

# University Turbine Systems Research Performing Member Directory

## ALABAMA

### Auburn University

Contact: Dr. Sushil H. Bhavnani, Alumni Professor  
Department of Mechanical Engineering  
213 Ross Hall  
Auburn University, AL 36849-5341  
334-844-3303/FAX 205-844-3307  
[bhavnani@eng.auburn.edu](mailto:bhavnani@eng.auburn.edu)

- **Experience** - Materials, Combustion, Design, Numerical methods
- **Interest** - Thermal radiation, Materials, Cooling techniques, Rotordynamics, Comb. Mixing
- **Facilities** - Turbomachinery Lab, Thermal Sys. Lab., Structural Dynamics Lab, Thermal Radiation Measurements Lab, Combustion Lab, Mat. Res. Lab

### University of Alabama, Birmingham

Contact: Dr. Stephen T. McClain  
The Department of Mechanical Engineering  
1530 3rd Avenue, South, BEC257  
Birmingham, AL 35294-4461  
205-934-0830/FAX 205-975-7217  
[smcclain@uab.edu](mailto:smcclain@uab.edu)

- **Experience** - Combustion of Coal or Biomass Fuels, Pollutant Formation/Emissions Control, Sensor Development, Computational Fluid Dynamics, Turbulence Modeling, Turbine Engine Analysis and Evaluation, Gasification of Fossil/Renewable Fuels
- **Interest** - Combustion, Pollution Control, HT, CFD, Turbulence Modeling, Turbine Machinery, Gasification
- **Facilities** - Enabling Technologies Laboratory, Combustion Research Facility, Energy and Environmental Laboratory

### University of Alabama, Huntsville

Contact: Dr. Clark W. Hawk, Director  
Propulsion Research Center  
Technology Hall S226  
Huntsville, AL 35899  
256-824-7200/FAX 256-824-7205  
[hawkc@email.uah.edu](mailto:hawkc@email.uah.edu)

- **Experience** - Cogeneration, Alternative Energy, Optics
- **Interest** - Cooling/HT, Multivariable control technology, Combustion of and combustors for, Cogeneration, Alternate energy, Combustion, CFD
- **Facilities** - Research gas turbine

### University of Alabama, Tuscaloosa

Contact: Dr. Ajay K. Agrawal, Professor/Chair  
Department of Mechanical Engineering  
290 Hardaway Hall  
Box 870276  
Tuscaloosa, AL 34587  
205-348-4964/FAX 205-348-6419  
[aaagrwal@coe.eng.ua.edu](mailto:aaagrwal@coe.eng.ua.edu)

- **Experience** - power generating gas turbines
- **Interest** – aerodynamics, combustion, heat transfer, and instrumentation, sensors and life
- **Facilities** - combustion laboratory, computational facility

## ALASKA

### University of Alaska, Fairbanks

Contact: Dr. Sukumar Bandopadhyay  
 School of Mineral Engineering  
 355 Duckering Building  
 Fairbanks, AK 99775  
 907-474-7730/FAX 907-474-6994  
[ffs0b@uaf.edu](mailto:ffs0b@uaf.edu)

- **Experience** - Mechanical Property Characterization of Materials at High Temperature and Corrosive Environments, Energy Related Research Projects (fossil fuel, gas, hydrate, petroleum)
- **Interest** - Mining, Geological & Petroleum Engineering, Stationary Gas Turbines (life cycles/failures)
- **Facilities** - High Temperature Testing Facilities

## ARIZONA

### Arizona State University

Contact: Dr. Ramendra P. Roy, Professor  
 Department of Mechanical and Aerospace Engineering  
 Box 876106  
 Tempe, AZ 85287-6106  
 480-965-1482/FAX 480-965-1384  
[roy@asu.edu](mailto:roy@asu.edu)

- **Experience** - Rotor-Stator Cavity and Seals—Flow and Heat Transfer, Vane Endwall Cooling, Film Cooling, Spray Combustion, Pulverized Coal Combustion, Turbulent Pre-Mixed Flames, Rotor Dynamics, Vibration Analysis, Single- and Two-Phase Flows and Heat Transfer
- **Interest** - Internal Flow and Seals, Disk Cavity Flow and Heat Transfer, Vane-Blade-Endwall Heat Transfer, Thermodynamic Analysis of Cycles, Convective Heat Transfer, Combustion, Heat Transfer from Flames, Flame-Vortex Interactions, Rotor Dynamics, Vibration, Turbulence Modeling
- **Facilities** - Gas Turbine Heat Transfer Lab, Convective Heat Transfer Lab, Combustion Research Lab, Computational Fluid Dynamics Lab, Vibrations Lab

## ARKANSAS

### Arkansas Tech University

Contact: Dr. John L. Krohn, Department Head  
 Department of Mechanical Engineering, CES 104  
 Russellville, AR 72801  
 479-968-0259/FAX 479-964-0882  
[john.krohn@mail.atu.edu](mailto:john.krohn@mail.atu.edu)

- **Experience** - Mechanical Behavior of Materials
- **Interest** - Fatigue, Corrosion, Isothermal Oxidation, Wear, Failure Analysis, Life Assessments, and Heat Transfer
- **Facilities** - Neutron Generator, Scanning Electron Microscopes, Instron Test System, Wind Tunnel Facilities

### University of Arkansas

Contact: Larry Roe, Professor  
 MEEG 204D, Mechanical Engineering Department  
 Fayetteville, AR 72701  
 479-575-3750/FAX 479-575-6982  
[lar@engr.uark.edu](mailto:lar@engr.uark.edu)

- **Experience** - Advanced manufacturing techniques, Micro sensors, Control systems and micro controllers, Gas turbine design and manufacture, Combustion, Corrosion and Optical diagnostics
- **Interest** - Combustion, Corrosion, Purge air reduction, Tip seals, Thin film sensors
- **Facilities** - Air supply, Combustion test rig

## CALIFORNIA

### California Institute of Technology

Contact: Joseph E. Shepherd, Professor  
Aeronautics, MS 105-50  
Pasadena, CA 91125  
626-395-3283/FAX 626-449-2677  
[jeshep@galcit.caltech.edu](mailto:jeshep@galcit.caltech.edu)

- **Experience** - Fluid Mechanics, Combustion, Acoustics, Combustion Dynamics, Propulsion Systems, Flight Mechanics, Aerodynamics, Space Propulsion, Control of Physical Systems, Liquid and Solid Rockets
- **Interest** - Combustor Dynamics, Nonlinear Acoustics, Combustion Instabilities, Control of combustor Dynamics, Nonlinear Flight Mechanics, Airfoil Theory, Wing Theory, Applied Aerodynamics
- **Facilities** - Combustion Test Rig, Optical Diagnostics, Computing Resources, Laboratory for Spacecraft and Mission Design, CAD Facilities, Access to JPL Research and Development Facilities

### Stanford University

Contact: Heinz Pitsch, Professor  
Flow Physics and Computation Division,  
M.E. Dept., Bldg 500  
Stanford, CA 94305-3030  
650-736-1995/FAX 650-725-7834  
[h.pitsch@stanford.edu](mailto:h.pitsch@stanford.edu)

- **Experience** - Heat Transfer, Turbulence Mechanics, and High Temperature Gas Dynamics
- **Interest** - Optical Diagnostics - Reacting or Non-Reacting Flows, Flow Control, High Free- Stream Turbulence, Turbulence Computer Simulations
- **Facilities** - Moving-Wall Wind Tunnel, Turbine Blade Cascade Rig, Computational Facilities-Access to NASA Ames

### University of California, Berkeley

Contact: Robert W. Dibble, Professor  
Mechanical Engineering  
6159 Etcheverry Hall  
Berkeley, CA 94720-1740  
510-642-4901/FAX 510-642-6163  
[rdibble@me.berkeley.edu](mailto:rdibble@me.berkeley.edu)

- **Experience** -
- **Interest** - Laser Diagnostics
- **Facilities** -

### University of California, Davis

Contact: Roger L. Davis, Professor  
Department of Mechanical and Aeronautical Engineering  
One Shields Avenue, 2104 Bainer Hall  
Davis, CA 95616  
530-752-2264/FAX 530-752-4158  
[davisrl@ucdavis.edu](mailto:davisrl@ucdavis.edu)

- **Experience** - Industrial and aircraft gas-turbine cycle analysis, turbomachinery design systems, steady/unsteady-flow analysis and simulations of gas-turbine components, computational fluid dynamics procedures for gas-turbine flows, combustion, structures, aeroelasticity, acoustics, vibration control, and material strengthening
- **Interest** - Turbomachinery unsteady aerodynamics (including forced-response and flutter), aeroelasticity, aeroacoustics, design optimization, multi-component integration of simulations, combustion, laser-peening and material life

- **Facilities** - Experimental facilities include subsonic wind tunnels, anechoic chamber, and combustion instability tunnel. Computer facilities include high-speed Linux cluster

### University of California, Irvine

Contact: Dr. G. Scott Samuelsen, Director  
 UCI Combustion Laboratory  
 Engineering Laboratory Facility  
 Building 323, Room 221  
 Irvine, CA 92697-3550  
 949-824-5468/FAX 949-824-7423  
[gss@uci.edu](mailto:gss@uci.edu)

- **Experience** - Fundamental and Applied Studies in Gas Turbine Combustion, Laser Diagnostics, GTE/Fuel Cell Hybrids, Advanced Boilers/Furnaces
- **Interest** - Combustion, Distributed Power, Fuel Cells
- **Facilities** - UCI Combustion Laboratory, National Fuel Cell Research

### University of California, Los Angeles

Contact: Professor Jeff D. Eldredge  
 MAE Department  
 BOX 951597, 48-121 Engr IV  
 Los Angeles, CA 90095-1597  
 310-206-5094/FAX 310-206-2302  
[eldredge@seas.ucla.edu](mailto:eldredge@seas.ucla.edu)

- **Experience** - modeling and design of acoustic dampers, aeroacoustics and the development of particle-based numerical methods for simulation of flow/acoustic interactions
- **Interest** - computational investigations of several problems in acoustics and fluid dynamics
- **Facilities** - dual Intel Xeon processor workstations and a library of computational tools

### University of California, San Diego

Contact: Dr. Robert Cattolica, Associate Director  
 Center for Energy & Combustion Research (CECR)  
 9500 Gilman Drive, Room 560 EBU1  
 LaJolla, CA 92093-0411  
 619-534-2433/FAX 619-534-5354  
[rjcat@ames.ucsd.edu](mailto:rjcat@ames.ucsd.edu)

- **Experience** - Combustion Theory, Diagnostics, Flame Modeling
- **Interest** - Experimental Methods, Flame Inhibition, Strain Rate Effects of Flame Extinction, High Pressure Combustion
- **Facilities** - Combustion Research Laboratory, Raman and Rayleigh Scattering, LDV, PIV, Gas Analyzers, GC-Mass Spectroscopy

### University of California, Santa Barbara

Contact: Professor Carlos G. Levi  
 Materials Department, College of Engineering  
 1361D Engineering II  
 Santa Barbara, CA, 93106-5050  
 805-893-2381/FAX 805-893-8486  
[levic@engineering.ucsb.edu](mailto:levic@engineering.ucsb.edu)

- **Experience** - Thermal Barrier Coatings Sensors, Process Control Catalysts, Active Control of Aeroengines
- **Interest** - Materials, Advanced Coatings, Nonlinear Control, Risk Assessment
- **Facilities** - EB-PVD System, Materials Research Laboratory, Composite Center

### University of Southern California

Contact: Dr. Paul Ronney  
 Department of Aerospace and Mechanical Engineering  
 Room OHE 430J  
 3650 McClintock Avenue  
 Los Angeles, CA 90089-1453

213-740-0490/FAX 213-740-8071

[ronney@usc.edu](mailto:ronney@usc.edu)

- **Experience** – Combustion, micro-scale power generation and propulsion, propulsion, turbulence, internal combustion engines and control systems, radiative transfer, aerodynamic and kinetics processes in flames, high-speed air-breathing propulsion, microgravity combustion, and heterogeneous reacting flows.
- **Interest** - Combustion, micro-scale power generation and propulsion, propulsion, turbulence, internal combustion engines and control systems, radiative transfer, aerodynamic and kinetics processes in flames, high-speed air-breathing propulsion, microgravity combustion, and heterogeneous reacting flows.
- **Facilities** - The research facilities of Prof. Egolfopoulos's laboratory include a Laser Doppler Anemometry (LDA) system, a Phase Doppler Anemometry (PDE) system, a Digital Particle Image Velocimetry (DPIV) system, a Raman Spectroscopy system, a variety of counterflow burners, a variety of thermocouple system, a high-pressure combustion chamber equipped with various remotely controlled mechanism, a recently developed liquid fuel handling system, a number of wet test meters, a large number of sonic orifices, and various workstations and a ten-processor parallel computing machine.

Prof. Ronney's combustion research laboratory is equipped with a wide variety of instruments including a fiber-optic Laser-Doppler Velocimeter system, 4-watt argon-ion laser, laser interferometers, digital storage oscilloscopes, a chemical fume hood, gas chromatographs and computerized Labview-based facilities for accurate partial pressure gas mixing and steady flow metering. PC and Macintosh personal computers are available for data acquisition and control and workstations are available for data processing. Multitasking multi-processor workstations are available for running this software. FLUENT computational fluid dynamics software is available for three-dimensional modeling of chemical reaction, heat transfer and fluid flow.

## COLORADO

### Colorado State University

Contact: Dr. Daniel B. Olsen  
Colorado State University  
Mechanical Engineering Department  
Fort Collins , CO 80523-1374  
970-491-4789/FAX-970-491-4799  
[Daniel.Olsen@engr.colostate.edu](mailto:Daniel.Olsen@engr.colostate.edu)

- **Experience** - fuel/air and combustion modeling, combustion diagnostics, in-cylinder measurements, sensor development, laser diagnostics, emissions measurements, computational fluid dynamics (CFD)
- **Interest** - same as above, plus plasma exhaust treatment
- **Facilities** - large bore engine testbed, industrial engine research facility, optical engine testbed / laser diagnostics laboratory

### University of Colorado, Boulder

Contact: Dr. John W. Daily, Professor and Director  
Center for Combustion Research  
Department of Mechanical Engineering  
Engineering Center  
Campus Box 427  
Boulder, CO 80309-0427  
303-492-7110/FAX 303-492-2863  
[john.daily@colorado.edu](mailto:john.daily@colorado.edu)

- **Experience** -
- **Interest** - Turbulent Premixed and Diffusion Flame Structure, Direct Numerical Simulation of Turbulent Diffusion Flames, Flame Vortex Interaction, Flame-Assisted Materials Processing, Air Pollution Chemistry, Passive and Active Combustion Control Techniques-ONR, Alternative Motor Vehicle Fuels
- **Facilities** - Liquid Hazardous Waste and Biomass Oil Burners, Low and High Pressure Premixed Flame Burners, Automotive Engine, High Pressure Chamber for Solid Combustion

### University of Denver

Contact: Dr. Corinne Lengsfeld  
Department of Engineering  
2390 S. York Street  
Denver, CO 80208  
303-871-4843/FAX 303-871-4450  
[clengsf@du.edu](mailto:clengsf@du.edu)

- **Experience** - Electrostatic precipitators, Dust ingestion, Heat flux
- **Interest** - HT, Deposition, Hot gas cleanup, Coal fuels
- **Facilities** - Low-speed wind tunnel, Hot-wire instrumentation

## CONNECTICUT

### University of Connecticut

Contact: Maurice Gell, Professor  
 Department of Metallurgy and Materials Engineering, U-136  
 Storrs, Connecticut 06269  
 860-486-3514/FAX 860-486-4745  
[mgell@mail.ims.uconn.edu](mailto:mgell@mail.ims.uconn.edu)

- **Experience** - Turbine Heat Transfer, Structures, Materials/Manufacturing Processes, Combustion
- **Interest** - Gas Turbine Aerodynamics and Heat Transfer Research, Thermal Barrier Coatings, Failure of Materials and Life- Time Prediction Methods
- **Facilities** - Mechanical Testing Laboratory, Chemical and Structural Analysis Laboratories, Plasma Spray Facility, Flame Research Facility, Supersonic and Subsonic Wind Tunnels

### University of Hartford

Contact: Dr. Devdas Shetty  
 United Technologies Hall, Room 232  
 West Hartford, CT 06117  
 860-768-4629/FAX 860-768-5073  
[shetty@hartford.edu](mailto:shetty@hartford.edu)

- **Experience** -
- **Interest** -
- **Facilities** -

### Yale University

Contact: Professor Lisa Pfefferle  
 Department of Chemical Engineering  
 9 Hillhouse Avenue  
 New Haven, CT 06520 -8286  
 203-432-4377/FAX 203-432-7232  
[pfefferle@BIOMED.MED.YALE.edu](mailto:pfefferle@BIOMED.MED.YALE.edu)

- **Experience** - Hydrocarbon reactions, Soot production
- **Interest** - Catalysis, Modeling
- **Facilities** - Laser diagnostics, Mass spec, Reactors

## DELAWARE

### University of Delaware

Contact: n/a  
 University of Delaware  
 Department of Mechanical Engineering  
 126 Spencer Lab  
 Newark, DE 19716-3140  
 302-831-2421/FAX 302-831-3619

- **Experience** - Unsteady Combustion, Combustion Instability
- **Interest** - Coal Gasification, Pulsed Combustion, Chaos, Aerodynamics
- **Facilities** - Gas Turbine Engine Test Cells

# FLORIDA

## Embry-Riddle Aeronautical University

Contact: Dr. Magdy S. Attia  
Aerospace Engineering Department  
College of Engineering  
600 S. Clyde Morris Blvd  
Daytona Beach, FL 32114  
386-323-8811/FAX 386-226-6747  
[magdy.attia@erau.edu](mailto:magdy.attia@erau.edu)

- **Experience** - Turbomachinery/Propulsion Component Design and Analysis, Combustion, Pulse Combustion and Gasification, Chaos, Noise Control, CFD
- **Interest** - Counter Rotating Components, Turbomachinery/Propulsion Component Design and Analysis, Propulsion, Combustion and Gasification, Chaos, Noise Control, CFD
- **Facilities** - Two gas turbine engine test cells. Capacity for design and analysis of compressors and turbines, employing the latest in NASA and USAF Technologies

## Florida Atlantic University

Contact: Davood Moslemian, Professor  
Department of Mechanical Engineering  
777 Glades Road, Building 36, Room 107  
Boca Raton, FL 33431-0991  
561-297-2652/FAX 561-297-2825  
[moslemian@fau.edu](mailto:moslemian@fau.edu)

- **Experience** - Jet engine materials, Swirling combustion
- **Interest** - Combustion, Materials, Multiphase flows
- **Facilities** - Radioactive particle tracer, Combustion test

## Florida Institute of Technology

Contact: Dr. L. Krishnamurthy, Professor  
150 West University Boulevard , ECE 258  
Melbourne, FL 32901-6975  
321-674-7112/FAX 321-674-8813  
[Krishna@fit.edu](mailto:Krishna@fit.edu)

- **Experience** - Combustion, Fluid Dynamics, Combustion modeling, Computational HT, Mechanics of materials
- **Interest** - Combustion, Fluid dynamics, HT, Materials
- **Facilities** - Labs for combustion, Fluid mechanics, HT, and mechanics of materials and system dynamics

## University of Central Florida

Contact: Vimal H. Desai, Associate Professor  
Advanced Materials Processing and Analysis Center & Mechanical, Materials and Aerospace Engineering  
Box 162455  
Orlando, FL 32816-2450  
407-882-1458/FAX 407-882-1462  
[vdesai@pegasus.cc.ucf.edu](mailto:vdesai@pegasus.cc.ucf.edu)

- **Experience** – Combustion: Chemical kinetics, sensor development, ignition and exit profiles, Heat Transfer/Aerodynamics: Film cooling, impingement cooling, rotating cooling channels, endwall/airfoil/tip heat transfer, conjugate heat transfer, computational fluid dynamics, supersonic flows, boundary element methods, Materials: Thermal barrier coatings, oxidation, hot corrosion, steam oxidation, degradation of overlay protective coatings and superalloys, non-destructive evaluation, microstructural characterization
- **Interest** -
- **Facilities** - Combustion: Pressure-driven shock-tube with high-temperature and heterogeneous measurement capability; chemical kinetics modeling using Chemkin ; flame speeds measurement of realistic gas turbine mixtures at elevated pressure under development. Heat Transfer/Aerodynamics: Transonic, closed loop transonic linear cascade facility for study of endwall, airfoil, and tip heat transfer, driven by a 15,000 CFM fan with 100 inches of water pressure rise ; LN2-cooled, high density ratio film cooling with metal test coupons;

flexible test rig for study of impingement cooling under a wide range of test/geometric/flow conditions; computational fluid dynamics (CFD) facility with 36 node 3.06Ghz Intel Xeon Dell PowerEdge cluster with 108 GB RAM and 3.7 TB disc storage that benchmarks at 130 GFLOPS; 2D and 3D steady and transient boundary element codes for turbine applications; meshless methods codes for CFD and computational heat transfer. Materials: Isothermal and cyclic furnaces for oxidation and hot-corrosion, electrochemical impedance spectroscopy (EIS), photo-stimulated luminescence spectroscopy (PSLS), complete materials characterization facility including field-emission scanning electron microscope (FE-SEM), electron probe microanalysis (EPMA), focused ion beam (FIB) with ex-situ and in-situ lift-out (EXLO & INLO), transmission and scanning transmission electron microscope (TEM & STEM); thermal spray systems including plasma (APS) and high velocity oxy fuel (HVOF) systems under development.

## **University of Florida**

Contact: Dr. Gerhard E. Fuchs, Assistant Professor  
Department of Materials Science & Engineering  
116 Rhines Hall  
217 MAE, POB 116400  
Gainesville, FL 32611-6400  
352-846-3317/FAX 352-392-3771  
[gfuch@mse.ufl.edu](mailto:gfuch@mse.ufl.edu)

- **Experience** - Thermal stability, materials processing, micro-structure characterization, rapid solidification, directional solidification
- **Interest** - High Temperature Materials
- **Facilities** - SEM, TEM, Mechanical Testing Lab, Analytical Instrumentation Center, Computational Materials Center

## **University of South Florida**

Contact: Shuh-Jing Ying  
Department of Mechanical Engineering  
4202 E. Fowler Avenue, ENG 118  
Tampa, FL 33620-5350  
813-974-2280/FAX 813-974-3539  
[ying@eng.usf.edu](mailto:ying@eng.usf.edu)

- **Experience** - Combustion, Fluid dynamics, KIVA Code
- **Interest** - Emissions, HT, Fluid flow
- **Facilities** - Wind tunnel

# GEORGIA

## **Georgia Institute of Technology**

Contact: Dr. Ben T. Zinn  
270 Ferst Drive  
Atlanta, GA 30332-0150  
404-894-3033/FAX 404-894-2760  
[ben.zinn@ae.gatech.edu](mailto:ben.zinn@ae.gatech.edu)

- **Experience** - Propulsion, Combustion, Combustion Instabilities and their control, Energy Conversion, Control of Fuel (or liquid) Injection, Energy Converters, Fire Safety, Explosions, Acoustics
- **Interest** - Combustion instabilities in rocket motors, ramjets, jet engine and gas turbines, oscillatory flame phenomena, reacting flows, soot formation, acoustics and pulse combustion
- **Facilities** -

## **Mercer University**

Contact: Dr. William Moses  
Department of Mechanical & Aerospace Engineering  
1400 Coleman Avenue  
Macon, GA 31207-0001  
912-752-2216/FAX 912-752-2331  
[moses\\_w@mercer.edu](mailto:moses_w@mercer.edu)

- **Experience** - Blade cooling (experimental and computational), Thermodynamics, Fluid mechanics, HT
- **Interest** - Experimental HT and fluid mechanics, Cycle performance analysis, Energy system simulation, Cogeneration
- **Facilities** - Low speed wind tunnel, Access to cascade wind tunnel, VAX

## HAWAII

### University of Hawaii, Manoa

Contact: Dr. Mehrdad Ghasemi Nejjhad, Professor  
 2540 Dole St., Holmes 302  
 Honolulu, HI 96822  
 808-956-7560/FAX 808-956-2373  
[nejhad@wiliki.eng.hawaii.edu](mailto:nejhad@wiliki.eng.hawaii.edu)

- **Experience** - Design, Analysis, Manufacturing, and Testing of Advanced Materials
- **Interest** - Continuous Fiber Ceramic Composites, Polymer Matrix Composites, Smart Composite Structures, Nanocomposites
- **Facilities** - Filament Winding (for both thermoset and thermoplastic composites), Autoclave, Resin Transfer Molding, High Temperature Furnaces (both for pyrolysis and testing with Instron), Instron, C-Scan, Active Vibration and Positioning Control Facilities, SEM

## IDAHO

### University of Idaho

Contact: Ralph S. Budwig, PhD, Professor and Chair  
 Department of Mechanical Engineering  
 Moscow, ID 83844-0902  
 208-885-6579/FAX 208-885-9031  
[rbudwig@uidaho.edu](mailto:rbudwig@uidaho.edu)

- **Experience** - Turbine Blade Heat Transfer, Fatigue and Fracture of Advanced Alloys
- **Interest** - Turbine Blade Heat Transfer, Fatigue and Fracture of Advanced Alloys
- **Facilities** - Fatigue and Fracture Laboratory

## ILLINOIS

### Northwestern University

Contact: Dr. Katherine T. Faber  
 Department of Materials Science and Engineering  
 2220 Campus Drive  
 Evanston, IL 60208  
 847-491-2444/FAX 847-491-7820  
[faber@northwestern.edu](mailto:faber@northwestern.edu)

- **Experience** - Structure, processing, and properties characterization of metals, ceramics, polymers and biomaterials; computational materials science and materials by design
- **Interest** - Ceramic matrix composites, ceramic coatings, fracture and fatigue
- **Facilities** -

### University of Illinois, Chicago

Contact: Dr. Ishwar K. Puri  
 Mechanical Engineering, M/C 251  
 842 W. Taylor Street, Room 2039  
 Chicago, IL 60607-7022

312-413-7560/FAX 312-413-0447

[ikpuri@uic.edu](mailto:ikpuri@uic.edu)

- **Experience** - Combustion, Materials
- **Interest** - Pollutant Formation, Combustion Reaction Mechanics, Flame Stability and Extinguishment, Reactant Mixing, Spray Deposition, Ceramics and Polymeric/ceramic High-performance Composites
- **Facilities** - Combustion Laboratory, Laser Diagnostic Laboratory, Heat Transfer Laboratory, Advanced Materials Processing Laboratory, Computational Analysis Laboratory

## INDIANA

### Purdue University

Contact: Jay P. Gore, Associate Dean for Research and Entrepreneurship

College of Engineering

Purdue University

West Lafayette, IN 47907

765-494-2122/FAX 765-494-0539

[gore@ecn.purdue.edu](mailto:gore@ecn.purdue.edu)

- **Experience** - Combustion, Control and sensor development, Unsteady aerodynamics
- **Interest** - Research in atomization and sprays, Appl. and fundamental combustion, Radiation and soot in turbulent flames, combust. chemistry/pollutants, materials, controls, plus turbomachinery and fund. fluid mech
- **Facilities** - Combustion Lab

### University of Notre Dame

Contact: Scott C. Morris, Assistant Professor

102 Hessert Laboratory

Notre Dame, IN 46556

574-631-3239/FAX 574-631-8355

[morris.65@nd.edu](mailto:morris.65@nd.edu)

- **Experience** - multi-phase flows, fluid structure interactions, aero-optics, acoustics, flow control
- **Interest** - experimental, computational (CFD), and theoretical applications related to flow control, acoustics, fluid-structure interactions, aero-optics, and multi-phase fluid dynamics
- **Facilities** - high speed compressor, transonic and supersonic tunnels, large scale cascade, anechoic wind tunnel

### Valparaiso University

Contact: John Steffen, Ph.D., P.E., Department Chair

Department of Mechanical Engineering

1900 Chapel Drive

Valparaiso, IN 46383-6493

219-464-5184/FAX 219-464-5065

[John.Steffen@valpo.edu](mailto:John.Steffen@valpo.edu)

- **Experience** - NASA Propulsion and Power Systems Ground Testing, Experimental Techniques, Turbulent Heat Transfer, Turbulence Modeling, Turbulent Length Scale Effects, Energy Systems Design/ Maintenance/ Operation, Mechatronic Systems, Cryogenics, Computational Fluid Dynamics, Control Systems
- **Interest** - Undergraduate Research, Education in Collaborative Research, Engineering Education, Turbine Heat Transfer, Thermodynamic Cycles, Systems Engineering, Cogeneration, Mechatronic Systems, Environmental Analysis
- **Facilities** - Subsonic Wind Tunnel, Water Tunnel (Flume), Small-scale Blow-down Supersonic Wind Tunnel, GE Multistage Axial Fan and Driving Dynamometer, Energy Systems Lab, Mechatronics Lab, CAD, CNC Manufacturing Lab, SPARCstation Lab, Environmental Chemistry Lab

# IOWA

## Iowa State University

Contact: Ted H. Okiishi, Associate Dean  
College of Engineering  
104 Marston Hall  
Ames, IA 50011  
515-294-4395/FAX 515-294-9273  
[tedo@iastate.edu](mailto:tedo@iastate.edu)

- **Experience** - Non-Destructive Evaluation, Plasma Spray Coatings, Virtual Reality Applications
- **Interest** - HT, MV control, Concurrent Eng. combustion, System performance/ economics
- **Facilities** - Center for Nondestructive Evaluation, Plasma Spray Facility, Virtual Reality Applications Center

## University of Iowa

Contact: Dr. Lea-Der Chen, Professor  
Department of Mechanical & Industrial Engineering  
2416B Seamans Center  
The University of Iowa  
Iowa City, Iowa 52242  
319-335-5674  
[ldchen@engineering.uiowa.edu](mailto:ldchen@engineering.uiowa.edu)

- **Experience** - Combustion, Fuel Cell, H<sub>2</sub> Separation and CO<sub>2</sub> Sequestration
- **Interest** - Combustion, Heat Transfer and Gas Separation
- **Facilities** -

# KANSAS

## University of Kansas

Contact: Peter W. TenPas, Associate Professor  
Department of Mechanical Engineering  
3143 Learned Hall  
Lawrence, KS 66045  
785-864-2986/FAX 785-864-5254  
[tenpas@ku.edu](mailto:tenpas@ku.edu)

- **Experience** – Turbine Aerothermodynamics
- **Interest** - CFD
- **Facilities** -

## Wichita State University

Contact: Dr. Jharna Chaudhuri and Dr. George E. Talia  
Mechanical Engineering Department  
1845 Fairmount Street  
Wichita, KS 67260  
316-978- 6368/FAX 316-978- 3236  
[jharna.chaudhuri@wichita.edu](mailto:jharna.chaudhuri@wichita.edu)

- **Experience** - Jharna Chaudhuri (X-ray Diffraction, Transmission Electron Microscopy), George Talia (Processing of materials, optical and scanning electron microscopy)
- **Interest** - Metal alloys, intermetallics
- **Facilities** - X-ray Diffractometer, Scanning Electron Microscope, user of TEM at Lawrence Berkeley National Laboratory, User of Facilities at NASA, Alabama

# KENTUCKY

## University of Kentucky

Contact: Donn E. Hancher, Interim Chair  
CME, 177A Anderson Hall  
Lexington, KY 40506-0046  
859-257-8059/FAX 859-323-1929  
[hancher@enr.uky.edu](mailto:hancher@enr.uky.edu)

- **Experience** - Thermal Barrier Coatings, Single Crystals , Turbine Blade Cooling, Experimental Combustion
- **Interest** - Materials, Coatings, Heat Transfer, Combustion
- **Facilities** - Materials Characterization Facility, Holographic Interferometers, Phase Doppler Particle Analyzer

# LOUISIANA

## Louisiana State University

Contact: Professor Sumanta Acharya  
Department of Mechanical Engineering  
1419-B CEBA Building  
Baton Rouge, LA 70803  
225-578-5809/FAX 225-578-5924  
[acharya@lsu.edu](mailto:acharya@lsu.edu)

- **Experience** - Chemistry of sulfur removal
- **Interest** - Hot gas cleanup
- **Facilities** - Reactors and associated instrumentation

## Southern University

Contact: Atley Walker  
Southern Branch Post Office  
College of Engineering  
Street S, J.B. Moore Hall  
Baton Rouge, LA 70813  
225-771-4500/FAX 225-771-5721  
[adwalker@subr.edu](mailto:adwalker@subr.edu)

- **Experience** - Rotor/blade vibrations, MV control
- **Interest** - Rotor/blade vibrations, MV control
- **Facilities** -

## University of New Orleans

Contact: Dr. Ting Wang, Director  
Energy Conversion and Conservation Center  
932 Engineering Building  
New Orleans, LA 70148-2220  
504-280-7183/FAX 504-280-5539  
[twang@uno.edu](mailto:twang@uno.edu)

- **Experience** - Thermal-fluid science, energy, power plant
- **Interest** - Gas Turbine Heat Transfer, Mist/Steam Cooling Transitional and Turbulent Boundary Layer Convective Heat Transfer, Curved Flow, Electronic Equipment Cooling, Bi-diffusion Natural Convection, Separated Flow, Jet Impingement Cooling, Heat Transfer Enhancement on Micro-Structured Surfaces, Energy Conservation in Housing, Alternative Fuels, Combustor Flow Aerodynamics and Heat Transfer, Integrated Gasification Combined Cycle (IGCC) Power Plant, Biomass gasification, and Energy Management.
- **Facilities** - The gas turbine system research is conducted by the Energy Conversion and Conservation Center (ECCC) located in the University of New Orleans's Research and Technology Park.

# MARYLAND

## University of Maryland, College Park

Contact: Ashwani K. Gupta, Professor  
Department of Mechanical Engineering  
College Park, MD 20742  
301-405-5276/FAX 301-314-9477  
[akgupta@eng.umd.edu](mailto:akgupta@eng.umd.edu)

- **Experience** - Gas turbine combustion, swirl flows, fuels, air pollution, combustion instabilities, optical diagnostics, flowfield modeling and diagnostics, combustion with high temperature air, combustion in microgravity, alternative fuels and fuel reforming.
- **Interest** - Advanced zero emission combustion systems, advanced energy conversion systems with high performance and lower pollution, clean energy conversion from low grade fuels, fuel-air mixing, thermal destruction of wastes, combustion with high temperature air, and high speed flows and propulsion.
- **Facilities** - Several experimental combustors for gas and liquid fuels, gas turbine combustor for high temperature and high pressure mixing and flow simulation, swirl combustors, plasma reactor, flow reactors, engines, high temperature air combustion facility, lasers, gas analyzers, GC/MS, PIV, LDV, Phase Doppler particle size analyzer, PLIF, sound spectrum analyzer, Thermal image analyzer, high speed camera, Chemiluminescence apparatus, and Heat flux apparatus.

## U.S. Naval Academy

Contact: Professor Ralph J. Volino  
Department of Mechanical Engineering  
590 Holloway Road  
Annapolis, MD 21402  
410-293-6520/FAX-410-293-3041  
[volino@usna.edu](mailto:volino@usna.edu)

- **Experience** - Aerodynamics, Heat Transfer, Endwall Flows.
- **Interest** - Aerodynamics, Heat Transfer, Endwall Flows, Film Cooling.
- **Facilities** - Two Open Return Wind Tunnels, One Closed Loop Wind Tunnell.

# MASSACHUSETTS

## Boston University

Contact: Michael Gevelber, Associate Professor  
Manufacturing Engineering Department  
15 St. Mary's Street  
Brookline, MA 02466  
617-353-9693/FAX 617-353-2967  
[gevelber@bu.edu](mailto:gevelber@bu.edu)

- **Experience** - Development of Advanced Materials for Turbines, including TBCs, Development of Advanced Process Control for Engineered Materials Including Plasma Spray and E-beam
- **Interest** - Materials, Controls, Engine Design, MEMS
- **Facilities** - Advanced Materials Process Control Laboratory: Provides Ability to Plasma Spray with Real-time Particle State Control

## Massachusetts Institute of Technology

Contact: Dr. Gerald R. Guenette  
77 Mass Avenue, Rm. 31-214  
Gas Turbine Laboratory 31-214  
Cambridge, MA 02139  
617-253-3764/FAX 617-258-6093  
[jerryg@mit.edu](mailto:jerryg@mit.edu)

- **Experience** - Gas Turbine Laboratory--aeropropulsion, gas turbine engines turbomachinery. Active control of aero instability, advanced instrumentation, unsteady flows, inlet distortion, 3-D computations
- **Interest** - Fluid mechanics, heat transfer, controls, Low NOx burners
- **Facilities** - Centrifugal and axial compressor testing, flow visualization, Transonic blow down stands, MASB Lab

## **Northeastern University**

Contact: Mo Taslim, Professor  
MIME Department, 334 SN  
360 Huntington Avenue  
Boston, MA 02115  
617-373-5514/FAX 617-373-2921  
[m.taslim@neu.edu](mailto:m.taslim@neu.edu)

- **Experience** - Experimental and Numerical Heat Transfer Related to the Gas Turbine Cooling Technology
- **Interest** - Convective, Impingement and Film Cooling in Subsonic and Transonic Conditions
- **Facilities** - The transonic experimental heat transfer facility consists of two rotary vane compressors and two blowers that provide air at a pressure range of 15 to 120 psia and a mass flow rate of up to 4 lbs/s . The data acquisition system includes a 32 -Channel Pressure Scanning Valve system, a TSI IFA 100 Constant Temperature Anemometer (CTA) and corresponding Digitizer, LaView data acquisition software, a range of digital video cameras with corresponding image capturing software and hardware and a series of critical venturi-meters for a range of mass flow rate measurements. The steady-state transonic plenum can house cascades of airfoils for aerodynamic and heat transfer testing. Film cooling tests of airfoils are accomplished through the use of foreign gases such as carbon dioxide or sulfur hexafluoride (SF6). Research in different areas of gas turbine cooling technology has been conducted for the past eighteen years and has been funded by GE, Wright-Patterson A.F.B and Siemens-Westinghouse

## **University of Massachusetts, Amherst**

Contact: Shantikumar V. Nair, Professor  
MIE Department, 220 ELAB  
Amherst, MA 01003 -2210  
413-545-4713/FAX 413-545-1027  
[nair@ecs.umass.edu](mailto:nair@ecs.umass.edu)

- **Experience** - Mechanical behavior of monolithic materials and composites, Atomization processes, LISA model, fluid dynamics, Steam injection in gas turbines
- **Interest** - ECBs, Mechanical behavior, Atomization, Steam injection
- **Facilities** -

## **University of Massachusetts, Lowell**

Contact: Dr. John W. McKelliget, Professor/Chair  
Department of Mechanical Engineering  
One University Avenue  
Lowell, MA 01854  
978-934-2974/FAX 978-934-3048  
[John\\_McKelliget@uml.edu](mailto:John_McKelliget@uml.edu)

- **Experience** - Combustion, Air Pollution, CO2 Capture and Disposal
- **Interest** - Advanced Cycles, Clean Coal Technology
- **Facilities** – (at Riley Stoker Corporation) Combustors and Emission Monitoring; (in-house) Emission and Ambient Pollutant Monitoring

## **Worcester Polytechnic Institute**

Contact: Gretar Tryggvason, Professor and Department Head  
Mechanical Engineering Department  
100 Institute Road, Higgins Labs 134  
Worcester, MA 01609 -2280  
508-831-5759  
[gretar@WPI.EDU](mailto:gretar@WPI.EDU)

- **Experience** - Combustion, Fluid mechanics, Ceramics
- **Interest** - Emission Reduction, Pulse flow, Composite materials
- **Facilities** - Variable Geometry Swirl Combustor, Wind tunnels, Water tunnel

# MICHIGAN

## Michigan State University

Contact: Abraham Engeda, Professor and Director Turbomachinery  
Mechanical Engineering Department  
Lab 2555 EB  
East Lansing, MI 48824  
517-432-1834/FAX 517-353-1750  
[engeda@egr.msu.edu](mailto:engeda@egr.msu.edu)

- **Experience** - Centrifugal Compressor and Turbomachinery Design, Experimental Testing and Analysis, Blade and Machine Cooling Analysis and Experimental Testing
- **Interest** - Centrifugal Compressor and Turbomachinery Design, Experimental Testing and Analysis, Blade and Machine Cooling Analysis and Experimental Testing
- **Facilities** - Three Fully Automated Each of 350 HP Centrifugal Compressor Testing Facility, One Wind Tunnel

## Michigan Technological University

Contact: Dr. Donna Michalek  
College of Engineering  
815 RL Smith Engineering Building  
1400 Townsend Drive  
Houghton, MI 49931  
906-497-3152/FAX 906-487-2822  
[donna@mtu.edu](mailto:donna@mtu.edu)

- **Experience** - Comb. flow, High-speed Civil Transport program, Computer codes
- **Interest** - Combustion, CFD, HT
- **Facilities** - Extensive computer facilities

## University of Michigan

Contact: Dr. Arvind Atreya, Professor  
2250 GG Brown Lab, ME/Apl. Mechanics Department  
Ann Arbor, MI 48109-2125  
734-647-4790/FAX 734-647-3170  
[aatreya@umich.edu](mailto:aatreya@umich.edu)

- **Experience** - Variable gravity HT, Materials
- **Interest** - Turbulent flow, HT materials, HT, Composites, High gravity HT
- **Facilities** - 1000g Centrifuge for HT

## Wayne State University

Contact: Dr. Ming-Chia Lai, Professor  
Department of Mechanical Engineering  
5050 Anthony Wayne Drive  
Detroit, MI 48202  
313-577-3893/FAX 313-577-8789  
[lai@eng.wayne.edu](mailto:lai@eng.wayne.edu)

- **Experience** - Internal Combustion, Experimental Fluid Dynamics Measurements
- **Interest** - Fuel Atomization, Evaporization and Mixing, Low Emission Combustors, Continuous Spray Combustion
- **Facilities** - Spray Combustion Facility and Internal Combustion Engine Cells, LDA and PDPA Systems, High-Speed Movies and Video Systems

## Western Michigan University

Contact:  
Western Michigan University  
Department of Mechanical & Aeronautical Engineering  
Kalamazoo, MI 49008-5343

269-276-3420/FAX 269-276-3421

- **Experience** - Computational and experimental studies in gas turbine heat transfer and aerodynamics
- **Interest** - Unsteady effects, Blade row interactions and rotating stall, Losses, Unsteady flows in seals and pumps
- **Facilities** - JT-15 Gas Turbine Engine, Particle Image Velocimetry, Computational Aerodynamics Labs, Subsonic Wind Tunnel, Water Tunnel

## MINNESOTA

### University of Minnesota

Contact: Dr. R. J. Goldstein, Prof., Head/ME  
Department of Mechanical Engineering  
125 Mechanical Engineering  
111 Church Street, S.E.  
Minneapolis, MN 55455-0111  
612-625-5552/FAX 612-625-3434  
[rjg@me.umn.edu](mailto:rjg@me.umn.edu)

- **Experience** - Fluid mechanics, HT
- **Interest** - HT, Flow fields, Film cooling
- **Facilities** - New cascade/wind tunnel to be used for flow visualization/mass transfer studies

## MISSISSIPPI

### Mississippi State University

Contact: James A. Parsons, Professor  
POB ME, 210 Carpenter Engineering Building  
Mississippi State, MS 39762-5925  
662-325-9303/FAX 662-325-7223  
[parsons@me.msstate.edu](mailto:parsons@me.msstate.edu)

- **Experience** - Metal castings/machining, Computational Fluid Dynamics, Multidisciplinary Analysis, Sensitivity Analysis, Design Optimization
- **Interest** - Computational Fluid Dynamics, HT
- **Facilities** - COVE Immersive Visualization Facility, Thermal and Fluids Dynamics Laboratory (includes wind tunnel designed to study the effects of surface roughness on HT in turbulent boundary layers), Diagnostic Instrumentation and Analysis Laboratory

## MISSOURI

### University of Missouri, Rolla

Contact: K. M. Isaac, Associate Professor  
Mechanical and Aerospace Engineering  
1870 Miner Circle, 102 ME Building  
Rolla, MO 65409  
573-341-4604/FAX 573-341-4607  
[isaac@umr.edu](mailto:isaac@umr.edu)

- **Experience** - Combustion Instability, NOx, Materials, Controls, Acoustics, HT
- **Interest** - Combustion, Sprays, Aerodynamics, Acoustics and Vibration, Materials, HT
- **Facilities** - Combustion Lab, Spray Diagnostics Lab, Wind Tunnels, Image Processing Lab, Vibration Lab, Controls Lab

### Washington University

Contact: David A. Peters, Chair  
Department of Mechanical Engineering  
Jolley Hall 305, Box 1185

St. Louis, MO 63130-4899  
314-935-4337/FAX 314-935-4014  
[DAP@ME.WUSTL.EDU](mailto:DAP@ME.WUSTL.EDU)

- **Experience** - Air foil design, Unsteady flow, Transient analysis, Cascades, Centrifugal compressors
- **Interest** - Analytical/computational work
- **Facilities** - Low turbulence wind tunnel, Turbocharger

## MONTANA

### Montana State University

Alan H. George, PhD, PE, Associate Professor  
Mechanical & Industrial Engineering Department  
220 Roberts Hall, P.O. Box 173800  
Bozeman, MT 59717-3800  
406-994-6282/FAX 406-994-6292  
[ageorge@me.montana.edu](mailto:ageorge@me.montana.edu)

- **Experience** - Natural & forced convection, Fuel Cell Research, Fatigue of composite materials, Energy Systems, Turbine Blade Cooling
- **Interest** - Fuel Cells, Turbine Blade Cooling, Energy Systems
- **Facilities** - Computer Integrated Manufacturing (CIM) Laboratory, Decision Support Systems Laboratory, Ergonomics and Human Factors Engineering Laboratory, Production Systems and Facilities Design Laboratory

## NEVADA

### University Of Nevada, Las Vegas

Dr. Eric Sandgren, Dean, College of Engineering  
4505 Maryland Parkway, Box 454005  
Las Vegas, NV 89154-4005  
702-895-4324/FAX 702-895-4059  
[Eric.Sandgren@cmail.nevada.edu](mailto:Eric.Sandgren@cmail.nevada.edu)

- **Experience** - Aero-Heat Transfer, Materials, Instrumentation Sensors and Life, Combustion
- **Interest** - Simulation, design and optimization of gas turbine components and systems.
- **Facilities** - Subsonic Wind Tunnel, Compressible Flow Bench, Anechoic Chamber, Large Scale Water Flume, 2 Reverberation Chambers, PIV Measurement System, 2 Component LDV System, Hot Wire Anemometer, Pilot Tubes/Boundary Layer Probes, Flow Meters/Flow Nozzles, 5 Axis HAAS CNC, 3 DOF HAAS Turning Center, Virtual Prototyping Machine, Metal Shop, Wood Shop

## NEW JERSEY

### Princeton University

Contact: Frederick L. Dryer, Professor  
Mechanical and Aerospace Engineering  
D329-Engineering Quadrangle  
Princeton, NJ 08544-5263  
609-258-5206/FAX 609-258-1939  
[fldryer@princeton.edu](mailto:fldryer@princeton.edu)

- **Experience** - Resources and experience in areas relevant to this program include faculty, researchers and facilities in the Mechanical and Aerospace Engineering Department (David J. Srolovitz, Chair), and in the Princeton Environmental Institute
- **Interest** -
- **Facilities** -

### Stevens Institute of Technology

Contact: Dr. Woo Young Lee, Associate Professor

CBME, BURCHARD B-308  
Hoboken, NJ 07030  
201-216-8307/FAX 201-216-8306  
[wlee@stevens-tech.edu](mailto:wlee@stevens-tech.edu)

- **Experience** - Aerodynamics of Complex Subsonic Flows, Aeroelasticity with Applications to Axial Flow Machinery and its Performance Improvement, Computational Modeling and Simulation of Turbomachinery with Emphasis on the Analysis of Blade Cooling, Emission Analysis, etc.
- **Interest** - Aerodynamics and Turbomachinery, Advanced Coatings
- **Facilities** -

## NEW YORK

### Clarkson University

Contact: Dr. Ronald S. LaFleur  
Mechanical & Aeronautical Engineering  
Box 5725 , 264 CAMP Building  
Potsdam, NY 13699-5725  
315-268-3823/FAX 315-268-6438  
[maddog@clarkson.edu](mailto:maddog@clarkson.edu)

- **Experience** - Materials processing, Aerodynamics
- **Interest** - High temp. materials, Vibration/noise control, Cooling/HT, MV controls
- **Facilities** - Wind tunnels, Mfg. center

### Cornell University

Contact: Stephen B. Pope, Professor  
Sibley School of Mechanical and Aerospace Engineering 240 Upson Hall  
Ithaca, New York 14853-7501  
607-255-4314/FAX 607-255-1222  
[pope@mae.cornell.edu](mailto:pope@mae.cornell.edu)

- **Experience** -
- **Interest** -
- **Facilities** -

### Polytechnic University

Contact: Dr. Iraj Kalkhoran  
Aerospace Engineering Department  
901 Route 110  
Farmingdale, NY 11735  
516-755-4334/FAX 516-755-4526  
[iraj@poly.edu](mailto:iraj@poly.edu)

- **Experience** - Turbomachinery, Combustion, Thermo- fluids, Controls, Metallurgy
- **Interest** - Combustor Emissions, Heat Transfer, Supersonic Flows, Aero-derivative Gas Turbines, Material Properties
- **Facilities** - Energy Systems Laboratory, Supersonic Wind Tunnel Facility, Controls and Robotics Laboratory, Combustion Facility, Vibration and Predictive Maintenance of Rotating Equipment Laboratory

### Rensselaer Polytechnic Institute

Contact: Zvi Rusak Professor  
Department of Mechanical and Aerospace Engineering  
JEC 4010, 110 8th Street,  
Troy, NY 12180-3590  
518-276-3036/FAX 518-276-2623  
[rusakz@rpi.edu](mailto:rusakz@rpi.edu)

- **Experience** - Combustion theory, Combustion Simulations, Aerodynamics, CFD, Flow Control Techniques, Heat Transfer
- **Interest** - Combustion Dynamics and control, Aerodynamics of Turbine Blades, Flow control and Aero shaping, Heat transfer

- **Facilities** - Theoretical and Computational Fluid Dynamics Laboratory, Flow Control Laboratory, Scientific Computations Center, Wind Tunnels: 4x6subsonic and 18x27subsonic tunnels, Mach 3 tunnel, Shock tunnel, Shock tube

## State University of New York, Stony Brook

Contact: Christopher C. Berndt, Professor  
 Department of Materials Science and Engineering  
 306 Old Engineering  
 Stony Brook, NY 11794-2275  
 631-632-8507/FAX 631-632-8525  
[cberndt@notes.cc.sunysb.edu](mailto:cberndt@notes.cc.sunysb.edu)

- **Experience** - Thermal Barrier Coatings, Thermal Spray Technology, Plasma Sprays
- **Interest** - Protective Coatings, Processing and Analysis, Microstructure and Properties, Failure Mechanisms
- **Facilities** - Thermal Spray Systems and Guns, TEM and SEM, Optical Microscopes, Quantachrome Mercury Intrusion Porosimeter

## Syracuse University

Contact: Thong Dang, Professor  
 Department of Mechanical & Aerospace Engineering  
 149 Link Hall  
 Syracuse, NY 13244  
 315-443-4311/FAX 315-443-9099  
[tqdang@ecs.syr.edu](mailto:tqdang@ecs.syr.edu)

- **Experience** - Turbomachine CFD. 3D inverse method for turbomachine blade design, axial/radial/transverse industrial-fan aerodynamics. Fluid dynamics of flow- interaction between a fan and a high-resistance medium. Turbine fluid dynamics and heat transfer.
- **Interest** -
- **Facilities** - Low-speed fan tunnel.

# NORTH CAROLINA

## Duke University

Contact: Dr. Josiah D. Knight, Professor  
 Department of Mechanical Engineering and Materials Science  
 Durham, NC 27708-0300  
 919-660-5337/FAX 919-660-8963  
[jknight@acpub.duke.edu](mailto:jknight@acpub.duke.edu)

- **Experience** - Dynamics and vibration, Heat transfer, aero/CFD, aeroelasticity
- **Interest** - Structural and rotor dynamics, fluid mechanics, heat transfer
- **Facilities** - Subsonic wind tunnel, rotor dynamics lab, anechoic chamber, laser velocimeter

## North Carolina State University

Contact: Dr. William Roberts

MAE, 3190 Broughton Hall  
 Box 7910  
 Raleigh, NC 27695-7910  
 919-515-5294/FAX 919-515-7968  
[bill\\_roberts@ncsu.edu](mailto:bill_roberts@ncsu.edu)

- **Experience** - Advanced instrumentation, aerodynamics, combustion, computational fluid dynamics, turbulence modeling, turbulence- chemistry closure, 3-D unsteady flows.
- **Interest** - Combustion and combustion diagnostics; experimental and computational fluid dynamics; propulsion.
- **Facilities** - Wind Tunnels, Counter flow diffusion flame burner, laser based optical diagnostic, research workstations, unsteady flow animation facilities.

# NORTH DAKOTA

## University of North Dakota

Contact: Dr. Forrest E. Ames  
POB 8359, ME Department  
Grand Forks, ND 58202-8359  
701-777-2095/FAX 701-777-4838  
[forrest\\_ames@mail.und.nodak.edu](mailto:forrest_ames@mail.und.nodak.edu)

- **Experience** - Gas Turbine External Heat Transfer, Film- Cooling and Aerodynamics, Turbine Component Internal Heat Transfer, Heat Transfer in Fluidized Beds, Manufacture of Ceramic Components
- **Interest** - HT, Turbine Vane HT, Film Cooling and Aerodynamics
- **Facilities** - Ambient Cascade Facility, Internal Heat Transfer Facility, Fluidized Bed

# OHIO

## Air Force Institute of Technology

Contact: Contact: Dr. Paul I. King  
Department of Aeronautics and Astronautics  
2950 P. Street  
Wright Patterson AFB, OH 45433-7765  
513-255-3636, x4628/FAX 513-255-7814  
[paul.king@afit.edu](mailto:paul.king@afit.edu)

- **Experience** - Turbine Heat Transfer, Compressor Aerodynamics, Hypersonic Propulsion
- **Interest** - Axial Flow Turbines and Compressors, Numerical Simulation of Multistage Compressors, Gortler Vortex Control (Riblets)
- **Facilities** - AFIT Turbine and Compressor Cascades, Wright Lab Rotating Compressor Facility, Joint Dynamic Airbreathing Propulsion Simulations (JDAPS) Capability

## Cleveland State University

Contact: Dr. Mounir Ibrahim  
Fenn College of Engineering  
Room 231, Stilwell Hall  
1960 East 24<sup>th</sup> Street  
Cleveland, OH 44115-2425  
(CSU) 216-687-2580/FAX 216-687-9280  
[m.ibrahim@csuohio.edu](mailto:m.ibrahim@csuohio.edu)

- **Experience** - HT, Fluid mechanics
- **Interest** - Thermal Sciences, Fluid Dynamics, Computational Fluid Dynamics, Combustion
- **Facilities** -

## Ohio State University

Contact: Dr. Michael Dunn, Director  
Gas Turbine Laboratory  
2300 West Case Road  
Columbus, OH 43235  
614-292-5015/FAX 614-292-5552  
[dunn.129@osu.edu](mailto:dunn.129@osu.edu)

- **Experience** - Heat Transfer, Aerodynamics, Aeromechanics
- **Interest** - Forced-response/Vibrations, Turbine Blade Heat Transfer, Rotor-Stator Interactions and Aerodynamic Losses
- **Facilities** - Turbine Research Rig, Spin-Pit facility, small blow down facilities

## University of Cincinnati

Contact: Dr. Widen Tabakoff, Professor

Department of Aerospace Engineering/Engineering Mechanics  
POB 210070, RHODES 833  
Cincinnati, OH 45221-0070  
513-556-3226/FAX 513-556-5038  
[Widen.Tabakoff@uc.edu](mailto:Widen.Tabakoff@uc.edu)

- **Experience** - Gas dynamics, Propulsion systems, Materials
- **Interest** - Turbine flow fields, Erosion, Coatings
- **Facilities** - 3D LDV, Wind tunnels, Metallography, Turbine/compressor rigs

### **University of Dayton Research Institute**

Contact: Dr. Roger R. Wills, Group Leader  
Structural Integrity Division  
Integrated Methods Materials Characterization – Applied Research and Systems Development Groups  
300 College Park  
Dayton, Ohio 45469-0120  
937-229-4730/FAX 937-229-3712  
[Roger.Wills@udri.udayton.edu](mailto:Roger.Wills@udri.udayton.edu)

- **Experience** - Structural ceramics characterization
- **Interest** - Ceramics
- **Facilities** - Use of Oak Ridge Lab

### **Wright State University**

Contact: Dr. J. Mitch Wolff  
Mechanical Engineering  
Materials Science and Engineering  
Dayton, OH 45435  
937-775-5141/FAX 937-775-5009  
[mwoff@cs.wright.edu](mailto:mwoff@cs.wright.edu)

- **Experience** - Heat Transfer, Fluid Mechanics, Materials, Optimization
- **Interest** - Vibrations, Gas Turbine Aerodynamics, Ceramics, Intermetallics, Titanium Alloys, Materials Processing
- **Facilities** - Fluids and Thermo Labs, Electron and Optical Microscopy, X-ray Diffraction, Processing of Metals, Ceramics and Polymers

## **OKLAHOMA**

### **University of Oklahoma**

Contact: S. R. Gollahalli, Director/Lesch Centennial Chair  
School of Aerospace and Mechanical Engineering  
Norman, OK 73019  
405-325-1728/ FAX 405-325-1088  
[gollahal@ou.edu](mailto:gollahal@ou.edu)

- **Experience** - Combustion, Propulsion, Pollutants, and Fluid Dynamics Composite Materials, Intelligence Systems/Controls Materials, Design Optimization
- **Interest** - Same as above
- **Facilities** - Combustion Lab and Test Cells, Gas Turbine Lab, Fluid Dynamics Lab, Wind-tunnels, Laser Diagnostics, Super-computer, Parallel Computing facilities

### **University of Tulsa**

Contact: Dr. Edmund F. Rybicki, Professor and Department Chair  
600 South College Avenue  
Tulsa, OK 74104  
918-631-2996/FAX 918-631-2397  
[Ed-Rybicki@UTulsa.Edu](mailto:Ed-Rybicki@UTulsa.Edu)

- **Experience** - Thermal Barrier Coatings
- **Interest** - Residual Stresses, Coating Life, Degradation, Coating Performance
- **Facilities** - Bond Strength Tests, Mechanical Property Measurements

# PENNSYLVANIA

## Carnegie Mellon University

Contact: Contact: Dr. Allen Robinson, Assistant Professor  
ME, Scaife Hall 303, 5000 Forbes Avenue  
Pittsburgh, PA 15213  
412-268-3657/FAX 412-268-3348  
[alr@andrew.cmu.edu](mailto:alr@andrew.cmu.edu)

- **Experience** - Blade Cooling, Combustion, CFD, Laser Diagnostics, Spray, Vibration
- **Interest** - Heat Transfer, Multiphase Flows, Spray Combustion, Optical Sensing, Rotor Dynamics
- **Facilities** - Atomization and Spray Lab, Thermal Imaging Lab, Thermal Science Lab, Vibration Lab

## Drexel University

Contact: Contact: Professor Mun Young Choi, Interim Head  
Mechanical Engineering and Mechanics Department  
3141 Chestnut Street  
Philadelphia, PA 19104  
215-895-2210/FAX 215-895-4929  
[choi@drexel.edu](mailto:choi@drexel.edu)

- **Experience** - Combustion chemistry and HT, Fuel atomization, Emissions, Flow visualization
- **Interest** - Computational and experimental combustion work, Staged combustion
- **Facilities** - Atmospheric and pressurized flow reactors, Laser flow and combustion diagnostics, FBC and pulse combustors

## Lehigh University

Contact: Dr. John N. DuPont  
R.D. Stout Distinguished Professor  
Associate Director, Dept. of Materials Science and Engineering  
5 East Packer Avenue  
Bethlehem, PA 18015  
610-758-3942  
[jnd1@lehigh.edu](mailto:jnd1@lehigh.edu)

- **Experience** - Alloy development, high temperature corrosion, welding and solidification
- **Interest** - Coatings, single crystal turbine blades
- **Facilities** - Materials testing, welding and solidification laboratory, alloy preparation (arc melting and thermo mechanical simulations with Gleeble), thermal analysis (thermogravimetric analysis and differential thermal analysis)

## Pennsylvania State University

Contact: Cengiz Camci, Professor of Aerospace Engineering  
Department of Aerospace Engineering  
Turbomachinery Heat Transfer Laboratory  
223 Hammond Building  
University Park, PA 16802  
814-865-9871/FAX 814-865-7092  
[C-CAMCI@PSU.EDU](mailto:C-CAMCI@PSU.EDU)

- **Experience** - Blade Cooling, 3-D Flow Field in Multistage Compressors and Turbines, Tip Clearance Desensitization, Controls, Coal Combustion, Combustion and Emissions, Noise and Vibration
- **Interest** - Computation, Modeling and Analysis of 3D Flow Field in Multistage Compressors and Turbines, Low Emission Combustion, Advanced Heat Transfer, Multivariable Controls, Composite Materials, Acoustics
- **Facilities** - Compressor and Turbine Testing, Material Fatigue/fracture, Composite Fabrication, Multifuel Combustion Testing, Acoustic Testing, Controls Lab

## University of Pittsburgh

Contact: Fred S. Pettit, Professor  
Department of Materials Science and Engineering

848 Benedum Hall  
Pittsburgh, PA 15261  
412-624-9730/FAX 412-624-8069  
[pettit@engr.pitt.edu](mailto:pettit@engr.pitt.edu)

- **Experience** - High Temperature Corrosion Use of Coatings for Protection Heat Transfer Microsystem Technology
- **Interest** - Same as Areas of Experience
- **Facilities** - Equipment is available to cyclically and isothermally oxidize materials at temperatures up to 1200 ° C, measure stresses in oxide scales, characterize microstructures and surface morphologies using optical microscopy, scanning electron microscopy, and transmission electron microscopy. A thermal science and Imaging Laboratory is equipped with advanced flow and heat transfer measurement facilities directed toward obtaining fundamental understanding and design strategies of particle imaging velocimetry. A computer-automated liquid crystal thermographic system and a UV-induced phosphor fluorescent thermometric imaging system are also available.

## SOUTH CAROLINA

### Clemson University

Contact: Richard S. Figliola, PhD, PE  
247 Fluor Daniel Building  
Department of Mechanical Engineering  
Clemson, SC 29630  
864-656-5635/FAX 864-656-4435  
[fgliola@clemson.edu](mailto:fgliola@clemson.edu)

- **Experience** - Aerodynamics, Measurements and Uncertainty Analysis, Energy-based Design and Optimization
- **Interest** - Aerodynamic shape optimization; Flexible and morphing surfaces; Atomization Physics for Material Processing
- **Facilities** - Stereo PIV; LDV; Low speed wind tunnel with balance; High Performance Parallel Computer for Numerical Simulation and Data Analysis. Large and small scale testing experience.

### University of South Carolina

Contact: Dr. Jeffrey Morehouse  
Department of Mechanical Engineering  
Columbia, SC 29208  
803-777-3017/FAX 803-777-0106  
[MORE@ENGR.SC.EDU](mailto:MORE@ENGR.SC.EDU)

- **Experience** -
- **Interest** - Hot gas clean up, Coal combustion, HT & thermal/fluid based concepts
- **Facilities** - Material Science, Catalysis and Spectroscopy Equipment

## TENNESSEE

### Tennessee Technological University

Contact: Sastry Munukutla, Director, Center for Energy Systems Research  
Box 5032, 1020 Stadium Drive, Room 414  
Cookeville, TN 38505  
931-372-3628/FAX 931-372-6369  
[smunukutla@ntech.edu](mailto:smunukutla@ntech.edu)

- **Experience** - Fluid/Thermal Sciences, Energy Systems
- **Interest** - CFD, Experimental Fluid Mechanics, High Speed Wind Tunnels, Shock Tubes
- **Facilities** - Turbulence Laboratory, Duct Flow Laboratory Including Acoustic Testing Facilities, Hydraulic Laboratory

## **University of Tennessee**

Contact: Peter K. Liaw, Professor  
Department of Materials Science and Engineering  
427-B Dougherty Hall  
Knoxville, TN 37996-2200  
865-974-6356/FAX 865-974-4115  
[pliaw@utk.edu](mailto:pliaw@utk.edu)

- **Experience** - High-temperature Materials, Microstructural Characterization
- **Interest** - Processing and Characterization of Polymeric Materials, Metal Joining
- **Facilities** - Processing, Mechanical Characterization and Microstructural Characterization and Nondestructive Evaluation Capabilities

## **University of Tennessee Space Institute**

Contact: Dr. Angie Buckley, Assistant Vice President and Dean for Research  
411 B. H. Goethert Parkway  
Tullahoma, TN 37388  
931-393-7286/FAX 931-455-7266  
[abuckley@utsi.edu](mailto:abuckley@utsi.edu)

- **Experience** - Gas turbine topping combustor, Gas flow, CFD
- **Interest** - Combustion, Aerodynamics, PFBC
- **Facilities** - Coal fired flow facility with analytical and chemistry labs, Electron Microscopy

## **Vanderbilt University**

Contact: Robert W. Pitz, Professor and Chair  
Mechanical Engineering Department  
104 Olin Hall, 2400 Highland Avenue  
Nashville, TN 37212  
615-322-0209/FAX 615-343-6687  
[robert.w.pitz@Vanderbilt.Edu](mailto:robert.w.pitz@Vanderbilt.Edu)

- **Experience** - Combustion modeling, Design of experiments, Laser diagnostics
- **Interest** - Combustion diagnostics, Turbine comb. research
- **Facilities** -

# TEXAS

## **Texas A & M University**

Contact: J.C. Han, Marcus C. Easterling Chair Professor  
303 Engineering/Physics Building Office Wing  
College Station, TX 77843-3123  
979-845-3738/FAX 979-845-3081  
[JCHan@mengr.tamu.edu](mailto:JCHan@mengr.tamu.edu)

- **Experience** - Turbomachinery design
- **Interest** - All phases of turbine design
- **Facilities** - Component testing labs

## **University of Houston**

Contact: Keith Hollingsworth, Professor  
Department of Mechanical Engineering  
4800 Calhoun Road  
Houston, TX 77204-4792  
713-743-4500/FAX 713-743-4503  
[hollingsworth@uh.edu](mailto:hollingsworth@uh.edu)

- **Experience** -
- **Interest** - Gas turbine blade cooling, Vibration/noise control, High-temp. ceramic/composite materials research
- **Facilities** - Labs for above interests

## **University of Texas, Arlington**

Contact: Dr. Pranesh B. Aswath, Assistant Professor

ME and Materials Science and Engineering Program  
Post Office Box 19031  
Arlington, TX 76006  
817-272-2008/FAX 817-272-2538  
[aswath@uta.edu](mailto:aswath@uta.edu)

- **Experience** - Design and development of advanced materials, Ceramics
- **Interest** - Advanced materials, Ceramics
- **Facilities** -

## University of Texas, Austin

Contact: David G. Bogard, Professor  
Department of Mechanical Engineering  
1 University Station C2200  
Austin, TX 78712-0292  
512-471-3128/FAX 512-471-8727  
[dbogard@mail.utexas.edu](mailto:dbogard@mail.utexas.edu)

- **Experience** - Aero/thermal studies turbine engine turbine sections. A wide range of studies have been completed in the area of turbine airfoil film cooling. Experimental studies include vane and blade leading edges, vane pressure and suction sides, and full coverage configurations. Special facilities are used to incorporate realistic airfoil geometries and high mainstream turbulence. Measurements include adiabatic effectiveness, heat transfer coefficients, thermal fields, and velocity fields for two-dimensional and three-dimensional regions. Computational studies have focused on the development of the TEXTAN CFD code for rapid analysis of the thermal fields associated with turbine airfoils.
- **Interest** - Recent areas of interest include studies of conjugate heat transfer using models constructed of high conductivity materials. We are also involved in studies of roughness effects and partial hole blockage effects on film cooling performance.
- **Facilities** - The primary facilities for gas turbine aero/thermal research are two wind tunnels that have been specially modified to incorporate models of turbine vanes and blades. Large scale models are used in both facilities to good spatial resolution of the flow and thermal fields on the scale of the cooling holes used in film cooling. These facilities incorporate secondary flow systems that are cryogenically cooled to allow coolant flows to be cooled to an absolute temperature that is a factor of two smaller than the mainstream temperature. This enables film cooling studies using realistic density ratios for the coolant. The wind tunnels also incorporate free stream turbulence generators that allow mainstream turbulence as high as 20% to be used in experiments. One of the wind tunnels also incorporates a hot streak generator that allows a simulated hot streak to be positioned at varying pitch positions relative to the test vane.

Essentially adiabatic test models are used in conjunction with IR camera surface temperature measurement to obtain adiabatic effectiveness distributions. Heat transfer coefficient measurements are accomplished with constant heat flux surface foils. Velocity field measurements are made with a three-component laser Doppler velocimeter system which was specially designed for near wall measurements around the vane leading edge. Thermal field measurements are made using a miniature thermocouple rake manufactured in our lab.

# UTAH

## Brigham Young University

Contact: Thomas H. Fletcher  
Chemical Engineering Department  
350 CB  
Provo, UT 84602  
801-422-6236/FAX 801-422-0151  
[tom\\_fletcher@byu.edu](mailto:tom_fletcher@byu.edu)

also

Dr. Jeffrey P. Bons, Associate Professor  
Department of Mechanical Engineering  
4350 CTB  
Provo, UT 84602  
801-422-8036/FAX 801-422-0516  
[jbons@byu.edu](mailto:jbons@byu.edu)  
<http://www.et.byu.edu/~jbons>

- **Experience** - Solid Fuel Combustion, Turbulence/Combustion, Pollutant formation, Computational fluid dynamics with combustion, Laser diagnostics

- **Interest** - Solid Fuel Combustion, Turbulence/Combustion, Pollutant formation, Computational fluid dynamics with combustion, Laser diagnostics
- **Facilities** - Dr. Fletcher is the Director of the Advanced Combustion Engineering Research Center (ACERC), initiated by the NSF in 1986. This center involves up to 22 faculty at BYU working on combustion-related projects in many fields, one of which is gas turbines. University computer facilities include the Ira & Mary Lou Fulton Supercomputing Center, which includes a 316 processor (@375 MHz) IBM Sp-2 machine, an IBM Linux cluster with 256 Pentium Xeon processors (@2.4 GHz), an SGI Origin 3800 with 64 processors, an SGI Origin 2000 with 24 processors, and an SGI 3900 with 128 processors (See <http://marylou.byu.edu/resources.htm>) . We have performed CARS, LDA, and PLIF-OH experiments on an atmospheric, lab-scale gas turbine combustor. We currently are equipped with an accelerated deposition facility that can experimentally reproduce the particle deposition mechanisms expected in land-based turbines. We have appropriate SEM, TEM, and other particle characterization facilities at BYU after years of working in coal combustion. We also have lab-scale burners for biomass and co-fired coal/biomass (up to 40 lbs/hr of coal), with the associated gas and particle sampling and analysis systems.

## University of Utah

Contact: Phil Ligrani, Professor/ Director, Convective Heat Transfer Laboratory  
 Department of Mechanical Engineering  
 50 S. Central Campus Drive, MEB 2110  
 Salt Lake City, Utah 84112-9208  
 801-581-4240/ FAX 801-585-9826  
[ligrani@mech.utah.edu](mailto:ligrani@mech.utah.edu)

- **Experience** - Transonic and subsonic turbine heat transfer - cooling - aerodynamics measurements, surface heat transfer augmentation, film cooling, aerodynamic losses, internal turbine airfoil heat transfer and cooling, numerical predictions
- **Interest** - Turbine heat transfer, turbine cooling, turbine airfoil aerodynamics, secondary flow effects, instrumentation development, effects of surface roughness, numerical predictions
- **Facilities** - CONVECTIVE HEAT TRANSFER LABORATORY: Transonic Wind Tunnel (TWT), Subsonic Wind Tunnels, 2 Swirl Chambers, Impingement Cooling Test Facilities, 2 Facilities for Internal Heat Transfer Studies, Infrared Imaging Capabilities, Facilities to Quantify Surface Roughness Characteristics, Extensive Instrumentation and Probing Equipment and Facilities

## **VIRGINIA**

### University of Virginia

Contact:

Department of Materials Science and Engineering  
 116 Engineer's Way  
 P.O. Box 400745  
 Charlottesville, VA 22904-4745  
 434-982-564/FAX 434-982-5660  
[ew2k@virginia.edu](mailto:ew2k@virginia.edu)

- **Experience** - Creation of Novel Thermal Barrier Coatings, Operation of Two In-house e-beam PVD Coaters, Eddy-current Sensing for Single Crystal Growth
- **Interest** - Thermal Barrier Coatings, Single Crystal Growth, Ceramic Matrix Composites
- **Facilities** - Intelligent Processing of Materials Laboratory, Two e-beam PVD Coaters (installed 1994 and 2000), Cyclic Oxidation Furnace, Eddy Current Sensors

### Virginia Commonwealth University

Contact: Dr. Mohamed Gad-el-Hak

Virginia Commonwealth University  
 601 West Main Street, ME Building, Room 303  
 Richmond, VA 23284-3015  
 804-828-3576/FAX 804-827-7030  
[gadelhak@vcu.edu](mailto:gadelhak@vcu.edu)

- **Experience** -
- **Interest** -
- **Facilities** -

## **Virginia Polytechnic Institute**

Contact: Danesh Tafti, Associate Professor  
114 Randolph Hall, Mechanical Engineering Department  
Blacksburg, VA 24061  
540-231-9975 /FAX 540-231-9100  
[dtafti@vt.edu](mailto:dtafti@vt.edu)

- **Experience** - turbine aero and heat transfer, active combustion control, flow control, pressure distortion in compressors, internal and film cooling of turbine blades, computational fluid dynamics including detached and large eddy simulation techniques
- **Interest** -
- **Facilities** - Virginia Tech's Center for Turbomachinery and Propulsion Research includes faculty from the Mechanical Engineering, Aerospace and Ocean Engineering, and Electrical and Computer Engineering Departments. The Center is actively working on projects concerned with combustion instabilities, turbine aero and heat transfer issues, unsteady stator/rotor interactions, distortion effects in compressor performance, turbine engine noise, analyses methods for controlling performance variability, rotor dynamics, magnetic bearings, and active flow control for reducing high-cycle fatigue.

The research projects use experimental facilities such as a heated transonic turbine blade cascade with cryogenic cooling to achieve high density ratios between the coolant and hot gas flows, a transonic compressor cascade, a moving wall compressor cascade, and a number of low speed wind tunnels with linear airfoil cascades. Rotor dynamics is studied using various facilities, which include a variable speed motor drive capable of 14,000 rpm for identification of fluid film bearing characteristics. Test rigs for combustion studies include a full scale combustor capable of high pressure combustion. In addition to the facilities mentioned, there is an airport laboratory that houses an operational JT15D-1 turbofan engine that can generate up to 2500 lbf of thrust. Instrumentation used for these studies include laser Doppler velocimeters, hot-wire anemometers, Schlieren systems, pressures probes, fast-responding heat flux sensors, thermal liquid crystals, and infrared thermography. In addition to a number of workstations and PCs, computational facilities include a cluster of 1,100 Apple G5s capable of 10.3 trillion operations per second, which makes the Virginia Tech Terascale Computing Facility the third-fastest machine in the world.

## **WASHINGTON**

### **University of Washington**

Contact: Philip C. Malte, Professor  
Mechanical Engineering Department  
Room 318, Mechanical Engineering Building  
Box 352600  
Seattle, WA 98195-2600  
206-543-5090/FAX 206-685-8047  
[malte@u.washington.edu](mailto:malte@u.washington.edu)

- **Experience** - NOx, CO control for turbines, Engines, Furnaces
- **Interest** - Combustion and emissions
- **Facilities** - Combustion Laboratory

### **Washington State University**

Contact: Dr. B. R. Ramaprian  
POB 642920, School of MME  
Pullman, WA 99164-2920  
509-335-1327/FAX 509-335-4662  
[ramapria@mme.wsu.edu](mailto:ramapria@mme.wsu.edu)

- **Experience** - Fluid Mechanics, HT & Materials Science, Aerodynamics
- **Interest** - Thin Film Research, Processing of Composites
- **Facilities** - Low-speed Wind Tunnels, LDA, PDI, 2-dimensional PIV System, TEM & SEM Facilities

## **WEST VIRGINIA**

### **West Virginia University**

Contact: Dr. Andrew C. Nix  
Center for Alternative Fuels, Engines and Emissions  
Department of Mechanical and Aerospace Engineering

327 ESB - Box 6106  
Morgantown, WV 26506-6106  
304-293-3111 ext 2352/ FAX 304-293-6689  
[andrew.nix@mail.wvu.edu](mailto:andrew.nix@mail.wvu.edu)

- **Experience** - turbine heat transfer and cooling, turbine hot section engineering support, alternative fuels, engines and emissions
- **Interest** - gas turbine engine heat transfer and film cooling, effects of unsteady flows on turbine engine heat transfer and aerodynamics, high frequency (time-resolved) heat transfer and velocity measurements, alternative fuels, engines and emissions, propulsion and power
- **Facilities** -

## WISCONSIN

### University of Wisconsin, Madison

Contact: Scott T. Sanders, Assistant Professor  
109 Engineering Research Building  
1500 Engineering Drive  
Madison, WI 53706-1687  
608-262-3540/FAX 608-265-2316  
[ssanders@engr.wisc.edu](mailto:ssanders@engr.wisc.edu)

- **Experience** - Combustor design and performance, Emissions Modeling
- **Interest** - Spray and Combustion Modeling, CFD Emissions
- **Facilities** - SGI Origin 2000 (32CPU), Cray J916 (8CPU), Combustion Lab, Gas Turbine Test Cell, Spray Lab

### University of Wisconsin, Milwaukee

Contact: Ryo Samuel Amano  
College of Engineering and Applied Science  
Mechanical Engineering Department  
P.O. Box 784  
Milwaukee, WI 53201  
414-229-2345/FAX 414-229-6958  
[amano@uwm.edu](mailto:amano@uwm.edu)

- **Experience** - External Blade Flows, Internal Blade Cooling, Combustion Chamber, Turbine Efficiencies, Compressor Efficiencies and Loss Evaluations.
- **Interest** - Computational Fluid Dynamics, Experimental Measurements of Flow and Heat Transfer of both external and internal flows of an airfoil.
- **Facilities** - Fluid Mechanics Lab, Heat Transfer Lab, Combustion Lab, Measurement Lab.

## WYOMING

### University of Wyoming

Contact: Paul A. Dellenback, Professor  
Department of Mechanical Engineering  
Post Office Box 3295  
Laramie, WY 82071-3295  
307-766-2946/FAX 307-766-2695  
[pad@uwyo.edu](mailto:pad@uwyo.edu)

- **Experience** - Experimental HT, Materials testing
- **Interest** - High temperature (ceramic) materials, Enhanced cooling and HT, Mixing in combustors
- **Facilities** - Materials testing and fabrication, Wind tunnels, LDA, PIV, Water Tunnel, Hot Wire