
- **High Resolution Film Cooling Effectiveness Comparison of Axial and Compound Angle Holes on the Suction Side of a Turbine Vane** - ASME Turbo Expo, Barcelona, ASME Paper GT-2006-90225
 - **Degradation of Film Cooling Performance on a Turbine Vane Suction Side Due to Surface Roughness** - ASME J. of Turbomachinery, vol. 128, 2006, pp. 547-554
 - **Effects of Regular and Random Roughness on the Heat Transfer and Skin friction Coefficient on the Suction Side of a Gas Turbine Vane** - ASME Turbo Expo, Montreal, Canada , ASME Paper GT-2007-27285
 - **Effects of Obstructions and Surface Roughness on Film Cooling Effectiveness With and Without a Transverse Trench** - ASME Gas Turbine Expo, Montreal, Canada, ASME Paper GT2007-28003
 - **Effects of Surface Roughness and Near Hole Obstructions on Film Cooling Effectiveness** - ASME Gas Turbine Expo, Montreal , Canada , ASME Paper GT2007-28004
 - **High Resolution Film Cooling Effectiveness Comparison of Axial and Compound Angle Holes on the Suction Side of a Turbine Vane** - ASME J. of Turbomachinery, 2007 (accepted)
 - **High Resolution Film Cooling Effectiveness Measurements of Axial Holes Embedded in a Transverse Trench With Various Trench Configurations** - ASME J. of Turbomachinery, 2007. (accepted)

University of Texas at Austin - Theses

- **Roughness Impact on Turbine Vane Suction Side Film Cooling Effectiveness** - M.S. Thesis, Robertson, D.R., 2004, University of Texas at Austin
- **Suction Side Roughness Effects on Film Cooling Heat Transfer on a First Stage Nozzle Guide Vane** - M.S. Thesis, Rutledge, J.L., 2004, University of Texas at Austin
- **The Effects of Obstructions on Film Cooling Effectiveness on the Suction Side of a Gas Turbine Vane** - M.S. Thesis, Demling, T., 2005, University of Texas at Austin
- **Effects of Roughness on Film Effectiveness on the Pressure Side of a Turbine Vane** - M.S. Thesis, Warren, D. J., 2005, University of Texas at Austin
- **Film Cooling Effectiveness of Suction Side Axial Holes, Compound Angle Holes, and Axial Holes Embedded within an Overlying Transverse Trench** - M.S. Thesis, Waye, S.K., 2005, University of Texas at Austin
- **Effects of Regular and Random Roughness on the Heat Transfer and Skin Friction Coefficient on the Suction Side of a Gas Turbine Vane** - M.S. Thesis, Dees, J.E., 2006, University of Texas at Austin
- **Rough Wall and Near-Hole Obstruction Effects on Film Cooling with and without a Transverse Trench** - M.S. Thesis, Somawardhana, R.P., 2006, University of Texas at Austin

[SR111](#)

Georgia Institute of Technology

Principal Investigator: Tim Lieuwen

Project Title: Combustion Instability and Blowout Characteristics of Fuel Flexible Combustors

- **Online Combustor Stability Margin Assessment Using Dynamic Pressure Data** - Submitted for Approval for Journal Publication and Conference Presentation at IGTI 2004, Vienna
- **Impacts of Hydrogen Addition on Near-Lean Blowout Dynamics in a Swirling**

Combustor - Proceedings of the GT2007 ASME Turbo Expo 2007: Power for Land, Sea and Air, May 14-17, 2007, Montreal, Canada

SR112

University of California, Irvine

Principal Investigator: Scott Samuelsen

Project Title: Correlation of Ignition Delay With IGCC Type Fuels

- **no publications reported**

SR113

Texas A&M University

Principal Investigator: J.C. Han

Project Title: Heat Transfer from Rotating Blade Platforms With and Without Film Cooling

- **Film Cooling Effectiveness on a Rotating Turbine Platform Using Pressure Sensitive Paint Technique** - Journal Publication
- **Prediction of Film Cooling and Heat Transfer on a Rotating Blade Platform with Stator-Rotor Purge and Discrete Film-Hole Flows in a 1-1/2 Turbine Stage** - Journal Publication
- **Effect of Upstream Wake with Vortex on Turbine Blade Platform Film Cooling and Simulated Stator-Rotor Purge Flow** - Journal Publication

SR114

University of Central Florida

Principal Investigator: Eric Petersen

Project Title: Combustion Characterization and Modeling of Fuel Blends for Power Generation Gas Turbines

- **Acceleration of Shock-Induced Ignition in CH₄/Air and CO/Air Mixtures Using Hydrogen Addition** - Journal Paper, Combustion Science and Technology
- **Test-Time Extension Behind Reflected Shock Waves Using CO₂-He and C₃H₈-He Driver Mixtures** - Journal Paper, Shock Waves
- **Design and Validation of a Reduced Test Matrix for the Autoignition of Gas Turbine Fuel Blends** - Presentation for Proceedings of IMECE2005 2005 ASME International Mechanical Engineering Congress and Exposition, November 5-11, 2005, Orlando, Florida
- **A Shock-Tube Study of The Ignition and Oxidation Characteristics of Syngas at Elevated Pressures** - Abstract for the 2005 Fall Meeting of the Eastern States Section of the Combustion Institute
- **Effect of Higher-Order Hydrocarbons on the Ignition of Lean Methane-Air Mixtures at Elevated Pressures** - Abstract for the 2005 Fall Meeting of the Eastern States Section of the Combustion Institute
- **Experimental Study on the Low-Temperature Ignition Behavior of Gas Turbine Fuel Blends** - Abstract for the 2005 Fall Meeting of the Eastern States Section of the Combustion Institute

[SR115](#)

University of Pittsburgh
Principal Investigator: Minking Chyu

Project Title: Effects of Coating Blockage and Deposits on Film Cooling Effectiveness and Heat Transfer

- no publications reported

[SR116](#)

University of Pittsburgh
Principal Investigator: Fred Pettit
Project Title: Investigation of Materials Performances in High Moisture Environments Including Corrosive Contaminants Typical of Those Arising by Using Alternate Fuels in Gas Turbines

- **The Effect of Ca-rich Deposits on the High Temperature Degradation of Coated and Uncoated Superalloys** - Publication: Materials Science Forum and Conference Presentation at the Les Embiez 2007 Conference

[SR117](#)

Pennsylvania State University
Principal Investigator: Robert J. Santoro

Project Title: Autoignition Studies of Syngas and Hydrogen (SGH) Fuels

- no publications reported

[SR118](#)

University of Central Florida
Principal Investigator: Yong-Ho Sohn
Project Title: Degradation of Thermal Barrier Coatings with Syngas Combustion: Testing by Hyperbaric Advanced Development Environmental Simulator (HADES) and Characterization by Advanced Electron Microscopy

- no publications reported

[SR119](#)

University of North Dakota
Principal Investigator: Forrest Ames
Project Title: Aero Losses, Heat Transfer, Discharge Coefficients for Different Vane Trailing Edge Configurations for Syngas Fired Turbines

- **Gill Slot Trailing Edge Aerodynamics-Effects of Blowing Rate, Reynolds Number, and External Turbulence on Aerodynamics Losses and Pressure Distribution** - Journal Publication
- **Gill Slot Trailing Edge Heat Transfer - Effects of Blowing Rate, Reynold Number, and External Turbulence on Heat Transfer and Film Cooling Effectiveness** - Journal Publications
- **Aerodynamics of a Letterbox Trailing Edge - Effects of Blowing Rate, Reynolds**

Number, and External Turbulence on Aerodynamics Losses and Pressure Distribution - ASME Turbo Expo 2008: Power for Land, Sea and Air, June 2008, Berlin, Germany

- **Letterbox Trailing Edge Heat Transfer Effects of Blowing Rate, Reynolds Number, and External Turbulence on Heat Transfer and Film Cooling Effectiveness** - ASME Turbo Expo 2008: Power for Land, Sea and Air, June 2008, Berlin, Germany

[SR120](#)

Brigham Young University

Principal Investigator: Jeffrey Bons

Project Title: Deposition of Alternative (Syngas) Fuels on Turbine Blades with Film Cooling

- **Effects of Particle Size, Gas Temperature, and Metal Temperature on High Pressure Turbine Disposition in Land Based Gas Turbines from Various Syngas** - Journal Publication
- **Deposition Near Film Cooling Holes on a High Pressure Turbine Vane** - ASME Turbo Expo 2008: Power for Land, Sea and Air, June 2008, Berlin, Germany

[SR121](#)

Massachusetts Institute of Technology

Principal Investigator: Ahmed Ghoniem

Project Title: Fundamental Studies in Syngas Premixed Combustion Dynamics

- no publications reported

[SR122](#)

Georgia Institute of Technology

Principal Investigator: Jerry Seitzman

Project Title: Turbulent Flame Speed Measurements and Modeling of Syngas Fuels

- no publications reported

[SR123](#)

Virginia Polytechnic Institute and State University

Principal Investigator: Danesh Tafti

Project Title: Syngas Particulate Deposition and Erosion at the Leading Edge of a Turbine Blade with Film Cooling

- no publications reported

[SR124](#)

University of Pittsburgh

Principal Investigator: Gerald Meier

Project Title: Materials for Oxy-Fuel Turbomachine Conditions

- no publications reported

[SR125](#)

University of California, Santa Barbara

Principal Investigator: Ted Bennett

Project Title: Evaluating Coatings for Current and Future Service with Thermal Property Measurements

- no publications reported

[SR126](#)

University of Colorado

Principal Investigator: John Daily

Project Title: High Pressure Kinetics of Syngas and Nearly Pure Hydrogen Fuels

- no publications reported

[SR127](#)

University of Texas, Austin

Principal Investigator: David Bogard

Project Title: Simulating Particle Deposition and Mitigating Deposition Degradation Effects in Film Cooled Turbine Sections

- no publications reported