

***MECHANICAL ENGINEERING  
DEPARTMENT'S***

***Ph.D. Degree***

***- REQUIREMENTS AND PROCEDURES -***

INTERDISCIPLINARY DOCTORAL PROCEDURES  
COLLEGE OF ENGINEERING

**TABLE OF CONTENTS**

College of Engineering's Graduate Degrees	2
Doctoral Student's Responsibilities	3
Graduate Assistanships	3
Admission Procedures	3
Admission Requirements	3
Residence Requirement	4
Continuous Enrollment Requirement	4
Time Limit	4
Transfer Credits	4
Initial Procedures	4
Doctoral Degree Requirements	4
Qualifying Examination	5
Dissertation Director	5
Interdisciplinary Doctoral Committee	5
Plan of Study	5
Credit Requirements	6
Language Requirement	6
Candidacy Examination	6
Dissertation Proposal	6
Dissertation and Oral Defense	6
Coordinated and Joint Programs	7-10
- The University of Akron and Youngstown State Univ.	
- Engineering Applied Mathematics Doctoral Program	
- MD/Ph.D. Program	
Departmental Faculty Profiles	11-12

*Note: The doctoral requirements of The University of Akron are italicized to distinguish  
The University's requirements from those of the College of Engineering.*

**INTERDISCIPLINARY DOCTORAL PROCEDURES  
COLLEGE OF ENGINEERING  
THE UNIVERSITY OF AKRON**

**College of Engineering's Graduate Degrees**

The graduate degrees offered in the College of Engineering are summarized in Table 1. Coordinated programs are those that are both an interdisciplinary program in the College of Engineering and a department at The University of Akron.

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Table 1. Graduate Degrees Offered in the College of Engineering at The University of Akron

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**DOCTOR OF PHILOSOPHY IN ENGINEERING DEGREE**

Interdisciplinary Programs

- Environmental Engineering
- Mechanics
- Systems Engineering
- Materials Engineering
- Transport Processes
- Biomedical Engineering\*
- Polymer Engineering\*
- Engineering Applied Mathematics\*

\*Coordinated Programs

- Biomedical Engineering with the Biomedical Engineering Department in the College of Engineering
- Polymer Engineering with the Polymer Engineering Department in the College of Polymer Science and Polymer Engineering
- Engineering Applied Mathematics with the Department of Mathematical Science in the College of Arts and Sciences
- College of Engineering at The University of Akron and the College of Engineering at Youngstown State University

Joint Program

- MD/Doctor of Philosophy in Engineering Degree with Northeastern Ohio Universities' College of Medicine (NEOUCOM)

**MASTER OF SCIENCE DEGREES**

- Master of Science in Chemical Engineering
- Master of Science in Civil Engineering
- Master of Science in Electrical Engineering
- Master of Science in Mechanical Engineering

- Master of Science in Engineering
  - Biomedical Specialization
  - Polymer Specialization
  - Engineering Management Specialization

## **Doctoral Student's Responsibilities**

Doctoral students are completely responsible for all aspects of their graduate education. Specifically, these responsibilities include:

- Understanding, adhering to, and implementing the procedures of the Graduate School, as described in the University of Akron Graduate Bulletin, and the Interdisciplinary Doctoral Procedures of the College of Engineering.
- Selecting an interdisciplinary program, Dissertation Director, and Interdisciplinary Doctoral Committee.
- Arranging, through the Dissertation Director, all Interdisciplinary Doctoral Committee meetings.
- Initiating, through their Dissertation Director, the forms that monitor their progress toward the doctoral degree.
- Proposing and executing an accepted Plan of Study.
- Proposing a Research Proposal and executing the proposed research.
- Preparing a scientifically acceptable and comprehensive dissertation whose format meets all the accepted standards of the Interdisciplinary Doctoral Committee, the College of Engineering, and the Graduate School.

## **Graduate Assistanships**

*The Acceptance Agreement for Graduate Assistants at The University of Akron states that the Appointee shall be enrolled in a full-time program of graduate study at The University of Akron. Full-time study is defined as 9-15 graduate credit hours.*

## **Admission Procedures**

All applicants for the doctoral program in the College of Engineering must submit their applications and supporting documentation to the Graduate School. When the documentation is complete, the Graduate School sends it to the Dean of the College of Engineering, who then distributes it to the departments for their evaluation and recommendations concerning acceptance or rejection. The documentation and recommendations are returned to the Graduate School via the Dean of the College of Engineering. The Graduate School then sends the letters of acceptance and rejection to each applicant.

## **Admission Requirements**

Applicants for the Doctor of Philosophy in Engineering must hold a bachelor's degree from a program that is accredited by the Engineering accreditation Commission of the Accreditation Board for Engineering and Technology at the time of graduation, or provide satisfactory evidence of an equivalent academic background to the Dean of the College of Engineering.

Applicants with a master of science degree must provide satisfactory evidence of an equivalent engineering baccalaureate background to the Dean of the College of Engineering.

Applicants must submit official undergraduate transcripts, undergraduate grade point average, at least two letters of recommendation, and official results of the verbal, quantitative, and analytical portions of the GRE. Personal statements or descriptions of post-baccalaureate experience that provide a rationale for the proposed graduate study may also be submitted.

Applicants with a bachelor's degree must have a cumulative grade point average of at least 3.0/4.0.

Applicants with a master's degree must have a cumulative graduate grade point average of at least 3.5/4.0.

Applicants whose native language is not English must have a TOEFL score of at least 550 (written test) or a score of at least 213 (computerized test), and also must submit their score on the Test of Written English.

Applicants not satisfying the requirements for Full Admission may be classified either as a Provisional Admission or as a Deferred Admission.

Applicants with a bachelor's degree in a discipline other than engineering shall have completed undergraduate course work in calculus, differential equations, and have one year of classical physics. These students may be required to take additional bridge-up courses, depending on their background. Graduate students entering with non-engineering degrees will be assigned to a graduate committee that will determine appropriate bridge-up courses. The bridge-up courses must be completed satisfactorily in addition to the doctoral course requirements. Within the first year of graduate study, the doctoral students will identify a faculty adviser, who will oversee that doctoral degree requirements are met.

### **Residence Requirement**

*The minimum residency requirement for a doctoral candidate is at least two consecutive semesters of full-time study in the program. Full-time study is defined as 9-15 semester graduate credits, except for graduate teaching and research assistants for whom full-time study is specified by the assistantship agreement. No student holding a full-time job is considered as fulfilling the residence requirement. The summer sessions may count as one semester, provided that the doctoral student is enrolled for a minimum of 10 consecutive weeks for full-time study and for a minimum of six semester credits per five-week session.*

### **Continuous Enrollment Requirement**

All students admitted to doctoral programs must register for a minimum of one graduate credit as approved by their advisors during each fall and spring semester.

### **Time Limit**

All doctoral requirements must be completed within 10 years of matriculation for doctoral studies.

### **Transfer Credits**

A student, who has a master's degree from another university or from one of the departments in the College of Engineering, may, upon recommendation of the Interdisciplinary Doctoral Committee, transfer up to 24 credits of course work. The courses comprising the transfer credits must be identified and itemized on the Plan of Study and must be substantiated by an official transcript from the educational institution that offered the courses.

A student, who has completed a non-thesis master's degree or has graduate credits, but has not completed the degree requirements for the master's degree, can transfer a maximum of 24 credits of course work toward the doctoral course requirements.

No more than six credit hours of research or completed thesis credits can be transferred.

### **Initial Procedures**

The Department Head will act as the faculty adviser for all incoming doctoral students, unless the student has already chosen a faculty adviser upon arrival.

### **Doctoral Degree Requirements**

The University's and College of Engineering's Requirements for the Doctoral Degree and the following Mechanical Engineering academic requirements for the Doctoral Degree must be satisfied:

- Pass a departmental Qualifying Examination. The purpose of the qualifying examination is to determine admissibility to the doctoral program and any technical weakness.
- Identify an interdisciplinary field of study, a dissertation director, and an Interdisciplinary Doctoral Committee before completion of 18 credits of course work.
- Complete a formal Plan of Study that is acceptable to the Interdisciplinary Doctoral Committee. The Plan of Study must have at least 42 credits at the 600 and 700 level. The minimum total credit hours for the doctoral program is 96 credit hours.

- Satisfy the language requirement specified by the Interdisciplinary Doctoral Committee.
- Pass a Candidacy Examination. The purpose of the candidacy examination is to test the student's ability to conduct independent research.
- Present an acceptable Dissertation Proposal that describes the proposed research to the Interdisciplinary Doctoral Committee.
- Present and successfully defend the dissertation to the Interdisciplinary Doctoral Committee.

### **Qualifying Examination**

The student must pass a Qualifying Examination before the Dissertation Director, the Interdisciplinary Doctoral Committee, and the courses for the Plan of Study are selected. The objective of the Qualifying Examination is to determine if the student has sufficient engineering background to qualify for doctoral studies. The Qualifying Examination must be taken by all first year graduate students. It is given in the spring semester of each academic year and consists of three examinations in Mathematics and six examinations in Mechanical Engineering (or in an area that is closely related to the candidate's field of study).

If the student fails the Qualifying Examination, the student may petition the Qualifying Examination Committee for a re-examination. One re-examination is permitted. If the student fails the second Qualifying Examination, the Dean of the College of Engineering shall forward the results of the Qualifying Examination along with the recommendation that the Dean of the Graduate School dismiss the student from the doctoral program in the College of Engineering.

### **Dissertation Director**

After passing the Qualifying Examination, the student selects a Dissertation Director. Any graduate student who does not select a Dissertation Director in the first year of doctoral study may be dismissed from the doctoral program and, if on assistantship, shall not receive further assistantship support.

### **Interdisciplinary Doctoral Committee**

After choosing the Dissertation Director, an Interdisciplinary Doctoral Committee is formed. The Interdisciplinary Doctoral Committee shall consist of a minimum of five full-time faculty members with a minimum of three from the College of Engineering and at least one from outside the College of Engineering.

Of the three members from the College of Engineering, one must be from a department different from that of the Dissertation Director and all three must have attained that graduate faculty status, as specified by the Graduate School, which permits the direction of doctoral students. The member from outside the College of Engineering must also have a status on the graduate faculty which allows him/her to direct doctoral dissertations. This member is selected so as to be maximally beneficial to the student in the design and conduct of the research, providing a perspective from a related discipline.

Any graduate student who does not form an Interdisciplinary Doctoral Committee in the first year of doctoral study may be dismissed from the doctoral program and, if on an assistantship, shall not receive further assistantship support.

### **Plan of Study**

After consultation with the Dissertation Director, the doctoral student shall formally present a Plan of Study to the Interdisciplinary Doctoral Committee for recommendations and acceptance. The courses listed on the Plan of Study constitute the individualized curriculum that the doctoral student must satisfy to meet the course requirements for the doctoral degree. Since the Plan of Study is individualized, it may contain more credits than the minimum specified in the doctoral degree requirements.

Any graduate student who does not have an approved Plan of Study in the first year of doctoral study may be dismissed from the doctoral program and, if on an assistantship, shall not receive further assistantship support.

### **Credit Requirements**

The Plan of Study must have at least 42 credits at the 600 and 700 level. The minimum total credit hours for the doctoral program is 96 credit hours.

**Language Requirement**

The Interdisciplinary Doctoral Committee may require the student to demonstrate proficiency in a foreign language. Demonstration of competence in appropriate research skills may serve as a substitute for the foreign language requirement.

**Candidacy Examination**

A Candidacy Examination is prepared and administered by the Interdisciplinary Doctoral Committee. The Interdisciplinary Doctoral Committee may combine the Candidacy Examination and the Dissertation Proposal as it sees fit.

If the doctoral student fails the Candidacy Examination, the doctoral student may submit a written petition to the Interdisciplinary Doctoral Committee for a re-examination. If the Committee concurs with the student's petition, then one re-examination is permitted within the time period specified by the Interdisciplinary Doctoral Committee.

If the Interdisciplinary Doctoral Committee rejects the petition for re-examination, or the student fails the re-examination, then the Dissertation Director shall notify the Dean of Engineering, in writing, that the student has failed the Candidacy Examination. The Dean of Engineering shall recommend to the Dean of the Graduate School that the student be dismissed from the doctoral program in engineering.

**Dissertation Proposal**

The Dissertation Proposal is a written description of the proposed research and should include a review of the previous work in this area, the significance of the investigation, the objectives, the methodology, and the expected results. The Interdisciplinary Doctoral Committee will also evaluate the doctoral student's ability to communicate the results of the investigations. The Interdisciplinary Doctoral Committee will give written recommendations on the dissertation proposal to the doctoral candidate.

## **Dissertation and Oral Defense**

The dissertation and oral examination must be approved by the Interdisciplinary Doctoral Committee before the dissertation can be submitted to the Graduate School.

The doctoral candidate distributes complete, but preliminary, copies of the dissertation to each member of the Interdisciplinary Doctoral Committee at least two weeks prior to the Dissertation Defense. The doctoral candidate then makes an oral presentation of the dissertation. The Interdisciplinary Doctoral Committee evaluates the presentation, and examines the candidate to determine that the investigations meet scholarly standards that are appropriate for the doctorate degree. At the end of the final defense, all committee members are polled for their vote on the defense and the dissertation. No fail votes are allowed for the student to pass. A form is sent to the Graduate School indicating that the defense has been held and that the student has passed or failed.

The doctoral candidate incorporates any recommendations and corrections of the Interdisciplinary Doctoral Committee into the dissertation and prepares the final draft of the dissertation. Five copies of the completed and signed dissertation are required; two for the Graduate School, one for the department, one for the Dissertation Director, and one for the doctoral candidate. The five required copies of the dissertation are submitted to the College of Engineering for approval by the Dean of the College of Engineering.

To obtain further information about Mechanical Engineering, please visit our website at [www.uakron.edu](http://www.uakron.edu) or contact:

**Dr. Celal Batur, Chair**  
**Department of Mechanical Engineering**  
The University of Akron  
**Akron, OH 44325-3903**  
**(330) 972-7731**



## COORDINATED AND JOINT PROGRAMS

### **Coordinated program for the Doctor of Philosophy in Engineering Degree between the University of Akron and Youngstown State University**

The University of Akron and Youngstown State University are Engaged in a joint program with the objective of facilitating graduate study by engineering students residing in the proximity of Youngstown State University by providing the opportunity and convenience of completing some of the requirements for the Doctor of Philosophy in Engineering at The University of Akron through joint counseling and enrollment at Youngstown State University.

#### **Admission Requirements**

When an engineering graduate student at Youngstown State University declares an interest in the joint doctoral program, the student shall prepare a letter of intent, with academic credentials, to the dean of engineering at Youngstown State University. The dean of engineering at Youngstown State University shall forward the letter of intent and academic credentials, together with a recommendation, to the dean of engineering at The University of Akron. The dean of engineering at The University of Akron shall have the graduate faculty in the applicant's discipline evaluate the academic credentials and make a recommendation in the academic acceptability of the applicant. If the recommendation is favorable, the student shall be advised to apply to the Graduate School at The University of Akron for formal admission to the doctoral Program in the College of Engineering at The University of Akron. The dean of Graduate and Research at Youngstown State University shall be kept informed of the progress of the admission procedure. The applicant from Youngstown State University must satisfy the admission Requirements for the Doctor of Philosophy in Engineering at The University of Akron.

#### **Degree Requirements**

The engineering student from Youngstown State University must satisfy the Degree Requirements for the Doctor of Philosophy in Engineering at The University of Akron subject to the following modifications.

- One of the members of the Interdisciplinary Doctoral Committee for the joint doctoral program candidate shall be an engineering faculty member from Youngstown State University and normally would be the student's dissertation director, although this is not necessary. The faculty member from Youngstown State University shall have adjunct status at The University of Akron and qualify for Category II graduate faculty membership.
- One-half (24 credits) of the course work and one-half (24 credits) of the research credits may be taken at Youngstown State University. The parity of courses is decided by the faculty on the Interdisciplinary Doctoral Committee when the student submits a proposed Plan of Study. At the Advancement to Candidacy, the Committee recommends official transfer of credits from Youngstown State University to The University of Akron.

### **Coordinated Engineering Applied Mathematics program for the Doctor of Philosophy in Engineering Degree between the College of Engineering and Applied Mathematics Division of the Department of Theoretical and Applied Mathematics (formerly Department of Mathematics and Computer Science)**

The faculty in the College of Engineering and the Department of Mathematical Sciences have agreed to provide a coordinated program, subject to the following conditions, for those graduate students who elect the interdisciplinary field of Engineering Applied Mathematics.

#### **Admission Requirements**

Applicants for the Engineering Applied Mathematics Program must have their graduate application and credentials evaluated by one of the departments in the College of Engineering and the Department of Mathematical Sciences. The Admission Requirements for the Doctor of Philosophy in Engineering, as

given in the Graduate Bulletin, and in these Procedures shall apply to all applicants for the Engineering Applied Mathematics Program.

### **Degree Requirements**

The applicable Degree Requirements for the Engineering Applied Mathematics Program are those given in the Graduate Bulletin, under the section Doctor of Philosophy in Engineering. These degree requirements include passing a Qualifying Examination, identifying a Dissertation Director, establishing an Interdisciplinary Doctoral Committee, completing a formal Plan of Study, satisfying the University's language and residency requirement, passing a Candidacy Examination, presenting an acceptable Dissertation Proposal, writing a dissertation, and publicly and successfully (no "fail" votes) defending the dissertation before the Interdisciplinary Doctoral Committee.

Students in the Engineering Applied Mathematics Program must pass a departmental Qualifying Examination composed and administrated by the participating faculty from the Department of Mathematical Sciences and the participating faculty from one of the four undergraduate departments in the College of Engineering.

The Interdisciplinary Doctoral Committee shall consist of at least six members. It shall have an equal number of faculty with primary appointments in the College of Engineering and participating program faculty from the Department of Mathematical Sciences. The participating faculty from the Department of Mathematical Sciences must hold joint appointments in the College of Engineering.

Graduate students who elect the Engineering Applied Mathematics Program may proceed directly from their baccalaureate degree to the doctoral degree.

Students participating in the Engineering Applied Mathematics Program must have at least 50 percent of minimum course work from the College of Engineering and at least 50 percent of minimum course work from the Department of Theoretical and Applied Mathematics.

### **A Coordinated Program for the M.D. and Doctor of Philosophy in Engineering Degree Between the College of Engineering at The University of Akron and the Northeastern Ohio Universities College of Medicine.**

The College of Engineering and NEOUCOM provide a coordinated program for those desiring both the M.D. and Doctor of Philosophy in Engineering degrees. This program integrates the knowledge and skills acquired by the student in each of the programs. Each individual coordinated degree program will be tailored to suit the background and research interests of the student. Additional information may be obtained from the Department of Biomedical Engineering at The University of Akron or NEOUCOM.

### **Admission Requirements**

Applicants with a bachelor's or master's degree in a discipline other than engineering or in engineering will be required to meet the Admission Requirements for the Doctor of Philosophy Degree in Engineering. Applicants will be required to have completed the following courses and to have taken the MCAT prior to admission into the coordinated M.D. and Doctor of Philosophy in Engineering program.

M.D.	Principles of Chemistry I and II
M.D.	Organic Chemistry I and II
M.D.	Principles of Biology I and II
M.D., Ph.D.	Classical Physics and I and II
Ph.D.	Statics
Ph.D.	Dynamics
Ph.D.	Strength of Materials (or Material Science)
Ph.D.	Basic Electrical Engineering (or Circuits I and II)
Ph.D.	Calculus I, II, III, and Differential Equations

## **Degree Requirements**

To obtain an M.D. degree from NEOUCOM and a Doctor of Philosophy Degree in Engineering, the student must satisfy NEOUCOM's degree requirements and the College of Engineering's Doctor of Philosophy in Engineering Degree Requirements. This coordinate program does not change in any way the degree requirements for either program.

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**The University of Akron**  
**Department of Mechanical Engineering Faculty**

		Research Interests
Dr. Celal Batur Department Chair <a href="mailto:batur@uakron.edu">batur@uakron.edu</a>	Ph.D. University of Leicester, 1975	Neural network, and fuzzy logic based process control. System identification, Nonlinear control.
Dr. M.J. Braun Professor <a href="mailto:mbraun@uakron.edu">mbraun@uakron.edu</a>	Ph.D. Carnegie-Mellon University, 1978	Energy conversion, Fluid dynamics, Lubrication, Heat transfer.
Dr. Abhilash Chandy Assistant Professor <a href="mailto:Ac76@uakron.edu">Ac76@uakron.edu</a>	Ph.D. Purdue University, 2007	Fluid dynamics, Combustion, Numerical methods and high-performance computing.
Dr. Fred Choy Professor <a href="mailto:fchoy@uakron.edu">fchoy@uakron.edu</a>	Ph.D. University of Virginia, 1977	Dynamics of rotating machinery, Lubrication, Vibrations, Experimental signal analysis.
Dr. B.T.F. Chung F. Theodore Harrington Professor Emeritus <a href="mailto:bchung@uakron.edu">bchung@uakron.edu</a>	Ph.D. Kansas State University, 1968	Heat and mass transfer, Fluid mechanics, Numerical methods.
Dr. Jerry E. Drummond Associate Professor <a href="mailto:drummon@uakron.edu">drummon@uakron.edu</a>	Ph.D. Ohio State University, 1981	Computational fluid mechanics heat transfer, Natural convection, Laminar flow stability.
Dr. Erik Engeberg Assistant Professor <a href="mailto:Ee9@uakron.edu">Ee9@uakron.edu</a>	Ph.D. University of Utah, 2008	Control of autonomous mobile robots, Biological signal processing, Bio-inspired control algorithms and sensor, Hybrid forms of robotic locomotion, Intelligent grasp force control of robotic manipulators.
Dr. Xiaosheng Gao Assistant Professor <a href="mailto:xgao@uakron.edu">xgao@uakron.edu</a>	Ph.D. Brown University, 1997	Solid Mechanics, Crack growth models.
Dr. Jon Gerhardt Adjunct Professor <a href="mailto:jgerhar@uakron.edu">jgerhar@uakron.edu</a>	Ph.D. University of Cincinnati, 1971	Design and Manufacturing.
Dr. Richard Gross Associate Professor Emeritus <a href="mailto:rgross@uakron.edu">rgross@uakron.edu</a>	Ph.D. (Mechanical Engineering), Carnegie-Mellon University, 1967	Heat transfer, Fluid flow, Thermodynamics.
Dr. Michelle S. Hoo Fatt Assistant Professor <a href="mailto:hoofatt@uakron.edu">hoofatt@uakron.edu</a>	Ph.D. Massachusetts Institute of Technology, 1992	Dynamic plasticity, Impact mechanics, Composite structures, Structural crashworthiness.
Dr. S. Graham Kelly Associate Professor <a href="mailto:sgraham@uakron.edu">sgraham@uakron.edu</a>	Ph.D. Virginia Polytechnic Inst. & State Univ., 1979	Nonlinear mechanics, Acoustics, Open cavity flows, Boundary layer stability.
Dr. Muammer Koc Associate Professor	Ohio State University 1999	Advanced manufacturing for sustainable transportation, Micro-manufacturing and fuel cell manufacturing, and Medical design and manufacturing.

Dr. Frank Loth F. Theodore Harrington Endowed Associate Professor <a href="mailto:Loth@uakron.edu">Loth@uakron.edu</a>	Ph.D. Georgia Institute of Technology, 1993	Fluid dynamics, Biofluids, Biological flows, Unsteady flows, Fluid structure interaction, Transitional flows, Laser Doppler anemometry, Doppler ultrasound, Computational fluid dynamics.
Dr. Gaurav Mittal Assistant Professor <a href="mailto:Gm29@uakron.edu">Gm29@uakron.edu</a>	Ph.D. Case Western Reserve University, 2001	Design of novel and well-characterized experimental facilities for combustion studies, Combustion at elevated pressures relevant to practical combustors and engines, Chemical kinetics of hydrocarbon fuels, Flame phenomena, Laser diagnostics, Development of reduced mechanisms, Alternative fuels.
Dr. Gregory Morscher Assistant Professor <a href="mailto:Gm33@uakron.edu">Gm33@uakron.edu</a>	Case Western Reserve University, 2000	Microstructure/property relationships of ceramic matrix composites and Nondestructive evaluations.
Dr. Alex Povitsky Associate Professor <a href="mailto:povitsky@uakron.edu">povitsky@uakron.edu</a>	Moscow Institute for Steel and Alloys, 1988	Heat transfer and Computational fluids.
Dr. D.Dane Quinn Assistant Professor <a href="mailto:quinn@uakron.edu">quinn@uakron.edu</a>	Cornell University, 1995	Applied dynamical systems, Mechanics, Combustion instability modeling.
Dr. Scott Sawyer Associate Professor <a href="mailto:ssawyer@uakron.edu">ssawyer@uakron.edu</a>	Purdue University, 1997	Fluid Mechanics, Turbo machinery, Active noise control, Computational fluid dynamics.
Dr. Tirumalai Srivatsan Professor <a href="mailto:tsrivatsan@uakron.edu">tsrivatsan@uakron.edu</a>	Georgia Institute of Technology, 1984	Mechanical behavior of materials, Materials science, Metallurgy, Fatigue analysis, Fracture mechanics, Electron microscopy, Composite materials.
Dr. Guo-Xiang Wang Assistant professor <a href="mailto:gwang@uakron.edu">gwang@uakron.edu</a>	University of California at Santa Barbara, 1995	Heat and mass transfer, Materials processing, Solidification theory and applications.
Dr. Shengyong Wang Assistant Professor <a href="mailto:wangs@uakron.edu">wangs@uakron.edu</a>	Purdue University, 2006	Systems engineering, Healthcare delivery systems modeling and optimization, Supervisory control for flexible manufacturing systems, Supply chain management.
Dr. Josh Wong Assistant Professor <a href="mailto:swong@uakron.edu">swong@uakron.edu</a>	University of Sydney, 1999	Nanomaterials, Polymer-Matrix Composites, Functional Materials, Fracture Behavior of Polymers and Biomaterials, Processing- Structure-Property Relationships.
Dr. Zhenhai Xia Assistant Professor <a href="mailto:zxia@uakron.edu">zxia@uakron.edu</a>	Northwestern Polytechnic University, 1990	Mechanics of micro- and nano-composites; Multiscale computational methods; Multifunctional and bio-/biomimetic materials; Characterization of nano-materials and thin films.
Dr. John Zhe Assistant Professor <a href="mailto:jzhe@uakron.edu">jzhe@uakron.edu</a>	Columbia University, 2002	MEMS.