

Graduate Program in Mechanical Engineering

University of Pittsburgh

Requirements for M.S.

Typical length: 1.5-2 years

Two Degree Options:

1) **Thesis Option:**

24 Course (didactic) Credits

6 Research Credits (ME 2999)

30 Total

(2) **Professional (non-thesis) Option:** 30 Course (didactic) Credits

A didactic course is a letter-graded (A-F) course that has a lecture component.

Minimum acceptable grade for a course is a C grade but your GPA must be >3.0

Course Requirements:

Must take at least one of these three mathematics courses:

- ME 2001, ME 2002, ME2646

May take up to nine approved credits from other engineering, mathematics, or physics departments (or technical areas)

Students must pursue at least one track and complete the requirements

Tracks for Master's program

- The essence of a track is that students need to complete 6-9 credits of required courses plus 6 credits of track electives.
 - Rest of the credits could come from other tracks or other engineering and science departments.
- Advanced Manufacturing & Design
- Computational & Data Enabled Engineering
- Control
- Dynamic Systems
- Fluids Engineering
- Thermal Engineering
- Solid Mechanics

Example: Controls Track

Degree Requirements

Semesters with **red font** are courses that are offered every other year

Required core courses (9 credits) <i>Students must complete the following courses</i> ME 2045 Linear Control Systems (Fall) ECE/ME 2646 Linear System Theory (Fall) ME 2027 Advanced Dynamics (Spring)	9 credits
Dynamics Systems and Controls (DSC) Electives <i>Choose two courses from the following list:</i> ME 2020 Mechanical Vibrations (Spring) ME 2043 Machine Learning-based Methods for Dynamics and Control (Spring) ME (ECE) 2046 Digital Control Systems (Spring) ME 2082 Electromechanical Sensors and Actuators (Spring) ME 2243 Bayesian Signal Processing (Spring) ECE (ME) 2247 Introduction to Nonlinear Control Design ME 2440 Fundamentals of Acoustics and Vibrations (Fall) ME 2441 Measurement and Analysis of Random Data from Dynamical Systems (Fall)	6 credits
ME Technical Electives <i>Students can choose any graduate-level ME courses aligned with their technical interests in <u>consultation</u> with their advisors</i>	6-15 credits
Non-ME Technical Electives <i>Students can take up to 9 credits from other engineering, math, and science programs. Advisor's <u>approval</u> is needed.</i>	0-9 credits
Total (minimum)	30 credits

GPA requirement for MS degree

Term GPA > 3.0 at all times

Term GPA < 3.0

First time $\rightarrow$ Academic probation

Second time $\rightarrow$ Academic dismissal

Minimum acceptable grade for a course is a C grade but your GPA must be > 3.0

You can retake a course in which you failed to replace your grade.

Requirements for Ph.D.

Typical length: 4-5 years

- Total Course Requirements
 - BS → PhD, requires 72 credits
 - MS → PhD, requires 42 credits (after block transfer)
- Take the PhD Qualifier (third semester at the latest, second chance in your fourth semester)
 - Termination after a second failed attempt
- Proposal Defense (at least one semester before your defense)
 - Coordinate with your PhD advisor
- Write thesis (don't wait for the last semester)
- Dissertation defense
- Submit final thesis to Engineering Administration



Direct entry to the PhD program with a BS degree: Students who are admitted to the PhD program directly after completing their BS degree must meet the following course requirements in addition to the general course requirements.

- At least 18 course credits (six courses) must come from mechanical engineering (ME) specific didactic graduate courses. The following professional preparation courses do not count toward ME-specific courses:

- ME/ENGR - Technical Communications
- ME 3100 - Engineering Research Leadership and Management
- ME 2095/3095 Graduate Projects
- ME 2097 Special Study
- At least one of the following mathematics courses:
 - ME 2001 - Differential Equations
 - ME 2002 - Linear and Complex Analysis
 - ME/ECE - 2646 Linear System Theory ¹

Entry to the PhD program with an MS degree: Students who have completed a masters degree in an engineering or a closely related field ² must meet the following requirements:

- At least 12 course credits (four courses) must be earned through didactic graduate courses and completed within the first year with a QPA of 3.3 or higher.
- Students holding an **MS degree in a field not related to mechanical engineering** must complete at least 12 credits from ME-specific graduate didactic courses with a minimum QPA of 3.3 or higher in their first year.
- The following professional preparation courses do not count toward the minimum 12 graduate course credits requirement:
 - ME/ENGR - Technical Communications
 - ME 3100 - Engineering Research Leadership and Management
 - ME 2095/3095 Graduate Projects
 - ME 2097 Special Study
- Students who have not taken an equivalent graduate-level mathematics course are required to take one of the following mathematics courses:
 - ME 2001 - Differential Equations
 - ME 2002 - Linear and Complex Analysis
 - ME/ECE - 2646 Linear System Theory¹

GPA Requirement for PhD degree

GPA > 3.30

Students must maintain a minimum cumulative QPA of 3.30 in courses to be eligible to take the preliminary and comprehensive examinations and to graduate.

Quality Point Average (QPA) and Grade Point Average (GPA) are numerical indications of a student's academic achievement. QPA is the average of letter grades earned toward a degree, whereas GPA is the average of total letter grades earned.

PhD Research Credits

ME 3997 & ME 3999

- Minimum 30 credits of PhD research
 - Of which minimum 12-credits must be from ME 3999
- ME 3997 Research, PhD
 - Only to be taken before becoming a PhD candidate
 - Sign up for the section under your advisor
- ME 3999 PhD Dissertation
 - Must be taken after becoming a PhD candidate
 - Sign up for the section under your advisor
 - Minimum 12 credits are required
- Full-time Dissertation Hours (FTDH)
 - After completing the minimum 72 credits
 - Gives you full-time status
 - You cannot take didactic courses once you start registering for FTDH

PhD Qualifying Exam

PhD Qualifying Exam Coordinator will send an email at the beginning of each semester inviting students to sign up

Direct-PhD students should attempt in their third semester

Post-MS students could attempt in their second semester, but no later than third semester

The PhD Qualifying Exam or preliminary evaluation is designed to assess the breadth of the student's knowledge of the discipline, the student's achievement during the first year of graduate study, and the potential to apply research methods independently. The qualifying exam must be attempted in the first year after the student begins the PhD program. The student must be enrolled or have completed a minimum of 12 credits of coursework before taking the qualifying exam. Special students (less prepared) may delay until the second year if the PhD advisor petitions the Graduate Committee.

The evaluation is used to identify those students who may be expected to complete a doctoral program successfully and to reveal areas of weakness in the student's preparation. The qualifying exam in the mechanical engineering PhD program is a two-component examination that includes the submission of a **written research proposal** to an examining committee and a **formal oral presentation** on the proposed research with a **period of open questioning** by an examining committee. This period of open questioning may include topics relevant to achieving a PhD degree in the chosen field of study by the examining committee as it evaluates the student's case toward PhD candidacy.

Cross registration

Full-time Pitt students can enroll for one more course at other Pittsburgh-area universities for free

[https://www.registrar.pitt.edu/sites/default/files/PCHE Cross Registration Form 3 26 2021.pdf](https://www.registrar.pitt.edu/sites/default/files/PCHE_Cross_Registration_Form_3_26_2021.pdf)

Cross-registration provides students with the opportunity to enroll in courses at member institutions of the Pittsburgh Council on Higher Education (PCHE). The designated colleges and universities at which undergraduate students may cross-register include Carlow University, Carnegie Mellon University, Chatham University, Community College of Allegheny County, Duquesne University, La Roche College, Pittsburgh Theological Seminary, Point Park University, and Robert Morris University. Only full-time students may cross-register. Only full-time students may cross-register. Please note that students must maintain a full-time course load (at least 9 credits as a graduate student) at Pitt while cross-registered. Students who cross-register do not pay tuition to the host institution; however, they are responsible for any additional fees associated with the course such as laboratory fees, books, and the like. Students normally may register for only one course off campus in a given term. The grades and credits earned at the host institution are transferred to the home school. The academic policies of the host institution prevail.

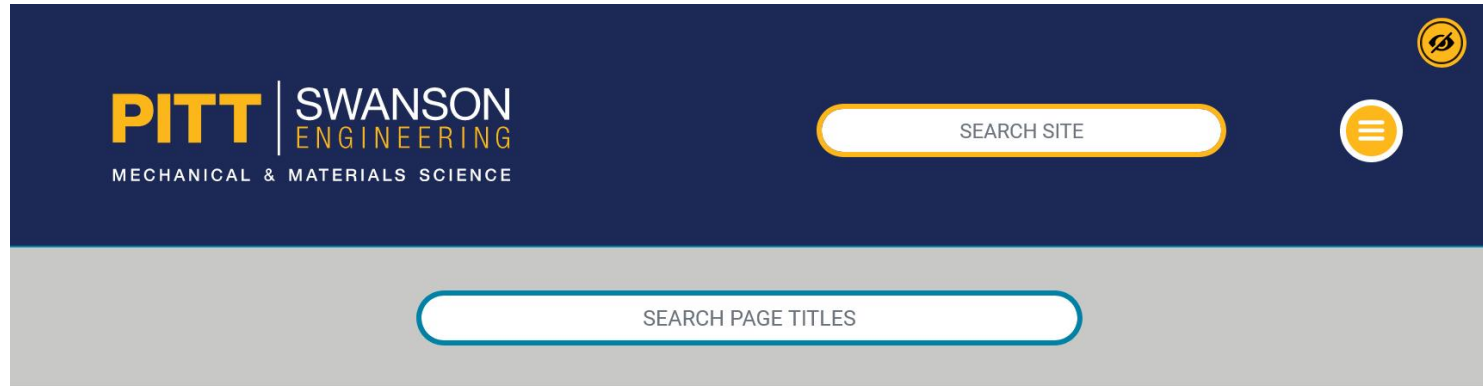
Cross-registration is only available in the fall and spring terms. During the summer, students may attend one of the above colleges as guest students, but they must pay that institution's tuition and fees. Students are discouraged from cross-registering during their term of graduation to avoid any delays in the receipt of course credit needed to graduate. Students should meet with their advisors or a school representative before they cross-register.

Transferring Graduate Courses

- If you have an MS degree from a closely related field
 - Do a block transfer of 30 credits in your first semester
- If you do not have an MS degree
 - Maximum 6 graduate credits (above 2000 level)
 - Graduate credits used for undergraduate degree are not transferable

MEMS Graduate Program Website

<https://www.engineering.pitt.edu/mems>



▼ ABOUT

▼ RESEARCH

▼ UNDERGRADUATE

▼ GRADUATE

▼ NEWS & EVENTS

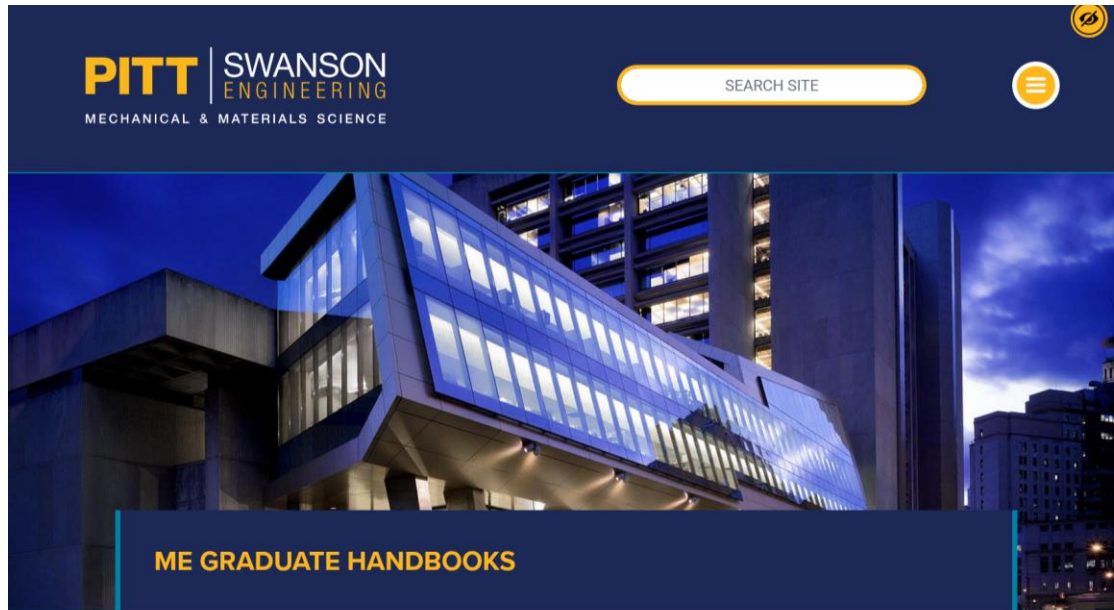
▼ PEOPLE

▼ CONTACT US

▼ ADMISSIONS



ME Graduate Handbook



2021-2022 HANDBOOK

2022-2023 HANDBOOK

GRADUATE

- ▶ ACADEMICS
- ▶ ALUMNI
- ▶ PHD MS POSITIONS
- ▶ FELLOWSHIPS
- ▶ COURSES
- ▶ CURRENT STUDENTS
- ▶ SEMINAR CALENDAR
- ▶ SEMESTER SEMINARS
- ▶ ME HANDBOOKS



University-wide Policies for Graduate Studies

<https://catalog.upp.pitt.edu/index.php>

[About](#)[Academics](#)[Admissions](#)[Research](#)[Life at Pitt](#)[Athletics](#)[Q](#)[|](#)[≡](#)

2023-2024 Graduate & Professional Studies Catalog

2023-2024 Graduate & Professional Studies Catalog



Search Programs, Courses & Policies

Whether you are interested in attending the University of Pittsburgh, or are already enrolled, you can search the Catalog to obtain campus information, academic programs, policies, and courses. For any questions, [Contact us!](#)

University of Pittsburgh Nondiscrimination Policy Statement

The University of Pittsburgh, as an educational institution and as an employer, values equality of opportunity, human dignity, and racial/ethnic and cultural diversity. Accordingly, the University prohibits and will not engage in discrimination or harassment on the basis of race, color, religion, national origin, ancestry, sex, age, marital status, familial status, sexual orientation, gender identity and expression, genetic information, disability, or status as a

Catalog Search

Courses

Search Catalog

☒ Whole Word/Phrase

[Advanced Search](#)

[Catalog Home](#)[Course Information](#)[Class Search](#)[Archived Catalogs](#)

Regional Campus Catalogs

[Bradford Campus Catalog](#)[Greensburg Campus Catalog](#)[Johnstown Campus Catalog](#)[Titusville Campus Catalog](#)

Schools and Academic Programs

[Academic Programs](#)[Kenneth P. Dietrich School of Arts and Sciences](#)[Joseph M. Katz Graduate School of Business](#)[School of Computing and Information](#)[School of Dental Medicine](#)[School of Education](#)[John A. Swanson School of](#)

2023-2024 Graduate & Professional Studies Catalog

John A. Swanson School of Engineering



- [Contact Information](#)
- [Admissions](#)
- [Financial Aid](#)
- [Advisors](#)
- [Responsibility for Academic Progress](#)
- [Academic Integrity and Code of Conduct](#)
- [Probation, Suspension and Dismissal](#)
- [Course Work for Graduate Credit](#)
- [Master of Science Programs](#)
- [Doctor of Philosophy Programs](#)
- [Cooperative Education](#)
- [SSOE Diversity Initiatives](#)
- [Swanson School of Engineering Faculty](#)
- [Program and Course Offerings](#)

Graduate study in engineering at the Swanson School is designed for those professionals who wish to further develop the ability to apply engineering principles to the solution of modern society's problems. The programs are flexible and can be used by those interested in research, design, management, and related technical positions in both the public and private sectors. PhD programs are designed for those individuals interested in an academic or research career.

The Swanson School of Engineering offers graduate education leading to the Master of Science degree in bioengineering, medical product engineering, chemical engineering, electrical and computer engineering, civil engineering, industrial engineering, materials science and engineering, mechanical engineering, nuclear engineering, petroleum engineering, and sustainable engineering. Swanson School of Engineering MS degree programs have two tracks: a professional track and a research track. The school offers PhD degrees in bioengineering, chemical engineering, civil engineering, electrical and computer engineering, industrial engineering, materials science and engineering, and mechanical engineering as well as computational modeling and simulation. Also offered is a MD/PhD Program with the School of Medicine, a DPT/PhD program with the School of Health and Rehabilitation Sciences, a MS/MBA program with the Katz School of Business, and Certificate programs in medical product innovation, circular economy, construction management, health care systems engineering, nuclear engineering, physical metallurgy, safety engineering, and sustainable engineering.

Contact Information

The Swanson School of Engineering is housed in the Michael L. Benedum Hall of Engineering. Inquiries and correspondence concerning graduate study toward a PhD, MS, or graduate Certificate, should be addressed to the graduate coordinator of the appropriate department or program. Inquiries of a general nature can be sent to:

Associate Dean for Graduate Education
151 Benedum Engineering Hall
Swanson School of Engineering
Pittsburgh, PA 15261
E-mail: GradAD_ssoe@pitt.edu
www.engineering.pitt.edu

Catalog Search

Courses

Search Catalog

☒ Whole Word/Phrase[Advanced Search](#)[Catalog Home](#)[Course Information](#)[Class Search](#)[Archived Catalogs](#)

Regional Campus Catalogs

[Bradford Campus Catalog](#)[Greensburg Campus Catalog](#)[Johnstown Campus Catalog](#)[Titusville Campus Catalog](#)

Schools and Academic Programs

[Academic Programs](#)[Kenneth P. Dietrich School of Arts and Sciences](#)[Joseph M. Katz Graduate School of Business](#)[School of Computing and Information](#)[School of Dental Medicine](#)[School of Education](#)[John A. Swanson School of Engineering](#)

Graduate Seminars

- All full-time students must register for ME 2085
 - Zero credit
 - Every semester until you graduate
 - Do not forget to sign the attendance sheet
- Seminars are announced at the beginning of the semester.
 - Check the Canvas site for ME 2085
 - Refreshments are served 30 minutes before the seminar
 - Good time to mingle and get to know others
 - Thursdays 11am-12pm
 - Times may change
 - Reminder email a week before the seminar

Date, Location & Host	Speaker	Topic	
Thursday, September 7, 2023 102 BEH 11:00am Guest Host: NNL - Dr. Reed Anderson	2023-2024 NNL Distinguished Lecturer Dr. Kathryn McCarthy Director, US ITER Project Oak Ridge National Laboratory Oak Ridge, TN	Paths to Fusion Electricity	
Thursday, September 28, 2023 102 BEH 11:00am Host: Inanc Senocak	Dr. Petros Koumoutsakos Herbert S. Winokur, Jr. Professor of Engineering and Applied Sciences Area Chair for Applied Mathematics Harvard University Cambridge, MA	AI/Computational Science: Alloys	
Thursday, October 5, 2023 102 BEH 11:00am Host: Juan José Mendoza Arenas	Dr. Nicholas Bronn Quantum Researcher IBM TJ Watson Research Center Ossining, NY	Quantum Simulation on Noisy Superconducting Quantum Computers	

Thursday, October 26, 2023 102 BEH 11:00am Host: Brian Gleeson	Dr. Douglas Wolfe Professor of Materials Science and Engineering, Engineering Science and Mechanics, Nuclear Engineering, and Additive Manufacturing and Design Metals, Ceramics and Coatings Processing Department Head for the Applied Research Laboratory Pennsylvania State University State College, PA	Advanced Materials and Manufacturing Techniques for Hypersonic Applications	
Thursday, November 2, 2023 102 BEH 11:00am Host: Anne Robertson	Dr. Margot Damaser Biomedical Engineering Full Staff and Professor The Cleveland Clinic Senior Research Career Scientist Deputy Director of the Advanced Platform Technology RR&D Center Cleveland VA Medical Center Cleveland, OH	Innovations for Wireless Catheter-Free Monitoring of Bladder Function	
Thursday, November 16, 2023 102 BEH 11:00am Host: Jung-Kun Lee	Dr. Quanxi Jia National Grid Professor of Materials Research State University of New York at Buffalo Buffalo, NY	The Interplay and Impact of Strain, Defect, and Interface on Functionalities of Epitaxial Nanocomposite Films	

If you have a question ...

- Check the **Graduate Handbook** first
- Check the Graduate Studies Catalog
- Contact our graduate administer Tara Rankin for forms, procedures, permission numbers etc.
 - mems_gradadmin@pitt.edu
 - Ms. Rankin will let you know if you need to talk to me

If you see an academic hold

- Do not panic!
- Academic hold is to enforce advising
- Contact me with the following information
 - Your degree (professional MS, MS Thesis or PhD)
 - If professional, your study track
 - Your unofficial transcript
 - If you are a new student, please mention it
 - Your course plan for the semester
 - Come up with an initial plan
 - I want to take these courses, what do you think?

Your well-being

<https://www.gradstudents.pitt.edu/>

TOOLS FOR SUCCESS



Academic Resources

Pitt provides [a number of academic resources](#) to ensure the success of our graduate and professional degree students.



Teaching Support

Pitt offers resources to help student instructors [meet their teaching goals and responsibilities](#), from the first day of class through their job-search.



Research

Graduate and professional students have the opportunity to take advantage of [exciting and rewarding research](#) while at Pitt and beyond.



Career Preparation

Pitt schools have a long-standing commitment to [preparing graduate and professional students for successful careers](#).



Student Life

Pitt programs and initiatives support [a strong graduate and professional student community](#).



Health & Wellness

From generous health insurance to programs that promote physical & mental fitness, Pitt encourages students [to be strong in both mind and body](#).

MEMS Graduate Student Group

Hosts social & professional events like...

- Coffee hours
 - Happy hours
 - Board game nights
 - Research symposium



You and Your Research

Richard Hamming



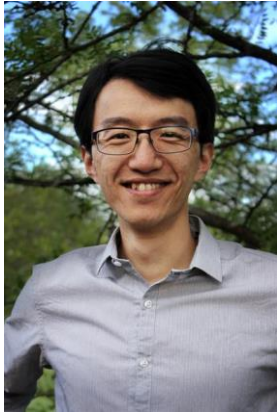
Lecture on youtube

' It is not about managing research, it is about how you individually do your research. I could give a talk on the other subject - but it's not, it's about you. I'm not talking about ordinary run-of-the-mill research; **I'm talking about great research.** And for the sake of describing great research I'll occasionally say Nobel-Prize type of work. It doesn't have to gain the Nobel Prize, but I mean those kinds of things which we perceive are significant things. Relativity, if you want, Shannon's information theory, any number of outstanding theories - that's the kind of thing I'm talking about.

<https://www.cs.virginia.edu/~robins/YouAndYourResearch.html>

Mechanical Engineering Faculty & Staff

Solid Mechanics



Qihan Liu



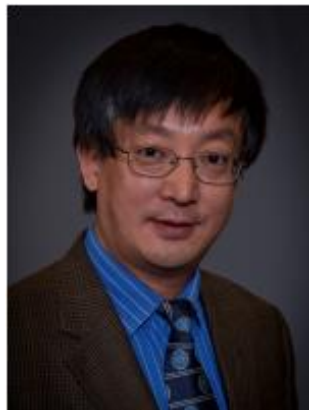
Pat Smolinski



Will Slaughter



Anne Robertson



Qing-Ming Wang



Albert To



Sylvanus Wosu

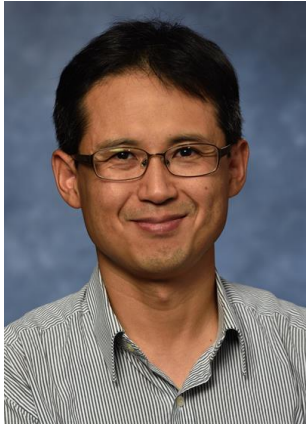


David Schmidt

On-going search for a new faculty member

Mechanical Engineering Faculty & Staff

Materials Science



Jung-Kun Lee



Jorg Wiezorek



Wissam Saidi



Brian Gleeson



Tevis Jacobs



Marcus Chmielus



Ian Nettleship



Paul Ohodnicki



Guofeng Wang



Wei Xiong

New faculty: Dr. Zach Harris

On-going search for a new faculty members

Mechanical Engineering Faculty & Staff

Thermal & Fluid Sciences



Sung Kwon Cho



Minking Chu



Paolo Galdi



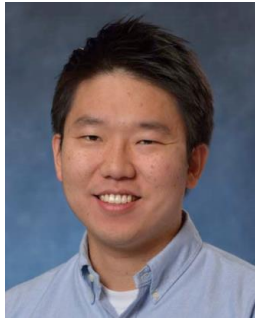
Peyman Givi



Anne Robertson



Katherine
Hornbostel



Sangyeop Lee



Heng Ban



Hessam Babaee



Inanc Senocak



Matthew Barry

New faculty: Ben Erichson (AI & machine learning)

Mechanical Engineering Faculty & Staff

Advanced Manufacturing



Albert To



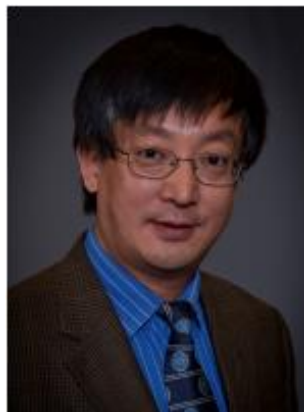
Xiayun Zhao



Sung Kwon Cho



Marcus Chmielus



Qing-Ming Wang



Minking Chu

Mechanical Engineering Faculty & Staff

Dynamic Systems & Controls



Buddy Clark



Dan Cole



Jeff Vipperman



Mark Miller



Nikhil Bajaj

On-going search for a new faculty member