THURSDAY, FEBRUARY 19, 2026
ACADEMIC AFFAIRS AND STUDENT LIFE COMMITTEE MEETING

Reginald A. Wilkinson, chair
Elizabeth A. Harsh, vice chair
Elizabeth P. Kessler
Jeff M.S. Kaplan
Bradley R. Kastan
Kara J. Trott
Patrick C. Arp
Phillip Popovich
Eric Bielefeld
Stefanie Sanford
John W. Zeiger (*ex officio*)

Location: Mount Leadership Room, Longaberger Alumni House
2200 Olentangy River Road, Columbus, OH 43210

Time: 1:00-4:00 p.m.

Executive Session **1:00-3:00 p.m.**

Public Session **3:00-4:00 p.m.**

1. *Provost's Report – Dr. Ravi Bellamkonda* 3:00-3:15 p.m.
2. *Senior Vice President for Student Life Report: Buckeye Commons – Dr. Melissa Shivers and Dr. Scott Brown* 3:15-3:30 p.m.
3. *Advancing Our Research Enterprise: FY25 Expenditures and FY24 Rankings – Dr. John Horack* 3:30-3:45 p.m.

ITEMS FOR ACTION 3:45-4:00 p.m.

4. Approval of November 2025 Committee Meeting Minutes – Dr. Reginald Wilkinson
5. Approval to Establish an Interdisciplinary Master of Science in Quantum Information Science and Engineering – Dr. Ravi Bellamkonda
6. Approval to Establish an Interdisciplinary Doctor of Philosophy in Quantum Information Science and Engineering – Dr. Ravi Bellamkonda
7. Approval to Establish a Master of Energy Sustainability – Dr. Ravi Bellamkonda
8. Amendments to the *Rules of the University Faculty* – Dr. Ravi Bellamkonda
9. Adoption of Resolution Specifying Conditions for Exemptions to the Civic Literacy Course Requirements in Ohio Senate Bill 1, the Advance Ohio Higher Education Act – Dr. Ravi Bellamkonda
10. Adoption of Resolution Establishing Process to Review and Approve New Academic Programs, Degree Programs, Curricula/Courses, General Education Requirements, Colleges, Departments, Schools, Centers and Institutes – Dr. Ravi Bellamkonda
11. Faculty Personnel Actions – Dr. Ravi Bellamkonda
12. Honorary Degree – Dr. Ravi Bellamkonda
13. Degrees and Certificates – Dr. Ravi Bellamkonda

Provost's Report

February 19, 2026

Ravi V. Bellamkonda, Executive Vice President and Provost

THE OHIO STATE UNIVERSITY

New leaders

Erik Porfeli

Interim Dean
College of Education
and Human Ecology

Amy Moore

Interim Dean
College of Medicine

Interim Vice President of Health Sciences
Ohio State Wexner Medical Center

Dean reappointments

Ayanna Howard

Dean
College of Engineering

Carroll Ann Trotman

Dean
College of Dentistry

Thank you, Dean Zadnik

Karla Zadnik
Dean, College of Optometry

Ohio State named #33 among the world's top universities

- *TIME* ranked Ohio State #33 globally on its new list of the "The World's Top Universities of 2026"
- Ranked #5 among U.S. publics
- Methodology based on:
  - Academic capacity and performance
  - Innovation and economic impact
  - Global engagement

Career Center of Excellence

Tricia Zelaya-Leon named inaugural senior director

Student Innovation and Entrepreneurship

Shereen Agrawal to lead ecosystem supporting student-led ventures

- Center for Software Innovation
- Keenan Center for Student Entrepreneurship

AI at Ohio State

- AI Fluency Forum
  - More than 300 Ohio State faculty and staff attendees
- AI Fluency Initiative national news coverage
  - **Lori Kendall**, senior lecturer, Fisher College of Business, and **Tina Tallon**, assistant professor of music, on PBS Newshour
- College roadmaps advancing

Lori Kendall

Tina Tallon

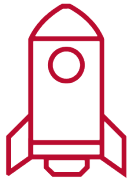
U.S. News and World Report online program rankings

- **College of Nursing online master's program ranked #1 in the country** (up from #3)
- Ohio State online bachelor's programs ranked #4 nationally
- Other rankings/specialties:
  - Graduate Nursing-Nurse Practitioner — Family #3
  - Grad Nursing-Nurse Practitioner — Psychiatric Mental Health, Across The Lifespan #5 (tie)
  - Veterans-Graduate Business #6
  - Graduate Business #8
  - MBA-Finance #14

Attracting and recognizing top faculty talent

AI Faculty Hiring initiative

Provost's Endowed Faculty Match Program



Game Changer Scholars

An academic powerhouse

- **National Academy of Medicine:** 11
- **National Academy of Engineering:** 10
- **National Academy of Sciences:** 10
- **National Academy of Inventors:** 22

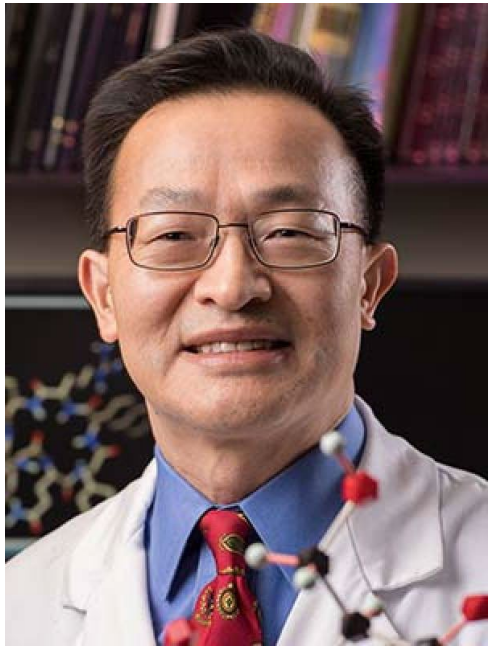
Active faculty members

National Academy of Inventors 2025 class of Fellows

Anant Agarwal, Electrical and Computer Engineering

Alan Luo, Materials Science and Engineering, and Integrated Systems Engineering

Dehua Pei, Chemistry and Biochemistry



Ohio State secures multiple OFRN awards

- Ohio State awarded nearly $9 million through the Ohio Federal Research Network
- Six collaborative research projects will advance aerospace, defense, autonomy, quantum systems and advanced materials
- Ohio State lead institution on three projects, collaborating with other institutions and industry partners

Kevin Singh, *assistant professor of physics, is leading a team that has been awarded $1.1M to develop technologies to better scale quantum networks*

Interdisciplinary Space Research

- Ohio State joins U.S. Space Command's (USSPACECOM) Academic Engagement Enterprise

Thank you

Buckeye Commons

Dr. Melissa S. Shivers
Senior Vice President for Student Life

Dr. Scott Brown
Managing Director, Buckeye Commons

Students' Priorities for Buckeye Commons

- Open, inviting, multi-purpose space to connect, network and build community
- Resources, support and programming that is attractive to all students
- Access to mentorship, advocacy and overall sense of care and belonging

Buckeye Commons

Programs and Services

- Career coaching
- Student Employment Experience
- Embedded mental health counselor
- Embedded Disability Services access specialist
- Proactive student outreach
- Networking and mentoring

Early Partner Programs

- Alumni Association
- Center for Ethics and Human Values
- Dennis Learning Center
- Education Abroad
- Graduate School
- International Affairs
- Listen. Learn. Discuss. Initiative
- Military and Veterans Services
- Student Wellness Center
- Undergraduate Education

Educational Offerings

- Community building space
- Student involvement
- Study skills and time management
- Civil discourse
- Leadership development
- Community engagement and networking
- Career preparation
- Wellness coaching

Autumn Semester Highlights

By the Numbers

1,845
unique student touchpoints

31
programs offered

47
outreach events

Student Quotes

“It provided me with….space to talk and collaborate with my peers.”

"I have gotten to interact with staff that I might have never met beforehand."

“It has helped Ohio State become a place where I feel at peace!”

What's Next?

Rendering provided by Wellogy

A Student Perspective

Joshua Davis

Ohio Army National Guard (Active)

Classification: Senior

Majors: International Studies and Public Affairs

Hometown: Pleasant City, Ohio

Student Leader Positions: President, Student Veterans Association; Veteran Peer Sponsor, Military Community Advocate

Questions?

Advancing Our Research Enterprise

FY25 Expenditures and FY24 Rankings

John M. Horack
Vice President for Research

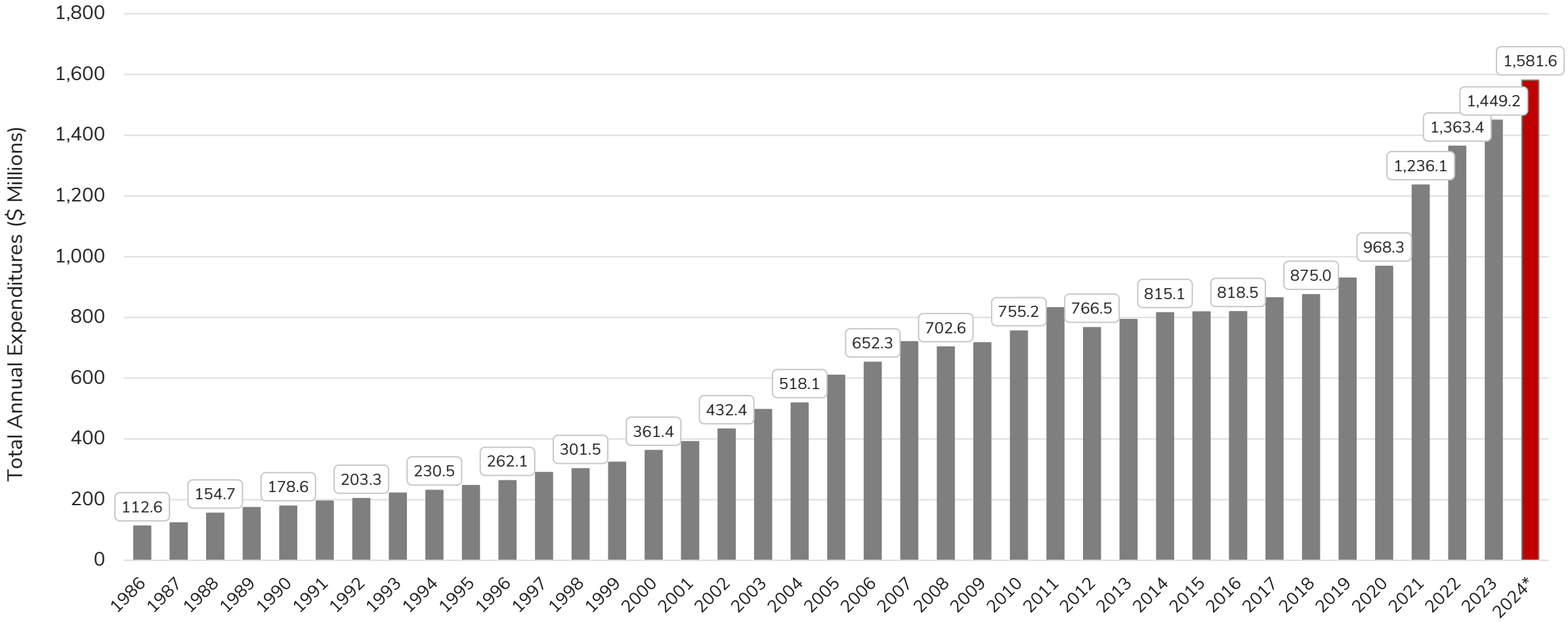
The Ohio State University
Enterprise for Research, Innovation and Knowledge

Ohio State sets R&D expenditures record for FY24

$1.58 Billion

Ohio State Total HERD R&D Expenditures

Fiscal years 1986 – 2024



Source: NSF HERD Survey. Feb 2025.

NSF HERD Survey Rankings Released for FY24

12th

In **Overall** Research and Development Expenditures among all U.S. Institutions

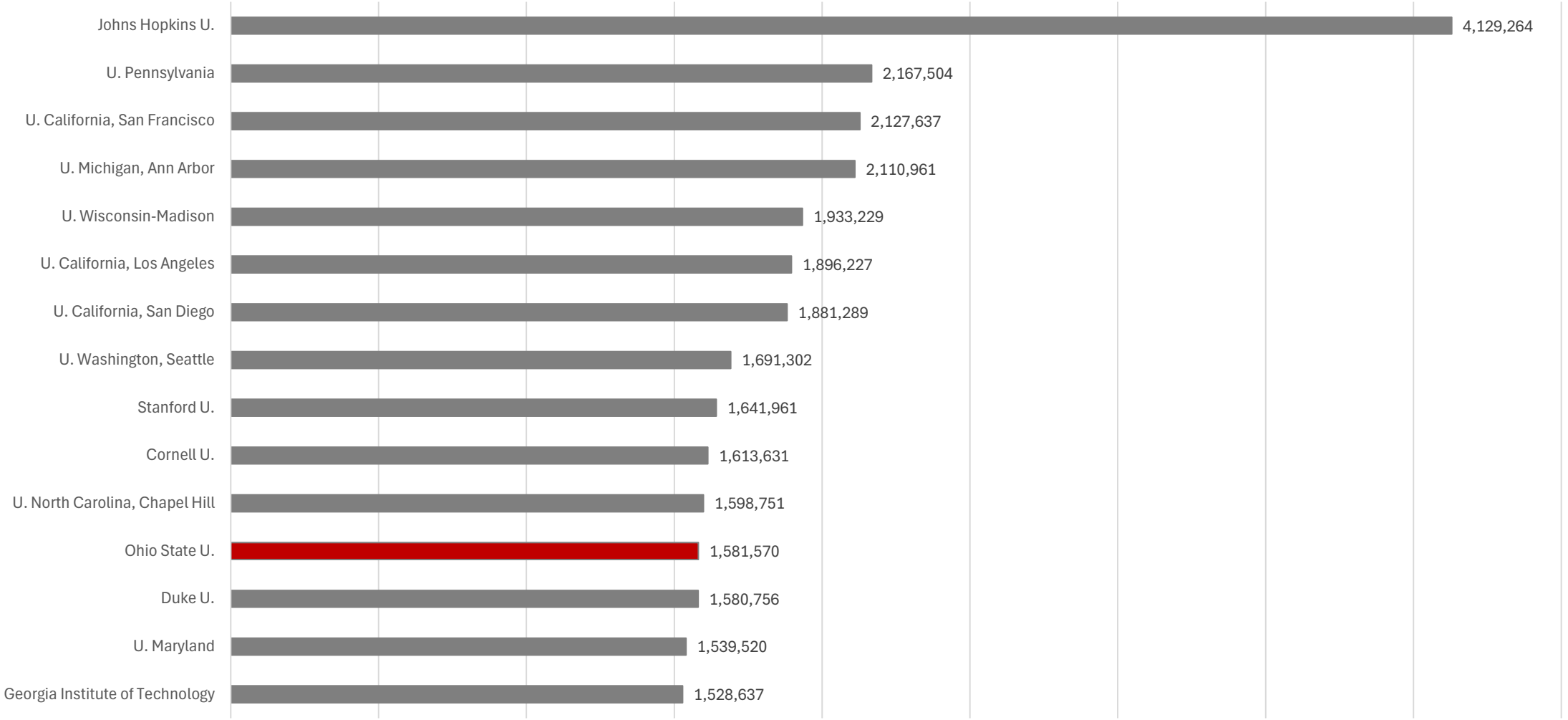
6th

In **Industry** Sponsored Research among all U.S. Institutions

Source: NSF HERD Survey. Dec 2025

NSF HERD Survey Rankings – FY24

Total R&D expenditures across all institutions



Source: NSF HERD Survey. Dec 2025

Fiscal Year 2025 Expenditures

THE OHIO STATE UNIVERSITY

Board of Trustees

University Square South
15 East 15th Avenue, 5th Floor
Columbus, OH 43201

Phone (614) 292-6359
Fax (614) 292-5903
trustees.osu.edu

SUMMARY OF ACTIONS TAKEN

November 20, 2025 – Academic Affairs and Student Life Committee Meeting

Members Present:

Reginald A. Wilkinson	Bradley R. Kastan	Phillip Popovich
Elizabeth A. Harsh	Kara J. Trott (arr. 1:34 p.m.)	Eric Bielefeld
Elizabeth P. Kessler	Patrick C. Arp	John W. Zeiger (ex officio)
Jeff M.S. Kaplan		

Members Present via Zoom: N/A

Members Absent:

Michael F. Kiggin	Stefanie Sanford

EXECUTIVE SESSION

The Academic Affairs and Student Life Committee of The Ohio State University Board of Trustees convened on Thursday, November 20, 2025, in person in the Alumni Room at the Fawcett Center on the Columbus campus. Committee Chair Reginald Wilkinson called the meeting to order at 1:00 p.m.

It was then moved by Dr. Wilkinson and seconded by Mr. Kaplan that the committee recess into executive session to discuss business-sensitive trade secrets; personnel matters involving the appointment, employment and compensation of public employees; and to consult with legal counsel regarding pending or imminent litigation.

A roll-call vote was taken, and the committee voted to move into executive session with the following members present and voting: Dr. Wilkinson, Mrs. Harsh, Ms. Kessler, Mr. Kaplan, Mr. Kastan, Mr. Arp, Dr. Popovich, Dr. Bielefeld and Mr. Zeiger. Ms. Trott was not present for this vote.

The committee entered executive session at 1:01 p.m. and reconvened in public session at 2:50 p.m.

PUBLIC SESSION

Items for Discussion:

1. Provost's Report: Executive Vice President and Provost Ravi Bellamkonda updated trustees on new leadership in the university's academic enterprise, efforts to recruit, retain and recognize Ohio State's faculty; and marked milestones in innovation — including celebrating 25 years of partnership between the university and Honda, and welcoming clean-energy startup Koloma to the Innovation District at Ohio State. The provost then shared early progress on the signature undergraduate experience and the AI Fluency initiative, both strategic priorities for Ohio State.

   (See Attachment X for background information, page XX)

2. Senior Vice President for Student Life Report: Senior Vice President for Student Life Melissa Shivers highlighted successes from the Office of Student Life over the past year. These included leveraging a new app to help incoming Buckeye students more easily navigate the Student Involvement Fair and get engaged. She also discussed Student Life's focus on comprehensive well-being, the work of the Monda Student Resource Center and the benefits of an on-campus residential experience. To close, three-time Ohio State alumna and former student trustee Dr. Taylor Schwein-Kachala joined the meeting to reflect on how her engagement through the Office of Student Life prepared her for leadership roles on campus and for the career she now holds.

   (See Attachment X for background information, page XX)

3. Introduction to the Vice President for Research: New Vice President for Research John Horack shared his observations from his first few weeks leading the Enterprise for Research, Innovation and Knowledge. Many things are going well. Continued growth in research funding, new facilities, 80 patents in the past year and more contribute to the excellence at scale from which Ohio State benefits. He sees his charge as building connections between areas of strength to better leverage existing assets; continuing to grow not just the amount of research, but the impact of that research; and investing in areas of strategic opportunity.

4. The Future of Career Development at Ohio State: Dr. Anne McDaniel, associate vice president for strategy, impact and strategic partnerships in the Office of Student Life, and Ann Talbot, associate vice president for strategic initiatives in the Office of Academic Affairs, updated the committee on ongoing work to streamline career and internship services at Ohio State. The current structure is decentralized, with some services offered by the university and many others offered by individual colleges. A more centralized, comprehensive arrangement will lead to better experiences for students, better tracking of outcomes, and better engagement with employers. The new effort will launch in January 2026 and aims to engage 80% of undergraduate students in internships and other career-preparation experiences.

   (See Attachment X for background information, page XX)

Items for Action:

5. Approval of July 2025 Committee Meeting Minutes: No changes were requested to the July 16, 2025, meeting minutes; therefore, a formal vote was not required, and the minutes were considered approved.

6. Resolution No. 2026-57, Revocation of Degree – Doctor of Philosophy:

   Synopsis: Revocation of a Doctor of Philosophy degree.

   WHEREAS the committee on academic misconduct constituted according to rule 3335-5-48.7 of the administrative code requested that the Board of Trustees effectuate the revocation of the Doctor of Philosophy degree of Samantha Carter; and

   WHEREAS the request was concurred with by the Executive Vice President and Provost; and

   WHEREAS the request was further concurred with by the Academic Affairs and Student Life Committee; and

   WHEREAS the appropriate bodies and administrative officer of the university have fully complied with applicable procedures and, in accordance with those procedures:

   NOW THEREFORE

BE IT RESOLVED, That the Doctor of Philosophy degree, granted on August 4, 2024, pursuant to paragraph (E) of rule 3335-1-06 of the administrative code, is hereby revoked immediately.

7. Resolution No. 2026-58, Revocation of Degree – Bachelor of Arts:

Synopsis: Revocation of a Bachelor of Arts degree.

WHEREAS the university registrar and director of undergraduate admissions after utilization of rule 3335-9-20 requested that the Board of Trustees effectuate the revocation of the Bachelor of Arts degree of Ava Misseldine conferred under the name of Brie Bourgeois; and

WHEREAS the request was concurred with by the Executive Vice President and Provost; and

WHEREAS the request was further concurred with by the Academic Affairs and Student Life Committee; and

WHEREAS the appropriate bodies and administrative officer of the university have fully complied with applicable procedures and, in accordance with those procedures:

NOW THEREFORE

BE IT RESOLVED, That the Bachelor of Arts degree, granted on March 22, 2009, pursuant to paragraph (E) of rule 3335-1-06 of the Administrative Code, is hereby revoked immediately.

8. Resolution No. 2026-59, Approval to Establish an Executive Master of Health Administration:

IN THE COLLEGE OF PUBLIC HEALTH

Synopsis: Approval to establish an Executive Master of Health Administration degree program in the College of Public Health is proposed.

WHEREAS the proposed Executive Master of Health Administration program is an extension of the accredited full-time, residential, early career Master of Health Administration program and would extend the reach of the program to more experienced mid-career professionals; and

WHEREAS the program's mission is to provide students with an exceptional educational experience encompassing the organization, financing, delivery and improvement of health care services leading to rewarding careers in health services management and policy; and

WHEREAS the residential program has been a national leader in healthcare management for more than 50 years and is currently ranked No. 8 in U.S. News & World Report; and

WHEREAS the proposed executive program is 45 credits, over five semesters, is primarily online and cohort-based with 20-25 students per cohort expected; and

WHEREAS markets for enrollment include employees of local health systems, clinicians seeking to move into leadership roles and others working in the broader healthcare space; and

WHEREAS the proposal was reviewed and approved by the Council on Academic Affairs at its meeting on May 28, 2025; and

WHEREAS the University Senate approved this proposal on October 30, 2025:

NOW THEREFORE

BE IT RESOLVED, That the Board of Trustees hereby approves the proposal to establish an Executive Master of Health Administration degree program in the College of Public Health.

(See Appendix X for background information, page XX)

9. Resolution No. 2026-60, Approval of the Report on Low Enrollment Courses and Duplicate Programs:

   Synopsis: Approval of the university's Report on Low Enrollment Courses and Duplicate Programs for submission to the Ohio Department of Higher Education is proposed.

   WHEREAS Ohio Revised Code 3345.35 requires the governing boards of each state institution of higher education to evaluate courses and programs based on enrollments and duplication with other state institutions of higher education within a geographic region; and

   WHEREAS the university currently adopts a minimum class size of 18 students, with exceptions for distinctive instructional settings; and

   WHEREAS to prepare for this submission, the Office of Academic Affairs worked with the university's 15 academic colleges and four regional campuses to examine trend data and alignment of college enrollment policies; and

   WHEREAS approximately 13,000 courses are offered at the university, with 409 identified as low enrolling; and

   WHEREAS each college or regional campus has been directed to take appropriate action on its low enrollment courses; and

   WHEREAS The Ohio State University has strong collaborations with two-year institutions and no significant program duplication with other institutions in the central Ohio region:

   NOW THEREFORE

   BE IT RESOLVED, That the Board of Trustees hereby approves the Report on Low Enrollment Courses and Duplicate Programs for submission to the Ohio Department of Higher Education.

   (See Appendix X for background information, page XX)

10. Resolution No. 2026-61, Approval of Revisions to the Interim Policy on Faculty Appointments, Faculty Workload, Tenure, and Retrenchment:

    Synopsis: Approval of revisions to the interim policy is requested to align with Senate Bill 1's faculty workload policy requirements found in Ohio Revised Code 3345.45.

    WHEREAS Ohio Senate Bill 1 (SB1), the Advance Ohio Higher Education Act, took effect on June 27, 2025; and

    WHEREAS SB1 requires the Board of Trustees to adopt a series of policies in accordance with statutory
    requirements, including those concerning faculty workload, and to submit those policies to the chancellor of higher education for review; and

    WHEREAS the Board of Trustees approved an interim Faculty Appointments, Tenure, and Retrenchment Policy at its August 20, 2025, meeting to address SB1's requirements related to tenure and retrenchment; and

WHEREAS the proposed revisions expand that interim policy to address the required elements of faculty workload, including alignment with the Ohio Department of Higher Education (ODHE) Standards for Instructional Workloads issued by the chancellor of higher education in late October; and

WHEREAS a faculty workload policy consistent with the ODHE standards should be adopted by the board of trustees and submitted to ODHE by December 31, 2025, and every five years thereafter:

NOW THEREFORE

BE IT RESOLVED, That the Board of Trustees hereby approves revisions to the renamed interim policy on Faculty Appointments, Faculty Workload, Tenure, and Retrenchment.

(See Appendix X for background information, page XX)

11. Resolution No. 2026-62, Amendments to the Rules of the University Faculty:

Synopsis: Approval of the following amendments to the *Rules of the University Faculty* are proposed.

WHEREAS the University Senate, pursuant to rule 3335-1-09 of the Administrative Code, is authorized to recommend through the President to the Board of Trustees the adoption of amendments to the *Rules of the University Faculty* as approved by the University Senate; and

WHEREAS rule 3335-5-04 outlines procedures for complaints of failure to meet academic responsibilities, post-tenure review, and misconduct made against faculty members, including different investigatory procedures for different cases depending on the subject matter at issue; and

WHEREAS, pursuant to rule 3335-5-04.2, the Research Integrity Standing Committee (RISC), which consists of faculty members with specific research expertise and training, performs investigations of complaints of research misconduct; and

WHEREAS all other research-related complaints are investigated by faculty members serving on college-level investigation committees; and

WHEREAS complaints relating to research compliance often involve complex research-related issues, such that the RISC committee's expertise would be beneficial in conducting those investigations; and

WHEREAS the proposed amendments would change the process for reviewing complaints pertaining to research compliance to assign such cases to RISC for investigation rather than college-level investigation committees; and

WHEREAS this change would ensure that faculty with relevant research experience perform these research compliance investigations; and

WHEREAS the proposed amendments were approved by the University Senate during its meeting on November 13, 2025:

NOW THEREFORE

BE IT RESOLVED, That the Board of Trustees hereby approves that the attached amendments to the *Rules of the University Faculty* be adopted as recommended by the University Senate.

(See Appendix X for background information, page XX)

12. Resolution No. 2026-63: Faculty Personnel Actions:

BE IT RESOLVED, That the Board of Trustees hereby approves the faculty personnel actions as recorded in the personnel budget records of the university since the August 20, 2025, meeting of the board, including the following appointments, appointments/reappointments of chairpersons, faculty professional leaves and emeritus titles:

Appointments

Name:	ELLIOT BENDOLY
Title:	Professor (The Richard M. Ross Chair in Management)
College:	Fisher College of Business
Term:	August 15, 2025, through August 14, 2030

Name:	LAURA FLANNIGAN
Title:	Assistant Professor (The Warner Woodring Chair in History)
College:	Arts and Sciences
Term:	August 15, 2025, through August 15, 2030

Name:	LARRY GARVIN
Title:	Professor (The Leon M. McCorkle Jr. Professorship in Commercial Law)
College:	Law
Term:	August 15, 2025, through August 15, 2030

Name:	ANNA GAWBOY
Title:	Associate Professor (Colleen McMahon Professorship in Music)
College:	Arts and Sciences
Term:	August 15, 2025, through June 30, 2030

Name:	KURT GRAY*
Title:	Professor (Weary Foundation Endowed Chair in Social Psychology)
College:	Arts and Sciences
Term:	December 4, 2025, through June 30, 2030

Name:	ROGER GODDARD
Title:	Professor (Novice G. Fawcett Chair in Educational Administration)
College:	Education and Human Ecology
Term:	September 15, 2025, through September 14, 2030

Name:	JENNIFER GOLD*
Title:	Professor and Chair (The Harry C. and Mary Elizabeth Powelson Professorship of Medicine)
College:	Medicine
Term:	December 1, 2025, through June 30, 2030

Name:	MARYANNA KLATT
Title:	Professor-Clinical (Endowed Chair in Integrative Health)
College:	Medicine
Term:	November 1, 2025, through June 30, 2029

Name:	JOSEPH KWON
Title:	Professor (Richard M. Morrow Chair in Polymer Engineering)
College:	Engineering
Term:	August 15, 2025, through June 30, 2030

THE OHIO STATE UNIVERSITY

Name:	ROBERT LOUNT
Title:	Professor (Irving Abramowitz Memorial Professorship)
College:	Fisher College of Business
Term:	August 15, 2025, through August 14, 2030

Name:	OLAN MUNSON
Title:	Assistant Professor (Dr. Chris Lee Endowed Professorship in Korean)
College:	Arts and Sciences
Term:	August 15, 2025, through August 15, 2030

Name:	MICHAEL MURPHY
Title:	Assistant Professor-Clinical (Smathers Designated Professor at the Moritz Entrepreneurial Business Law Clinic)
College:	Law
Term:	August 15, 2025, through August 14, 2030

Name:	EFTHIMI PARASIDIS
Title:	Professor (The Kara J. Trott Endowed Professorship in Law in honor of Prof. Morgan E. Shipman)
College:	Law
Term:	November 15, 2025, through November 14, 2030

Name:	ERIK PORFELI
Title:	Interim Dean
College:	Education and Human Ecology
Term:	January 1, 2026, through June 30, 2028, or until a permanent Dean is appointed

Name:	PAUL REITTER
Title:	Professor (The Ohio Eminent Scholar in German)
College:	Arts and Sciences
Term:	August 15, 2025, through June 30, 2030

Name:	BLAINE SAITO
Title:	Associate Professor (The Lawrence D. Stanley Professorship in Law)
College:	Law
Term:	August 15, 2025, through August 15, 2030

Name:	COLLEEN SETTINERI
Title:	Professor-Clinical (The Chief Justice Thomas J. Moyer Professorship for the Administration of Justice and Rule of Law)
College:	Law
Term:	November 15, 2025, through November 14, 2030

Name:	ABRAHAM SCHNEIDER*
Title:	Professor (The George C. Paffenbarger Alumni Chair in Dental Research)
College:	Dentistry
Term:	November 3, 2025, through November 2, 2030

Name:	BENNETT TEPPER
Title:	Professor (John A. Russell Chair for Communication Excellence)
College:	Fisher College of Business
Term:	August 15, 2025, through August 14, 2030

THE OHIO STATE UNIVERSITY

Name: ANDREW VAN BUSKIRK
Title: Professor (The Harry T. Mangurian, Jr. Foundation Professorship in Business)
College: Fisher College of Business
Term: August 15, 2025, through August 14, 2030

Name: XIAOGUANG WANG
Title: Assistant Professor (The H.C. 'Slip' Slider Professorship in Chemical and Biomolecular Engineering)
College: Engineering
Term: August 15, 2025, through June 30, 2030

Name: LIN ZHU NEWSAD
Title: Assistant Professor (Elizabeth McKeever Ross Professorship Fund)
College: Medicine
Term: November 1, 2025, through June 30, 2029

Reappointments

Name: YIGIT AKIN
Title: Associate Professor (Carter V. Findley Chair of Ottoman and Turkish History)
College: Arts and Sciences
Term: August 15, 2025, through June 30, 2030

Name: ARNAB CHAKRAVARTI
Title: Professor and Chair (Klotz Family Chair in Cancer Research)
College: Medicine
Term: July 1, 2025, through June 30, 2029

Name: JEFFREY CHALMERS
Title: Professor (Helen C. Kurtz Chair in Chemical Engineering)
College: Engineering
Term: July 1, 2025, through June 30, 2030

Name: DANIEL CHOW
Title: Professor (The Frank E. and Virginia H. Bazler Chair in Business Law)
College: Law
Term: November 16, 2025, through November 15, 2030

Name: LOUIS DIMAURO
Title: Professor (The Dr. Edward E. and Sylvia Hagenlocker Chair in Physics)
College: Arts and Sciences
Term: July 1, 2025, through December 31, 2027

Name: EDWARD FOLEY
Title: Professor (Charles W. Ebersold and Florence Whitcomb Ebersold Chair)
College: Law
Term: November 16, 2025, through November 15, 2030

Name: JOHN FULTON
Title: Professor (The Food, Agricultural, and Biological Engineering Endowed Professorship)
College: Food, Agricultural, and Environmental Sciences
Term: June 1, 2024, through May 31, 2029

Name:	JINGYIN HUANG
Title:	Associate Professor (The Alice Louise Ridenour Wood Chair in Mathematics)
College:	Arts and Sciences
Term:	August 15, 2025, through August 15, 2030

Name:	DOROTHEE IMBERT
Title:	Professor and Director (The Hubert Schmidt Chair in Landscape Architecture)
College:	Engineering
Term:	July 1, 2025, through June 30, 2026

Name:	ALAN MICHAELS
Title:	Professor (The Edwin M. Cooperman Endowed Chair at The Michael E. Mortiz College of Law)
College:	Law
Term:	February 1, 2026, through January 31, 2031

Name:	ERIN MOORE
Title:	Assistant Professor (Dr. Carl F. Asseff Professorship in Anthropology and History of Medicine)
College:	Arts and Sciences
Term:	August 15, 2024, through June 30, 2030

Name:	DAVID NAGIB
Title:	Professor (Dr. Harold “Hal” Miller and Betty J. Miller Endowed Chair in Organic Chemistry and Biochemistry)
College:	Arts and Sciences
Term:	August 15, 2025, through August 14, 2027

Name:	RITA PICKLER
Title:	Professor (FloAnn Sours Easton Endowed Professorship in Child and Adolescent Health)
College:	Nursing
Term:	October 1, 2025, through May 15, 2028

Name:	JAMES ROCCO
Title:	Professor and Chair (The Mary E. and John W. Alford Research Chair in Head and Neck Cancer)
College:	Medicine
Term:	July 1, 2025, through June 30, 2029

Name:	BRUCE WEINBERG
Title:	Professor (Eric Byron Fix-Monda Endowed Chair)
College:	Arts and Sciences
Term:	December 4, 2025, through August 14, 2026

Extensions

*New Hire

(See Appendix X for background information, page XX)

13. Resolution No. 2026-64: Degrees and Certificates:

Synopsis: Approval of Degrees and Certificates for autumn term 2025 is proposed.

WHEREAS pursuant to paragraph (E) of rule 3335-1-06 of the Administrative Code, the Board has authority for the issuance of degrees and certificates; and

WHEREAS the faculties of the colleges and schools shall transmit, in accordance with rule 3335-9-29 of the Administrative Code, for approval by the Board of Trustees, the names of persons who have completed degree and certificate requirements:

NOW THEREFORE

BE IT RESOLVED, That the Board of Trustees hereby approves the degrees and certificates to be conferred on December 21, 2025, to those persons who have completed the requirements for their respective degrees and certificates and are recommended by the colleges and schools.

(See Appendix X for background information, page XX)

The committee first voted on item No. 12 – Faculty Personnel Actions. Ms. Trott was advised to abstain.

Action: Upon the motion of Dr. Wilkinson, seconded by Mr. Kaplan, the foregoing resolution was adopted by majority roll-call vote, with the following members present and voting: Dr. Wilkinson, Mrs. Harsh, Ms. Kessler, Mr. Kaplan, Mr. Kastan, Mr. Arp, Dr. Popovich, Dr. Bielefeld and Mr. Zeiger. Ms. Trott abstained.

The committee then voted on the remainder of the items for approval.

Action: Upon the motion of Dr. Wilkinson, seconded by Mr. Kaplan, the remainder of the resolutions for approval were adopted by unanimous roll-call vote, with the following members present and voting: Dr. Wilkinson, Mrs. Harsh, Ms. Kessler, Mr. Kaplan, Mr. Kastan, Ms. Trott, Mr. Arp, Dr. Popovich, Dr. Bielefeld and Mr. Zeiger.

The committee adjourned at 3:57 p.m.

The Ohio State University
Board of Trustees

February 19, 2026

APPROVAL TO ESTABLISH AN INTERDISCIPLINARY MASTER OF SCIENCE IN QUANTUM INFORMATION SCIENCE AND ENGINEERING

IN THE CENTER FOR QUANTUM INFORMATION SCIENCE AND ENGINEERING

Synopsis: Approval to establish an Interdisciplinary Master of Science in Quantum Information Science and Engineering degree program in the Center for Quantum Information Science and Engineering is proposed.

WHEREAS the grand challenges in quantum information science and engineering (QISE) research, coupled with the national need for a quantum workforce, require an interdisciplinary approach; and

WHEREAS the program draws on faculty and research expertise across multiple departments in the College of Arts and Sciences and the College of Engineering, including Chemistry and Biochemistry, Computer Science and Engineering, Electrical and Computer Engineering, Mathematics, Materials Science and Engineering, and Physics; and

WHEREAS this graduate program would be one of the first truly interdisciplinary QISE programs in the country; and

WHEREAS there will be a compact common core of QISE courses through which students will develop a common vernacular and teaming skills, participate in research rotations across disciplines, engage in informal community building and industry engagement, and build skills in ethics, technical writing and communication; and

WHEREAS the Master of Science program will include a minimum of 30 credit hours with at least nine for foundational graduate coursework, six for seminar professional development courses, and three for experiential learning; and

WHEREAS the proposal was reviewed and approved by the Council on Academic Affairs at its meeting on December 3, 2025; and

WHEREAS the University Senate approved this proposal on January 29, 2026:

NOW THEREFORE

BE IT RESOLVED, That the Board of Trustees hereby approves the proposal to establish an Interdisciplinary Master of Science in Quantum Information Science and Engineering degree program in the Center for Quantum Information Science and Engineering.

Proposal for an Interdisciplinary Graduate Program in Quantum Information Science and Engineering

The Ohio State University, College of Arts and Sciences and College of Engineering

Mode of delivery: on campus

Participating Departments: Chemistry and Biochemistry, Computer Science Engineering, Electrical and Computer Engineering, Materials Science Engineering, Mathematics, Physics.

Executive Summary

We propose to develop and launch a Quantum Graduate Interdisciplinary Program (***QuGIP***), at Ohio State University (OSU), focused on quantum information science and engineering (QISE). The launch phase of this program (up to AY 2028-29) will be supported by an NSF NRT award, which will directly fund 25 trainees with first year fellowships, approximately 5-10 Masters students, and 15-20 students in the companion PhD program to be developed subsequently. While an increasing number of QISE programs have emerged in recent years, these are often hosted in traditional units such as Physics Departments. However, the grand challenges in QISE research, and the national need for a quantum workforce, require a more interdisciplinary approach. Toward that end, QuGIP features a team of faculty leaders in Physics, Chemistry, Mathematics, and Engineering (Electrical and Computer, Computer Science, Materials Science), and will be administratively housed under the OSU Center for Quantum Information Science and Engineering (CQISE). QuGIP will feature a compact common core of QISE courses, designed to accommodate variations in student preparation from these disciplines. QuGIP students will develop a common vernacular and teaming skills through the compact core sequence, research rotations across disciplines, informal community building and industry engagement. Skill-building in ethics, technical writing and communication will be integrated in both classroom and research activities. QuGIP students will thus be uniquely prepared to make new insights and research connections that would not otherwise occur. The QuGIP Masters curriculum is structured to prepare and facilitate transition of QuGIP students to the quantum workforce, offering an accelerated course-based option, and a more research-focused thesis-based option. This leverages, and will help expand, the portfolio of QISE research at OSU.

QuGIP will make broader impacts as envisioned in the National Quantum Workforce Strategic plan, through interdisciplinary research to solve grand challenges in QISE, with broad dissemination in national networks and by training a diverse quantum workforce. In addition to the directly-funded trainees, we estimate another 10-20 degree students will be funded from other sources such as assistantships and competitively awarded university fellowships. In their research at OSU, QuGIP students will work at the forefront in QISE and will be well prepared to translate their experiences to other problems, applications and fields after graduating. As a new model for graduate training, QuGIP will feature a flexible specialization structure that facilitates industry engagement and professional development. The QuGIP course curricula have been designed with evidence-based methods and implemented with expert guidance from the OSU Drake Institute of Teaching and Learning. QuGIP courses will be available as electives to graduate students in existing programs, and based on experience with pilot courses, we estimate another 100 students will take QuGIP courses during the launch period. The QuGIP model will be broadly disseminated by leveraging OSU membership in national networks, including QuSTEAM and the Chicago Quantum Exchange. Lastly, QuGIP will help fill a critical need for a *quantum workforce*, as nearly 60% of OSU graduates take positions in industry, and the top employers of OSU graduates: Google, Intel, and Amazon all have made substantial investments in QISE and in Central Ohio. QuGIP students will benefit from a network spanning these large industry partners down to small quantum startups, and will have the broad skillset to develop quantum technologies and solve societal needs.

Table of Contents

Projected impacts

Impact on OSU: Quantum information science and engineering is a rapidly developing field in STEM that has captured the attention of the general public, large and small technology companies, government and education. The proposed Quantum Graduate Interdisciplinary Program (QuGIP) will be an innovative 21st century graduate program featuring interdisciplinary courses designed with evidence-based methods and seamless integration with industry, nonprofit and national lab experiences. The proposed program will position OSU in the vanguard of institutions developing QISE degree programs and will be visible and attractive to a growing number of students and professionals seeking training in this area. We anticipate positive impacts on collaborative research in quantum at OSU, which will be evidenced by external funding and high impact publications.

Impacts to OSU students in other graduate programs: QuGIP courses will be available and appropriate for STEM graduate students to take as electives. The courses are designed to accommodate varying background preparation in e.g. linear algebra and quantum mechanics, and could help students from other disciplines build a foundation in quantum as well.

Impacts to OSU undergraduate students: OSU undergraduate students will benefit from an increased development of interdisciplinary research opportunities that QuGIP will help foster. There are also natural synergies between the proposed graduate program, and the QuSTEAM undergraduate minor program, which is currently under development. For example, quantum-related seminars, internships and professional development opportunities will be disseminated to both communities.

Impacts on participating units (c.f. Appendix for Concurrence letters): QuGIP is expected to have small or negligible impact on graduate recruiting to the 6 participating Departments (Physics, Math, Chemistry and Biochemistry, ECE, MSE, CSE), as some Departments do not have active Masters programs (Physics, Chemistry and Biochemistry), and the program will target a pool of students with complementary interests. The establishment of QuGIP would give these students a second option at OSU, and will likely increase the chances of OSU to attract these students. The new program will moreover, develop new recruiting pipelines to increase the number of applicants to OSU. The program will also likely positively impact faculty research programs, through the development of new interdisciplinary projects in quantum science and increased competitiveness for the growing pool of external funding in quantum at DOE, NSF and other federal agencies. In addition, we anticipate that the increased interactions among faculty and students in the participating departments will also seed collaborative efforts not directly related in quantum science, and thus could have additional impacts on research and education.

Impacts to other units: Though the field is still at an early stage, it is likely there will be corollary benefits of QISE research to other programs at OSU. For example, quantum sensing has a broad range of potential applications from medical imaging to geodesy. Quantum cryptography has a similarly broad range of applications in finance and national security. We thus expect that the program will help grow a dense network of collaborative work between participating faculty and those in other units. No negative impacts are anticipated.

Review process

This QuGIP Curriculum proposal has been reviewed and approved by the following academic units:

OSU Departments (c.f. appendix for concurrence letters):

- Department of Chemistry and Biochemistry
- Department of Computer Science and Engineering
- Department of Electrical and Computer Engineering
- Department of Materials Science Engineering
- Department of Mathematics
- Department of Physics

College of Arts and Sciences Curriculum Committee

College of Engineering Curriculum Committee

Stakeholder input

This curriculum proposal was informed by numerous discussions with faculty and students in the participating Departments, the broader OSU STEM community, and in collaboration with other universities through NSF-sponsored events. Included in the appendix are some examples including:

- NSF National Research Traineeship Annual Meeting (Oct 29-31, 2023, hosted by Arizona State University): The NSF NRT program makes training grant awards in a broad range of fields, including quantum-related NRTs at University of Washington, UCSB, Univ. Arkansas, Univ. Tennessee, Colorado School of Mines and Yale. QuGIP Director Gupta attended this meeting, and is coordinating a satellite meeting in 2024 with the other quantum NRTs to share best practices in quantum education and training.
- OSU Center for QISE Quantum Collaborators Kickoff Meeting (Sep 22, 2023). This meeting provided an opportunity for networking and to learn about the quantum activity occurring across the University and regionally. QuGIP presented a poster at this meeting, and QuGIP personnel were available for questions and discussions from attendees.
- Open solicitations to faculty in the participating departments: Shortly after the NSF NRT award was made public, we sent out emails to faculty lists announcing the award and soliciting input. The co-PIs on the NSF proposal are serving as points of contact for these interactions.
- Weekly QuGIP happy hours – these informal get togethers of the QuGIP leadership team have helped build a sense of community among stakeholders, and inspired creative brainstorming for program components.
- Outreach to expanded base of participating faculty: To build a broad base of support for the program (and advisors for QuGIP students), emails were sent out to participating faculty and soliciting input and suggestions.
- Informal discussions with students: QuGIP faculty have had numerous informal discussions with students at OSU and externally about the program. In particular, suggestions for program components and feedback were solicited in these interactions.
- Sustained discussions with OSU leadership: the proposal has been informed by discussions with the OSU Graduate School (Dean Stromberger and Associate Dean Miriti), Office of Academic Affairs (Vice Provost Smith), ASC (Dean Horn, Assistant Dean Vankeerbergen), and CoE (Associate Deans Tomasko and Stiner-Jones).

SUMMARY OF SUPPORTING RESOURCES

The administrative and research infrastructure are in place to support the proposed program. Here we provide a bulleted list, with links to the relevant sections below.

Administrative infrastructure: The OSU Center for Quantum Information Science and Engineering (CQISE) will be the administrative home for the new graduate program, administering admissions, student tracking and finances. Discussed further here.

Financial support: NSF funding will provide first year fellowships to all MS students admitted into the program through AY28-29 (budget: $3M / 5 years from 2023-2028 + planned 1 year no-cost extension). As described in the Appendix, NSF funding includes 1 yr fellowships for trainees, the program coordinator position, curriculum development (faculty teaching buyout, OSU Drake Institute of Teaching and Learning) and program evaluation (Strategic Evaluations LLC.). As the program becomes well established, we expect to admit ~ 20 MS students per year as a sustained target. More detailed budget information can be found in the Appendix.

Non-thesis MS students will be able to finish their degree by the end of their first year, while thesis MS students will likely require up to one additional year for their thesis research. During this time, the student will be supported via a funding plan developed by their advisor for any subsequent terms. Following the launch phase, MS students will be charged tuition to cover program expenses.

Research infrastructure support: Students in the new program will benefit from and contribute to the strong culture of collaborative and interdisciplinary research at OSU that is nurtured by OSU Centers, including CQISE, the Ohio State University Institute for Materials and Manufacturing Research, and the OSU Center for Emergent Materials (CEM). The research by QuGIP students will benefit from the extensive network of equipment and computational facilities at OSU. Examples include the Ohio Supercomputing Center (OSC), NanoSystems Laboratory (NSL), Semiconductor Epitaxy and Analysis Laboratory (SEAL), Center for Electron Microscopy and Analysis (CEMAS), Nanotech West Laboratory (NTW), the NSF NeXUS facility, the Campus Chemical Instrumentation Center (CCIC). These Centers and Facilities are discussed in more detail here.

PROGRAM NARRATIVE - BASIC CHARACTERISTICS

Purpose

The National Quantum Initiative Act was signed into law in 2018 "to accelerate quantum research and development for the economic and national security of the United States." Representing a community consensus developed through subsequent workshops and planning roundtables, the 2022 U.S. National Strategic Overview for Quantum Information Science and Engineering (QISE) calls for (*i*) QISE to be recognized as its own discipline, calling for new faculty, programs and initiatives, (*ii*) a *science-first approach* fostering collaboration across disciplines to solve Grand Challenges in QISE, and (*iii*) *deepened engagement* with industry for workforce development.

To meet this national need, we propose to launch one of the first truly interdisciplinary QISE MS programs in the U.S. at The Ohio State University. This program leverages and will reinforce federal, university and regional investments in QISE. These include an NSF-funded training award to OSU, the OSU Center for QISE, cross-cutting faculty hires in quantum science, and partnership programs such as StarLab and the OSU/Air Force Institute of Technology Intercity Quantum Network. As QISE spans algorithms, fundamental physics, and hardware implementations from atoms to architectures, a new approach to graduate education is needed so that students in physics, chemistry, mathematics and engineering (electrical, computer, and materials) can combine efforts to solve complex Grand Challenges in the field. Our program will build a common vernacular to overcome structural barriers to interdisciplinary graduate education, is developed with evidence-based methods from the start and will accelerate the transition to experiential learning through research and industry internships. In addition to technical content learning outcomes, the program places equal priority on our students developing communication skills and a moral compass for 'quantum ethics', so they can become leaders in industry, government and academia.

Program focus

The proposed graduate program will provide students with foundational coursework and accelerate their transition to experiential learning through quantum science research and industry graduate internships. Not only will these students have the interdisciplinary and professional skills needed for the quantum workforce, but they will also help OSU faculty who are interested in pivoting some of their research activity into this field. The proposed curriculum will feature a compact core of four graduate-level QISE courses with content specifically designed to accommodate students with Bachelor's degrees in Chemistry, Physics, Math, Computer Science and Engineering, Materials Science Engineering or Electrical and Computer Engineering. Students will be recruited into one of four program specializations that integrate advanced elective courses, research rotations and experiential learning opportunities. The Quantum Computing specialization is focused on the development, implementation and scaling of

quantum algorithms for solving complex problems and error correction. The Quantum Networking and Communication specialization is focused on the transportation and multiplexing of quantum information using elements such as photonics and microwave cavities. The Quantum Simulation specialization is focused on quantum-enabled methods to better understand physical systems whose complexity exceeds even the best classical high performance computing algorithms. Lastly, the Quantum Materials and Sensing specialization is focused on the physical materials (solid state and molecular) used for quantum bits, sensors and storage. These specializations will be included on student diplomas to highlight the specific content and experiential knowledge students gain in the program.

Rationale

Graduate degrees in Quantum Information Science and Engineering demonstrate proficiency in an interdisciplinary curriculum that requires strong communication skills and an active growth mindset for continued learning as the field evolves. Depending on their career goals, Masters students may choose either thesis- or non-thesis degree experiences (described further below). The degree and specialization certifications will be attractive for employers in industry, government and academia.

Duration of Program

Example curricula for Masters students are discussed in more detail here.

Course requirements: A minimum of 30 credit hours will be required for Masters degree recipients. These requirements are consistent with the OSU Graduate School, and national expectations for graduate education in related STEM fields. Of these credit hours, at least 9 credit hours will be for foundational graduate coursework, at least 6 credits will be for seminar-style professional development courses (ethics, writing, journal club), and at least 3 credit hours will be for experiential learning (research, internships).

Time to degree: Depending on their preparation and career goals, the Masters degree program can be completed by students in 3-6 semester terms, typically 1-2 academic years. The time to degree will be similar for the four program Specializations. MS students will enter the program in a cohort taking the graduate core courses and seminars, but will progress through the program at rates determined by their career goals and research program. These degree times and support models are typical for STEM programs at OSU and nationally.

Admission timing

The program will recruit one cohort of students per year, to start classes in Autumn semester. The admissions application will be launched the preceding Autumn semester, and review of the applications will be conducted by a Graduate Admissions Committee on a rolling basis after the application submission deadline (Dec 15th). MS applications will be considered for a number of

slots that will be based on program priorities as determined by the QuGIP Director and *Graduate Studies Committee*.

Primary target audience

The Masters program will primarily target traditional college-age students, but will encourage a greater variety of workforce outcomes than traditional programs, such as K-12 education, industry technician, government data analyst and startup entrepreneurs. In addition to students coming into the program straight from their Bachelors institution, we will actively recruit professionals in related industries by leveraging existing relationships.

Admissions will be conducted through the OSU Office of Graduate Education, and students will meet Graduate School requirements, including a 3.0 GPA and an official transcript showing proof-of-degree completion. As there are few Bachelors degree programs in QISE, students recruited into the program will typically have Bachelors degrees and minors in the related disciplines: Physics, Chemistry, Mathematics, Engineering (Electrical and Computer, Materials Science, Computer Science). The admissions process will include a rubric-based review of written applications which will include a personal statement describing student motivations for applying to the program, challenges overcome and future goals and at least three letters of recommendation. All international applications whose native language is not English will be required to take the TOEFL test and provide an official score report. In addition to the written materials, admissions will be based on Zoom interviews conducted by the Graduate Admissions Committee. These interviews will help assess student non-cognitive factors, research interests and identify potential faculty advisors.

During the NSF-funded launch phase of the program (up to AY28/29), applicants must be eligible for NRT Fellowship funding, which stipulates that trainees are US Citizens, nationals or permanent residents. International students may come in self-funded, or with their own fellowship funding. After the launch phase, self-funded domestic and international students will be eligible for the program.

Recruiting plan: Our recruiting goal is to consistently attract a pool of applicants from a wide range of backgrounds to the QISE program by leveraging our substantial existing networks. For example, the Physics and Chemistry Departments draw on the NSF IGEN network, which provides a nationwide, free, common application. In 2025, the IGEN pool featured 186 applications, with at least 30 students expressing interest in QISE or related areas. OSU is also a founding member of the Open Quantum Initiative summer research program hosted by the Chicago Quantum Exchange network. In 2025, there were 350+ applications from students all over the country, coming from large R1 research institutions, as well as smaller colleges, with majors including Physics, Engineering and double majors with various combinations (Physics/Math, Computer Science/Physics etc.). OSU has hosted 12 summer students since the program launched in 2021.

Retention through graduation: The participating Departments in QuGIP have demonstrated a commitment to degree attainment, with an average of over 90% of students achieving a Masters degree or higher, while maintaining a time-to-degree consistent with disciplinary national averages. To achieve our target of at least 80% degree attainment, QuGIP will leverage and uniformly apply mentoring best practices that have grown from OSU engagement with networks such as the National Math Alliance and the APS IDEA. For example, peer, near peer and faculty mentoring networks will be established for each student when they first arrive on campus, ensuring they have a broad support system that has been proven critical for degree attainment.

PROGRAM NARRATIVE - INSTITUTIONAL PLANNING

Physical Infrastructure

Organizational infrastructure: The OSU Center for Quantum Information Science and Engineering (CQISE) will serve as the administrative home of the new graduate program. Sufficient office space for the program students will be provided by the participating departments. Student research needs (e.g. primary laboratory space, computing clusters etc.), will be provided as per their advisor. Participating faculty (c.f. Appendix A) have the extensive infrastructure already in place for cutting-edge research in quantum information science and engineering.

Students in the new program will benefit from and contribute to the strong culture of collaborative and interdisciplinary research at OSU among the participating departments. For example, CQISE sponsors a variety of community-building programs, including seminars, project seed funding, and networking events with regional industries. In addition to CQISE, the Ohio State University Institute for Materials and Manufacturing Research is a campus-wide, multidisciplinary institute that facilitates, promotes and coordinates research activities and infrastructure related to the science and engineering of materials throughout The Ohio State University. IMR's community-building activities include a Distinguished Lecture series, and the annual Materials Week conference, which draws several hundred attendees from both academia and industry. Students will also benefit from externally-funded centers, such as the OSU Center for Emergent Materials (CEM), one of the flagship materials centers sponsored by the NSF which has 20+ participating faculty at OSU in Physics, Chemistry and Biochemistry, Materials Science and Mechanical Engineering. CEM hosts a variety of seminar speakers, technical workshops, outreach events and professional development opportunities.

New opportunities in quantum infrastructure: QuGIP students will have the opportunity to contribute to regional investments in quantum infrastructure. For example, a team at OSU is leading the development of an intercity quantum network with the Air Force Institute of Technology (AFIT) in Dayton. This project has just received a congressionally-directed three year, $1M award. Quantum communication may also play a role in the new StarLab venture, led by a team comprising OSU, The Universities Space Research Association, Zin Technologies, and the International Association of Science Parks and Areas of Innovation. This effort has been chosen by Voyager Space to build terrestrial analogue laboratories to help guide the development of a commercial space station.

OSU research user facilities: The research by QuGIP students will benefit from the extensive network of equipment and computational facilities at OSU. Examples include the Ohio Supercomputing Center (OSC), NanoSystems Laboratory (NSL), Semiconductor Epitaxy and Analysis Laboratory (SEAL), Center for Electron Microscopy and Analysis (CEMAS), Nanotech West Laboratory (NTW), the NSF NeXUS facility, the Campus Chemical Instrumentation Center (CCIC). These user facilities employ technicians and engineers to support training and project execution as needed by the research community. Some examples of relevant capabilities for student researchers in the quantum graduate program include:

- The Ohio Supercomputer Center empowers researchers via high performance computing, advanced networking, and training resources; partners with leading scientific

investigators in developing joint proposals to regional, national, and international organizations; and leads research activities of strategic interest to OSC, the state, and the country.

- NSL has a 1,500 sq. ft. class 1000 cleanroom and operates the following instruments: 1) an optical lithography maskless aligner, 2) a Kurt Lesker sputtering/ion-milling/e-beam evaporation system, 3) an ICP-RIE, 4) an FEI Helios dual-beam FIB/SEM with e-beam lithography, 5) a Bruker triple-axis x-ray diffraction system, 6) two AFM/MFM systems, 7) two Quantum Design 7-T SQUID magnetometers, 8) a Quantum Design 14-T PPMS, 9) a Magneto-Optical Kerr Effect Microscope, 10) a diamond CVD System, 11) a low-temperature flow cryostat magneto-transport system, 12) a Montana Instrument cryogen-free magneto-optical system, 13) a Bruker Electron Paramagnetic Resonance (EPR) spectrometer, 14) a suite of microwave instruments including network analyzers, signal generators, and amplifier.
- SEAL is OSU's primary facility for MBE and is located within the 4,000 sq. ft. Dreese Lab Cleanroom. SEAL houses 6 state-of-the art MBE chambers each dedicated to different, complementary material systems, including group IV and III-V (III-As, III-P, III-N, and III-Sb) semiconductor epitaxial heterostructures, and TMD 2D materials for both basic studies and true device development.
- CEMAS operates two FEI Titan Scanning Transmission Electron Microscopes (S/TEM), one FEI Tecnai S/TEM, one FEI Tecnai G2 TEM, two Apreo Scanning Electron Microscopes (SEM), one FEI SEM, Two FEI dual-beam FIB/SEMs, and two Rigaku XRD systems.
- NTW is the largest nanotechnology user facility in Ohio and supports more than 100 research and development projects per year for commercial, government, and academic clients including many external users. NTW consists of a 6,000 sq. ft. class 100 cleanroom and possesses the following capabilities for 4" wafers: MOCVD, ALD, LPCVD, PECVD, e-beam evaporation and sputter deposition, ICP-RIE, ashing, and wet chemical etching.
- NSF NeXUS is a first-of-its-kind facility for ultrafast science, funded and maintained at OSU in partnership with the National Science Foundation. A kW-class laser drives the generation of extreme ultraviolet (XUV) and soft x-ray pulses with durations from femtoseconds to attoseconds. NeXUS has a "beamline" arrangement so that three distinct XUV beams, each with its own time and spectral characteristics, can be generated from a single laser. The laser and XUV pulses are then coupled into an "end station" that directly support user measurements. The NeXUS System is being built with multiple end stations to support user measurements of angle-resolve photoelectron spectroscopy (ARPES), element-specific scanning tunneling microscopy (STM), x-ray absorption spectroscopy (XAS), x-ray reflection spectroscopy (XRS), attosecond science, and laser induced electron diffraction (LIED). All of these measurements can be time resolved using combinations of the laser and XUV pulses.
- The CCIC hosted by the Department of Chemistry and Biochemistry hosts a wide range of analytical equipment for magnetic resonance, surface analysis, x-ray crystallography, mass spectrometry and ultrafast dynamics measurements.

Market Demand

At the societal level, the National Quantum Initiative Act signed into law in 2018 represents an 'all of government' approach to develop quantum technologies for future economic growth and national security. Substantial federal investments in QISE have been made

through the NSF, DOE and DOD, and include awards for fundamental research, technology transfer and workforce development. These investments are matched by industry research and development, including by leading information technology companies such as Intel, Google, IBM, Microsoft, Amazon, and Meta. A variety of other large companies such as JP Morgan Chase, Corning, Applied Materials, and Boeing and startups are interested in recruiting talent in this area as well. To grow this 'quantum ecosystem', regional hubs have been established in recent years, led for example by the Chicago Quantum Exchange, which facilitates exchange among academic (including OSU), national lab and industry partners. Recent job postings attest to the rapidly growing opportunities in this field.

The growing employment opportunities (c.f. Appendix) and rapid progress publicized in the media (such as IBM's 1000 qubit report (12/4/2023) and Google's quantum supremacy report (10/23/2019) are catalyzing growing student interest in QISE. This is directly evidenced by one of the recruiting pools OSU faculty has helped establish: the Open Quantum Initiative (OQI). Launched in 2021, the OQI is an innovative, multi-institution summer research program for undergraduate students interested in QISE. For example, there were 350+ applicants to OQI summer research program in 2025 from all over the country, with 30% annual growth in the number of applications since the program started in 2022. These students applied from a variety of institutions, ranging from large R1 universities (Berkeley, Illinois) to primarily undergraduate institutions (Rhodes College, Kenyon College), and had a range of majors, including Physics, Mathematics, Computer Science, Electrical Engineering, with many double-majoring in various combinations. In addition to the ~ 20 OQI Fellows per year selected to participate in the program, we can draw on the full applicant pool for recruiting students to the proposed graduate program at OSU.

Ohio State's mission for undergraduate and graduate education plays a crucial role in connecting societal needs and student interests. OSU is leading the development of a quantum minor program at the undergraduate level through the NSF-funded QuSTEAM network (https://qusteam.org/). QuSTEAM is a non-profit, membership-based organization serving a network of academic institutions and industry employers. The purpose is to facilitate the national scale-up of equitable and effective undergraduate quantum education by building and supporting a collaborative network of academic institutions (currently 30+), private sector employers, and a community of instructors. Ohio State has also invested heavily in QISE, including the establishment of CQISE in 2022 and faculty cluster hiring in Physics, Math, Chemistry and Biochemistry and Computer Science Engineering. The establishment of a graduate QISE degree program will help integrate and expand these efforts. Not only will the program spur the development of new QISE courses that will be available for STEM graduate students, but the dissertation research of MS and PHD students in the program will lead to a growing portfolio of new experiential learning opportunities including industry internships.

PROGRAM NARRATIVE - STATEWIDE ALTERNATIVES

Faculty leaders have been polled at other universities in Ohio, including University of Cincinnati, Case Western Reserve and Ohio University. None of these universities currently have QISE degree programs, although all have developed QISE-related courses.

QuGIP will be one of the first dedicated and interdisciplinary MS programs in the U.S., but there are a number of related programs that have launched in the last few years which provide models for the proposed program (c.f. Table). Two close comparison points for the proposed MS program are the MS programs at Univ. Wisconsin and UCLA. Discussion with program leaders at those institutions indicates substantial demand (100+ applications annually) and a steady-state cohort size of ~ 20 *self-funded* Masters students per year. Unlike our program however, these are housed in Physics departments, and thus are not as interdisciplinary as our program is designed to be. Thus, the establishment of a stand-alone MS QISE program at a land-grant institution such as Ohio State will provide a national model for graduate education in this field.

Institution	Degree name	Host Unit (if applicable)	Comments
Univ. Chicago	PhD in Quantum Science and Engineering	Pritzker School of Molecular Engineering	stand-alone, interdisciplinary, launched 2021
Harvard	PhD in QSE	n/a	stand-alone, interdisciplinary, first cohort in AY22-23
USC	MS in QIS	ECE	takes in BS from Chem, CS, ECE, Math, Physics
Univ. Washington	Grad Certificate in QISE	n/a	participating faculty in Phys, Chem, ECE, CSE, MSE
Univ. Wisconsin - Madison	MS Physics - Quantum Computing Specialization	Physics	separate admissions from Physics PhD program, can finish program in 1 calendar year
Univ. Arizona	MS in QISE	Optical Sciences	Specialization within program
George Mason	MS in Physics w/ QISE concentration	Physics	
UCLA	MS of Quantum Science and Technology	Physics & Astronomy	

CO School of Mines	MS in Quantum Engineering	n/a	has hard/soft specializations, also Thesis, nonthesis, certificate versions
Univ. Rhode Island	MS in Quantum Computing	Physics	
Duke	Master of Science, Master of Engineering	ECE	Quantum Software/Hardware specializations as part of the two MS programs

1. **Address appropriateness of specific locale for the new program.**

OSU is centrally located in Ohio, both geographically and scientifically and is a top 10 producer of STEM graduate degrees. OSU also benefits from and contributes to nearby technology hubs, including the new Intel semiconductor fabrication plants in Columbus, and the quantum technology hub being developed with the Chicago Quantum Exchange. Ohio State faculty have a broad portfolio of externally-funded QISE research that will form the basis for dissertation work by students in the new program. These students will also benefit from OSU engagement in emerging institutional networks in QISE, including the Chicago Quantum Exchange, and QuSTEAM, which OSU leads. Lastly, OSU has made substantial investments in this field, including the Center for QISE (launched in 2022), and cluster faculty hiring in QISE (Physics, Chemistry and Biochemistry, Computer Science Engineering, Electrical and Computer Engineering, Mathematics).

2. **Address opportunities for inter-institutional collaboration.**

There are numerous opportunities for collaboration, both in terms of curricular development, and in terms of QISE-related research. At the curricular level, QuGIP faculty will be encouraged to share best practices with other institutions seeking to launch similar programs. There is already a culture of this in the participating departments, evidenced by the QuSTEAM network for example, which develops undergraduate minor curricula and is disseminating these to network partners, including 10+ universities. The breadth of opportunity and the collaborative environment at OSU will ensure that the OSU program maintains unique aspects that will help us compete for students as the number of programs in this field grows.

QuGIP participating faculty have a broad network of research collaborations in QISE-related research, including institutions in Ohio, in the U.S. and internationally. This will provide QuGIP students with a broad variety of research options, and help prepare them to be leaders in the field by being able to collaborate across traditional disciplines.

PROGRAM NARRATIVE - GROWTH OF THE PROGRAM

We currently have NSF training grant funding to launch the program and fund 25 x 1 year fellowships, including full stipend and tuition. These funds are sufficient to launch initial cohorts in the proposed Masters program, and the PhD program to be developed subsequently. The training grant includes funds for staff support, curriculum development and program evaluation. We have funded a number of current OSU graduate students to help pilot program components (e.g. courses, professional development, internships), providing feedback that has informed this program proposal. Our target for sustaining the program after the launch period will be to matriculate 20 self-funded Masters students and 6 PhD students into the program per year. Masters students will be either self- or employer-funded, or will have won other fellowships or scholarships. Returned tuition from Masters students, industry sponsorships and leveraging for external funding will help defray program costs.

	AY24-25	AY25-26	AY26-27	AY27-28	AY 28-29	Sustained (≥AY29-30)
Masters						
# NSF funded students	0	0	2	2	0	0
# self-, OSU- or employer-funded students	0	0	6	10	16	20
PhD						
# NSF funded students	1	5	5	5	5	0
# OSU funded students	0	0	0	0	0	6

CURRICULUM AND INSTRUCTIONAL DESIGN

Program Learning Goals

Learning Goals for MS

At the end of the program, the learner will be able to:

1. Demonstrate fundamental knowledge in quantum information science and engineering (QISE)
    a. Demonstrate quantum advantage using a real-world problem (e.g., how does one algorithm demonstrate quantum advantage over a classical counterpart).
    b. Explain pros and cons of leading physical systems for implementing qubits (e.g., coherence and decoherence).
    c. Explain pros and cons of different approaches for multi-qubit entanglement.
    d. Distinguish different approaches to error correction.
2. Demonstrate the ability to use analytical and computational methods to solve QISE problems (e.g., Python, Qiskit, LMS (e.g., qBraid), IBM Composer).
    a. Quantum circuits.
    b. Disciplinary methods.
3. Be able to connect their coursework to real-world applications in QISE as currently being developed by industry
4. Demonstrate a familiarity with QISE methods based on experiential learning in project rotations or thesis research
5. Be able to discuss course concepts and present research with a broad STEM community.

New graduate courses in QISE (c.f. Appendix for course syllabi).

QISE 7100 - Foundations in QISE (3 cr) will focus on the foundational mathematics and physics needed to describe quantum information and related phenomena.

QISE 7101 – Quantum Circuits and Algorithms (3 cr) is designed to provide students with a broad introduction to quantum computing. Using tools such as IBM Quantum Composer, students from diverse backgrounds will visualize quantum computing concepts, and compare them with classical computing models.

QISE 7102 – Grand Challenges in QISE (3 cr) will focus on grand challenges toward realizing quantum computers, including scalable multi-qubit entanglement, long-distance networking, error correction and algorithms, with a particular focus on physical platforms and their pros/cons.

QISE 7111 – Graduate seminar: Journal Club (1 cr): This student-led seminar-style course will meet once weekly during the term, and will feature regular presentations by students on a journal article of current interest. Students will gain experience in presenting technical content to a multi-disciplinary audience.

QISE 7112 – Graduate seminar: Professional Development (1 cr): This seminar-style course will feature a variety of discussions including aspects of professional skills (e.g., writing and presentation skills, literature research) and ethical questions posed by QISE (e.g. quantum cryptography).

QISE 7113 – 1st year research rotation (1.5 credits): This course will introduce students to research techniques through a 7 week experience with one of the QuGIP faculty advisors. This course may be repeated in 1.5 credit increments for multiple rotations, or taken for 3 or 4.5 credits for a more sustained effort during one rotation.

Degree requirements – MS in QISE

Course requirements: A minimum of 30 credit hours will be required for Masters degree recipients. These requirements are consistent with the OSU Graduate School, and national expectations for graduate education in related STEM fields. As summarized in the tables below, the course requirements include foundational graduate coursework, seminar-style professional development (ethics, writing, journal club), and experiential learning (research, internships). All of the courses will be delivered in person. Two Masters options will be offered. Option A is a course-focused Masters, which will include foundational and elective coursework, and two 7-week research rotations (3 total credits) focused on learning and applying research methods to specific, well-defined problems. Option B is a thesis-based Masters, which will feature the same foundation of four courses (QISE 7100-7012 plus a computational methods course), but will replace some elective coursework with a greater emphasis on experiential learning through research rotations, followed by a sustained period for thesis research with a specific faculty advisor.

As an introduction to elements of responsible conduct in research, Option A students will take the CITI RCR training offered through the university. As option B is a thesis-based Masters, with a greater focus on research, these students are required to take GRADSCH 8000 to develop a solid foundation for responsible conduct in research.

Time to degree: Depending on their preparation and career goals, the Masters degree program can be completed by students in 3-6 semester terms, typically 1-2 academic years. Though there are some variations in the elective courses by program Specialization, these will not impact the overall time to degree for the students. In addition to coursework, Masters students pursuing the thesis option will have a 1-2 term period for experiential learning, including research with a faculty advisor and/or industry internship. Students will be enrolled in the program full-time, and will be supported with fellowships in their first year, and with Research or Teaching Assistantships in following years, depending on the Departmental affiliation of their primary faculty advisor. Masters students wishing to transition into the PhD program may do so with permission of the QuGIP Graduate Studies Committee (QGSC).

MS in QISE Curriculum

Required core courses for degree: MS			
course # (red = new course)	**Course Title**	**Credits for non-thesis**	**Credits for thesis based**
QISE 7100 (and cross-lists)	Foundations in QISE	3	3
QISE 7101 (and cross lists)	Quantum Circuits and Algorithms	3	3
QISE 7102 (and cross lists)	Grand Challenges in QISE	3	3
PHY 6810, CHEM 6540, MATSCEN 6756.72, CSE 6321, ECE 5510, MATH 6601	Computational/Numerical Methods	1	1
QISE 7111	Journal club	2	2
QISE 7112	Professional development seminar	2	2
QISE 7113	1st year Research Rotations	3	6
XXXX-7999	Thesis research	0	10
GRADSCH 8000	Responsible conduct in research	0	1

Specializations: While the core course requirements are the same for all students in the program, choice of specialization will guide the choices of the required computational methods course, elective courses and the faculty advisors for research rotations. Students will choose from one of four transcriptable specializations:

1) The *Quantum Computing* specialization is focused on the development, implementation and scaling of quantum algorithms and associated hardware for solving complex problems and error correction.

Specialization	**Example electives (# cr)**
Quantum Computing	CSE 6429 Advanced Computer Architecture (1-3); ECE 7005 Information Theory (3); MATH 6251 Theory of Probability (4), MATH 5801 General topology and knot theory (3), ECE 6531 Semiconductor Devices (3), ECE 7022 Advanced RF integrated circuits (3), MATSCEN 6295 Superconducting Materials and Properties (2), PHY 5680 Big Data Analysis in Physics (3),

2) The *Quantum Networking and Communication* specialization is focused on the transportation and multiplexing of quantum information using elements such as photonics and microwave cavities.

Specialization	**Example electives (# cr)**
Quantum Networking and Communication	ECE 6511 Nonlinear Optics (3), CSE 6469 Advanced Studies in Computer networking (1-3); CSE 6422 Advanced Computer Architecture (3), Physics 8820 Special topics: Atomic, molecular and optical physics (3), MATSCEN 6777 Electronic properties of materials (2), ECE 6010 EM Field Theory (3), ECE 6101 Computer Communication Networks (3)

3) The *Quantum Simulation* specialization is focused on quantum-enabled methods to better understand physical systems whose complexity exceeds even the best classical high performance computing algorithms.

Specialization	**Example electives (# cr)**
Quantum Simulation	MATH 6801 Algebraic Topology (3); MATH 6151 Commutative Algebra (3); PHY 8820 Special Topics: Quantum information theory (3), ECE 5200 Digital Signal Processing (3), ECE 5307 Machine Learning (4), MATSCEN 6756 Computational Materials Modeling (2), CSE 6521 Artificial Intelligence (3),

4) The *Quantum Materials and Sensing* specialization is focused on the physical materials (solid state and molecular) used for quantum bits, sensors and storage.

Specialization	**Example electives (# cr)**
Quantum Materials and Sensing	MATSCEN 7835 Point Defects in Crystalline Materials (2); PHY 8806 Topics in Condensed Matter Physics (3); CHEM 6510 Quantum Mechanics and Spectroscopy (1.5) , CHEM 6540 Electronic Structure (1.5), CHEM 7370 Nanochemistry and Nanomaterials (1.5), ECE 5033 Surfaces and Interfaces of Electronic Materials (3),

These tables are not an exhaustive list of courses, and requests for additional courses will be reviewed by the QGSC each semester.

Course-based Masters students are required to complete 3 elective courses, including 2 within the list for their specialization. The third elective course can be chosen from the list of electives

for one of the other specializations, or any (PHY 6000+, MATSCEN 6000+, ECE 5000+, CHEM 6000+, CSE 5000+, MATH 6000+) course with permission of the QGSC. Students will also choose research rotations with faculty whose expertise aligns with their specialization.

Thesis-based Masters students are required to complete 1 elective course from the list for their specialization. Students will also choose research rotations and thesis research with faculty whose expertise aligns with their specialization.

Example progress in MS program:

MS		# cr		# cr		# cr		# cr
	Y1-Au		Y1-Sp		Y1-Su		Y2+	
Common core	QISE 7100	3	QISE 7101	3				
	Comp. Methods	3	QISE 7102	3				
	QISE 7111	1	QISE 7111	1				
	QISE 7112	1	QISE 7112	1				
Course-based	Elective #1	4	QISE 7113	3				
	Elective #2	4	Elective #3	3				
	TOTAL	16		14				
	Cumulative	16		30				
Thesis-based	QISE 7113	3	QISE 7113	3	Research - 7999	6	Research - 7999	TBD
	GRADSCH 8000	1	Elective #1	3	QISE 7111	1	QISE 7111	1
	TOTAL	12		14				
	Cumulative	12		26		33		34+

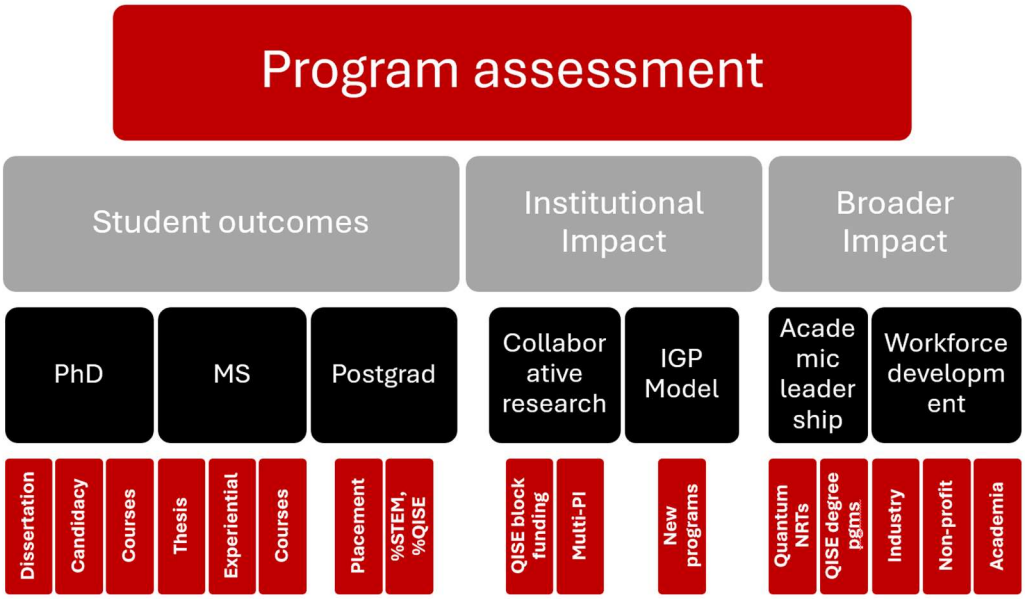
Culminating experience: Masters in QISE: Masters degree recipients will have demonstrated strong academic performance in the core coursework listed above, and will have gained professional skills in communication, ethics and interdisciplinary collaboration through seminar-style courses and program events.

In the course-focused track, students will complete a short-format oral exam with a committee of two QuGIP faculty. The exam will consist of course-related questions, probing understanding of fundamental concepts in QISE. The degree will be considered complete upon successful completion of this exam and the required courses.

Thesis-based Masters students will conduct 1+ semesters of sustained research on a project developed in consultation with a faculty advisor, or an industry internship. The culminating requirement for these students will be a thesis document (typically 20-50 pages) with an introduction that builds on course concepts and places the results and methodologies of the research/internship experience in the context of the field as a whole. The Masters candidate will defend this document in a short-format oral exam to a committee of 2-3 program faculty. The exam will comprise a ~15min presentation by the student on their research results and methodologies, followed by questions from the committee.

Program Assessment Plan

As shown here, the QuGIP program will be assessed in terms of *student outcomes*, *institutional impact* within OSU, and *broader impact* at the national level. For example, student outcomes will be assessed through course grades, thesis document and oral defense. Both formative and summative rubrics will be used for thesis and defense (discussed further below). Institutional impact will be assessed by tracking extramural funding among QuGIP participating faculty and students, including programs in QISE and non-QISE. More broadly, program components will be disseminated through workforce and academic networks, thus contributing to a rapidly-developing, nationwide infrastructure for QISE.



Assessment data will be compiled by several QuGIP stakeholders. The QuGIP *Graduate Studies Committee* will be tasked with assessing the quality of the applicant pool and curating collected data including demographic information, applicant institutions, Bachelors fields of study, GPAs, prior research experience, and Specialization interest. These data will be collected by the QuGIP *Program Coordinator.*

In addition, the NSF NRT award has subaward funding reserved for the development of initial program assessment by Strategic Evaluations, Inc. (SEI). SEI is a HUB-certified evaluation consulting firm located in Durham, North Carolina specializing in evaluating science education grants, particularly training grants. SEI will help the QuGIP team develop an assessment infrastructure that can then be sustained locally after the NSF NRT award ends in AY28-29, such as the following:

Expected Student, Faculty Teaching, and Institutional Competencies and Outcomes: The program leaders will work with SEI to document and measure targeted competencies and outcomes for stakeholders such as:

Trainees

- Increase QISE knowledge and technical skills
- Increase skills in ethics, technical writing, and communication
- Increase students' self-efficacy, science identity and sense of belonging
- Increased growth mindset

Faculty Instruction/Mentorship

- QISE courses and research opportunities utilize best practices and pedagogies, and and are aligned to students' long-term career interests (via Drake Institute)
- Instruction promotes a growth mindset across faculty and trainees in the QISE graduate program
- High quality mentorship (research mentors required to participate in mentorship training)
- Increased recruitment and training of students in QISE research projects in faculty labs
- Strengthened interdisciplinary research/course development

Institution

- Development of a QISE Graduate Interdisciplinary Program at OSU
- Industry partnerships result in graduate internships and sponsored research
- Relationships between participating departments are strengthened

During Year 1, the evaluation team will work closely with project leaders to further develop a project logic model and related evaluation framework that will serve as the guide for activities and the key metrics for documenting outcomes.

Table 2. Evaluation framework for QuGIP Logic Model

Sample Evaluation Questions for OUTCOMES	Possible Indicators/Measures	Possible Data Collection Methods and Information Sources
1. To what extent is the program able to garner buy-in from participating departments and industry partners? 2. Is the program able to obtain approvals from all the necessary groups and in a timely manner to launch new courses? 3. To what extent to the members/key stakeholders work together towards effectively and efficiently a common goal? 4. Is the program able to recruit its targeted number trainees, and retain these trainees to obtain terminal degrees (20% Master's/60%PhD/20%Other)? 5. Do students who participate in QISE courses exit with more confidence, stronger lab abilities, greater content knowledge, and higher interest in completing a degree/certificate program in QISE? 6. To what extent does participation increasae students' ethics, technical writing, and communication skills? 7. Does participation in the QISE interdisciplinary degree program lead to a sense of belonging and greater confidence that students are well prepared for the emerging careers in QISE? 8. To what extent are QISE courses inclusive and based on a "growth mindset"? 9. To what extent are trainees provided inclusive and convergent QISE	• Documentation of approval of QuGIP courses/curriculum • Documentation of trainees in OSU labs/industry partner training • Documentation of numbers of students enrolled in QISE courses and of students' obtaining QISE degrees, certifications, etc. • Documentation of job application data • Student self-report of content knowledge, research skills, job competitiveness, and career interest (pre/post) • Research mentors/industry mentors' ratings of trainees' QISE knowledge and skills and career preparedness • Student and course instructors' ratings of the inclusiveness of the courses and extent to which courses include a "growth mindset" (post course) • Student self-report of interest in QISE careers • Measure of working of the program partnership (Partnership self-assessment tool)	OSU Departments/Graduate School ▪ Records of approval of QuGIP courses/curriculum ▪ Records of departments accepting trainees in research labs/training ▪ QISE course enrollment records ▪ Records of QISE degrees/certificates earned Industry Partners ▪ Records of partners accepting trainees in labs/training Student Trainees ▪ Document course enrollment ▪ Track students' thoughts on program, growth in research self-efficacy, sense of belonging, growth in knowledgge and career interests and preparedness on pre- and post-surveys ▪ Document students' thought on the inclusiveness of courses and extent to which courses include a "growth mindset" (post-course survey and focus group interviews) ▪ Qualitively document quality and impact of courses/research opportunties as well as suggested improvement through focus group interviews Research Mentors/Industry Mentors ▪ Document students' growth in QISE knoweldge, skills and job preparedness via surveys Course Instructors ▪ Document students' thought on the inclusiveness of courses and extent to

The evaluation timeline of performance measures is presented in the Table below:

Performance Measures Timeline	Yr1	Yr2	Yr3	Yr4	Yr5
Finalizing of logic model / competency tools to be embedded in project	X				
Structuring of Year-by-year evaluation plan in alignment with logic model (with monthly calendar of deliverables)	X	X	X	X	X
Document analysis (e.g. participation, degrees earned, internal course evaluations, student interests, industry needs, curriculum development)		X	X	X	X
Instrument development (e.g., trainees' baseline survey, trainees' annual/exit survey, research/industry mentors survey, partnership survey, trainees' and course instructors' focus group protocols)		X			
Partnership self-assessment	X		X		X
Trainees' surveys/assessments (baseline upon entering and annually until exiting)			X	X	X

Research/industry mentors' surveys (end of every trainee's internship/IDP)			X	X	X
Faculty surveys (when piloting a new course)			X	X	X
Focus group in-depth feedback on new course from trainees (after first implementation)			X		
Focus group in-depth feedback on new course from instructors (after second implementation to specialization improvements)				X	
Reporting/Communicating Evaluation Results (website, IAC meetings annually, etc.)	X	X	X	X	X

Feedback Mechanisms for Improving Practice: Four reporting and data sharing strategies will be included in the evaluation to facilitate QuGIP leaders' ability to assess progress in a timely manner, make any necessary mid-course adjustments, and report findings to outside stakeholders.

- Monthly Evaluation Update Calls - The evaluation team will lead monthly update calls in which program data will be shared across the partnership.
- Formative Evaluation Data Throughout – There are several surveys and focus group interviews planned across the 5 years. Data tables with evaluator's comments will be shared with the program at the conclusion of each data collection period (e.g., annually for partnership self-assessment survey, once a year with each new cohort for baseline trainee survey, etc.)
- Annual Summative Evaluation Report - As is customary, the evaluation team will prepare annual executive summary reports detailing all evaluation activities and findings, along with recommendations from stakeholders for improvement. At the end of the final project year, the external evaluation team will submit a summative evaluation report detailing the extent to which the project achieved its goals.

Program Academic Assessment Plan

As discussed in the Program Learning Goals above, we have identified a specific series of Learning Goals for MS students. The extent to which these goals are met by students in the program will be assessed in several ways.

Course assessments: Each course (c.f. course syllabi in the Appendix) has its own set of learning goals and a concrete plan for how these will be assessed through course components such as presentations, written exams and homework problems.

MS thesis and defense: rubrics (c.f. Appendix) will be used to assess the extent to which the MS thesis document and oral defense reflect Program Learning Goals.

The table here illustrates how program components provide targeted assessment of the program learning goals articulated above.

	MS
Program Component	Learning goals
QISE 7100	2
QISE 7101	1d
QISE 7102	1a-d,3
QISE 7111	5
QISE 7112	5
QISE 7113	4
XXXX-7999 research	4
Computational	2
Professional	3,5
Candidacy	n/a
Internship	n/a
Thesis	1-5

INSTITUTIONAL STAFFING, FACULTY AND STUDENT SUPPORT

Faculty

As listed in the Appendix, we have assembled a team of 30+ participating faculty during this initial phase of the program, drawn from the six participating Departments. These faculty were selected based on their track records of QISE-related research (including externally-funded programs), commitment to evidence-based teaching and curriculum development, and all have 'P' status for graduate advising. This broad participation is essential for matching applicant interests to faculty advisors' expertise and availability. Although no faculty will be hired as a result of this new graduate program, there are significant synergies with recent cluster hiring in quantum science in the participating departments, including new hires in Chemistry and Biochemistry (Prof. Joe Zadrozny), Math (Prof. Kaifeng Bu), and Physics (Prof. Kevin Singh), and anticipated searches in

Electrical and Computer Engineering, and Computer Science Engineering. Faculty wishing to join the program will submit an application detailing their QISE-related research experience or future interests, and their track record or plans for external funding and graduate advising. These applications will be reviewed by the QuGIP Graduate Studies Committee.

Administration and support

The OSU Center for Quantum Information Science and Engineering (CQISE) will be the administrative home for the new graduate program. The Program Director (Professor Jay Gupta, Physics) will be the lead program manager, responsible for fund raising, unit MOUs and stakeholder reporting. The principal administrative staff will be a Program Coordinator (position housed in CQISE), whose duties will include program financial and progress reporting, admissions, website maintenance, event planning and team communication. Admissions will be conducted by a Graduate Admissions Committee, comprising faculty from each of the six participating Departments. Student progress monitoring will be the responsibility of a Graduate Studies Committee, also comprising faculty from the participating Departments, as well as 1-2 student representatives. Oversight of the program will be provided by (i) an OSU Advisory Board, comprising unit leaders at the Department, College, Grad School and OAA levels and (ii) an Independent Advisory Board (Chair, Dr. Chris Porter, IBM Quantum) comprising external leadership in academia, industry and national labs.

Sufficient funding for the program through AY 28-29 is provided through an NSF training grant (budget: $3M / 5 years from 2023-2028 + planned 1 year no-cost extension). As described in the Appendix, NSF funding includes 1 yr fellowships for 25 trainees over the 5 year launch phase, the program coordinator position, curriculum development (faculty teaching buyout, OSU Drake Institute of Teaching and Learning) and program evaluation (Strategic Evaluations LLC.). In subsequent years, MS students will be self-funded; returned tuition from these students will be used to cover program costs. This is outlined more fully in the Appendix.

The Ohio State University
Board of Trustees

February 19, 2026

APPROVAL TO ESTABLISH AN INTERDISCIPLINARY DOCTOR OF PHILOSOPHY IN QUANTUM INFORMATION SCIENCE AND ENGINEERING

IN THE CENTER FOR QUANTUM INFORMATION SCIENCE AND ENGINEERING

Synopsis: Approval to establish an Interdisciplinary Doctor of Philosophy in Quantum Information Science and Engineering degree program in the Center for Quantum Information Science and Engineering is proposed.

WHEREAS the grand challenges in quantum information science and engineering (QISE) research, coupled with the national need for a quantum workforce, require an interdisciplinary approach; and

WHEREAS the program draws on faculty and research expertise across multiple departments in the College of Arts and Sciences and the College of Engineering, including Chemistry and Biochemistry, Computer Science and Engineering, Electrical and Computer Engineering, Mathematics, Materials Science and Engineering, and Physics; and

WHEREAS this graduate program would be one of the first truly interdisciplinary QISE programs in the country; and

WHEREAS there will be a compact common core of QISE courses through which students will develop a common vernacular and teaming skills, participate in research rotations across disciplines, engage in informal community building and industry engagement, and build skills in ethics, technical writing and communication; and

WHEREAS the Doctor of Philosophy program will include a minimum of 90 credit hours, including 10 for foundational graduate coursework, six for seminar professional development courses, and 40 for experiential learning; and

WHEREAS the proposal was reviewed and approved by the Council on Academic Affairs at its meeting on December 3, 2025; and

WHEREAS the University Senate approved this proposal on January 29, 2026:

NOW THEREFORE

BE IT RESOLVED, That the Board of Trustees hereby approves the proposal to establish an Interdisciplinary Doctor of Philosophy in Quantum Information Science and Engineering degree program in the Center for Quantum Information Science and Engineering.

THE OHIO STATE UNIVERSITY

Proposal for an Interdisciplinary Graduate Program in Quantum Information Science and Engineering

The Ohio State University, College of Arts and Sciences and College of Engineering

Mode of delivery: on campus

Participating Departments: Chemistry and Biochemistry, Computer Science Engineering, Electrical and Computer Engineering, Materials Science Engineering, Mathematics, Physics.

Executive Summary

We propose to develop and launch a Quantum Graduate Interdisciplinary Program (***QuGIP***), at Ohio State University (OSU), focused on quantum information science and engineering (QISE). The launch phase of this program (up to AY 2028-29) will be supported by an NSF NRT award, which will directly fund 25 trainees with first year fellowships, approximately 15-20 students in the PhD program, and 5-10 students in the companion Masters program. While an increasing number of QISE programs have emerged in recent years, these are often hosted in traditional units such as Physics Departments. However, the grand challenges in QISE research, and the national need for a quantum workforce, require a more interdisciplinary approach. Toward that end, QuGIP features a team of faculty leaders in Physics, Chemistry, Mathematics, and Engineering (Electrical and Computer, Computer Science, Materials Science), and will be administratively housed under the OSU Center for Quantum Information Science and Engineering (CQISE). QuGIP will feature a compact common core of QISE courses, enabled by graduate modules to accommodate variations in student preparation from these disciplines. QuGIP students will develop a common vernacular and teaming skills through the compact core sequence, 1st-year research rotations across disciplines, informal community building and industry engagement. Skill-building in ethics, technical writing and communication will be integrated in both classroom and research activities. QuGIP students will thus be uniquely prepared to make new insights and research connections that would not otherwise occur. The QuGIP curriculum is structured to prepare and facilitate transition of QuGIP students to externally-funded research assistantship positions with a primary faculty advisor after the first year. This leverages, and will help expand, the portfolio of QISE research at OSU.

QuGIP will make broader impacts as envisioned in the National Quantum Workforce Strategic plan, through interdisciplinary research to solve grand challenges in QISE, with broad dissemination in national networks and by training a quantum workforce. In addition to the directly-funded trainees, we estimate another 10-20 degree students will be funded from other sources such as assistantships and competitively awarded university fellowships. In their research at OSU, QuGIP students will work at the forefront in QISE and will be well prepared to translate their experiences to other problems, applications and fields after graduating. As a new model for graduate training, QuGIP will feature a flexible specialization structure that facilitates industry engagement and professional development. The QuGIP course curricula have been designed with evidence-based methods and implemented with expert guidance from the OSU Drake Institute of Teaching and Learning. QuGIP courses will be available as electives to graduate students in existing programs, and based on experience with pilot courses, we estimate another 100 students will take QuGIP courses during the launch period. The QuGIP model will be broadly disseminated by leveraging OSU membership in national networks, including QuSTEAM, the Chicago Quantum Exchange, and IGEN. Lastly, QuGIP will help fill a critical need for a *quantum workforce*, as nearly 60% of OSU graduates take positions in industry, and the top employers of OSU graduates: Google, Intel, and Amazon all have made substantial investments in QISE and in Central Ohio. QuGIP students will benefit from a network spanning these large industry partners down to small quantum startups, and will have the broad skillset to develop quantum technologies and solve societal needs.

Table of Contents

Projected impacts

Impact on OSU: Quantum information science and engineering is a rapidly developing field in STEM that has captured the attention of the general public, large and small technology companies, government and education. The proposed Quantum Graduate Interdisciplinary Program (QuGIP) will be an innovative 21st century graduate program featuring interdisciplinary courses designed with evidence-based methods and seamless integration with industry, nonprofit and national lab experiences. The proposed program will position OSU in the vanguard of institutions developing QISE degree programs and will be visible and attractive to a growing number of students and professionals seeking training in this area. We anticipate positive impacts on collaborative research in quantum at OSU, which will be evidenced by external funding and high impact publications.

Impacts to OSU students in other graduate programs: QuGIP courses will be available and appropriate for STEM graduate students to take as electives. The courses are designed to accommodate varying background preparation in e.g. linear algebra and quantum mechanics, and could help students from other disciplines build a foundation in quantum as well.

Impacts to OSU undergraduate students: OSU undergraduate students will benefit from an increased development of interdisciplinary research opportunities that QuGIP will help foster. There are also natural synergies between the proposed graduate program, and the QuSTEAM undergraduate minor program, which is currently under development. For example, quantum-related seminars, internships and professional development opportunities will be disseminated to both communities.

Impacts on participating units (c.f. Appendix for Concurrence letters): As cohort sizes will be small, QuGIP is expected to have small or negligible impact on graduate recruiting to the 6 participating Departments (Physics, Math, Chemistry and Biochemistry, ECE, MSE, CSE). Physics for example, currently attracts a handful of applicants interested in QISE. The establishment of QuGIP would give these students a second option at OSU, and will likely increase the chances of OSU to attract these students. The new program will moreover, develop new recruiting pipelines to increase the number of applicants to OSU. The program will also likely positively impact faculty research programs, through the development of new interdisciplinary projects in quantum science and increased competitiveness for the growing pool of external funding in quantum at DOE, NSF and other federal agencies. In addition, we anticipate that the increased interactions among faculty and students in the participating departments will also seed collaborative efforts not directly related in quantum science, and thus could have additional impacts on research and education.

Impacts to other units: Though the field is still at an early stage, it is likely there will be corollary benefits of QISE research to other programs at OSU. For example, quantum sensing has a broad range of potential applications from medical imaging to geodesy. Quantum cryptography has a similarly broad range of applications in finance and national security. We thus expect that the program will help grow a dense network of collaborative work between participating faculty and those in other units. No negative impacts are anticipated.

Review process

This QuGIP Curriculum proposal has been reviewed and approved by the following academic units:

OSU Departments (c.f. appendix for concurrence letters):

- Department of Chemistry and Biochemistry
- Department of Computer Science and Engineering
- Department of Electrical and Computer Engineering
- Department of Materials Science Engineering
- Department of Mathematics
- Department of Physics

College of Arts and Sciences Curriculum Committee

College of Engineering Curriculum Committee

Stakeholder input

This curriculum proposal was informed by numerous discussions with faculty and students in the participating Departments, the broader OSU STEM community, and in collaboration with other universities through NSF-sponsored events. Included in the appendix are some examples including:

- NSF National Research Traineeship Annual Meeting (Oct 29-31, 2023, hosted by Arizona State University): The NSF NRT program makes training grant awards in a broad range of fields, including quantum-related NRTs at University of Washington, UCSB, Univ. Arkansas, Univ. Tennessee, Colorado School of Mines and Yale. QuGIP Director Gupta attended this meeting, and is coordinating a satellite meeting in 2024 with the other quantum NRTs to share best practices in quantum education and training.
- OSU Center for QISE Quantum Collaborators Kickoff Meeting (Sep 22, 2023). This meeting provided an opportunity for networking and to learn about the quantum activity occurring across the University and regionally. QuGIP presented a poster at this meeting, and QuGIP personnel were available for questions and discussions from attendees.
- Open solicitations to faculty in the participating departments: Shortly after the NSF NRT award was made public, we sent out emails to faculty lists announcing the award and soliciting input. The co-PIs on the NSF proposal are serving as points of contact for these interactions.
- Weekly QuGIP happy hours – these informal get togethers of the QuGIP leadership team have helped build a sense of community among stakeholders, and inspired creative brainstorming for program components.
- Outreach to expanded base of participating faculty: To build a broad base of support for the program (and advisors for QuGIP students), emails were sent out to participating faculty and soliciting input and suggestions.
- Informal discussions with students: QuGIP faculty have had numerous informal discussions with students at OSU and externally about the program. In particular, suggestions for program components and feedback were solicited in these interactions.
- Sustained discussions with OSU leadership: the proposal has been informed by discussions with the OSU Graduate School (Dean Stromberger and Associate Dean Miriti), Office of Academic Affairs (Vice Provost Smith), ASC (Dean Horn, Assistant Dean Vankeerbergen), and CoE (Associate Deans Tomasko and Stiner-Jones).

SUMMARY OF SUPPORTING RESOURCES

The administrative and research infrastructure are in place to support the proposed program. Here we provide a bulleted list, with links to the relevant sections below.

Administrative infrastructure: The OSU Center for Quantum Information Science and Engineering (CQISE) will be the administrative home for the new graduate program, administering admissions, student tracking and finances. Discussed further here.

Financial support: QuGIP will make every effort to ensure students are supported financially throughout their degree. Discussed in more detail in the Graduate Handbook (Section 6), NSF funding will provide first year fellowships to all MS and PhD students admitted into the program through AY28-29 (budget: $3M / 5 years from 2023-2028 + planned 1 year no-cost extension). As described in the Appendix, NSF funding includes 1 yr fellowships for 25 trainees, the program coordinator position, curriculum development (faculty teaching buyout, OSU Drake Institute of Teaching and Learning) and program evaluation (Strategic Evaluations LLC.). As the program becomes well established, we expect to admit ~ 8 PhD and 20 MS students per year as a sustained target. More detailed budget information can be found in the Appendix.

PhD students in subsequent years will be supported through a combination of Fellowships, Graduate Teaching Associateship (GTA) and Graduate Research Assistant (GRA) appointments. As the mix of available positions varies widely among the participating departments, prospective faculty advisors are required to develop a funding plan for the years following the first fellowship year, in consultation with their Department leadership. ***This funding plan must be approved by the QuGIP Graduate Studies Committee (QGSC) before the prospective advisor can review applications.*** Once the funding plan is approved, the prospective faculty advisor will be able to review the pool of applicants and select a prioritized list of top candidates for admission. This list will be reviewed by the QGSC to ensure the students meet admissions criteria.

We discuss two examples which span the arrangements that are anticipated:

1) A QuGIP faculty member in the *Department of Mathematics* is interested in recruiting a student for the coming academic year. In Mathematics, there is relatively little federal research funding, and instead GTA positions are commonly used to support PhD students throughout their degree. The faculty member has consulted with their Department leadership, and has secured a GTA position for their QuGIP student following their Fellowship year.
2) A QuGIP faculty member in the *Department of Materials Science and Engineering* is interested in recruiting a student for the coming academic year. There are relatively few GTA positions available in MSE but faculty run externally-funded research programs with substantial support for GRA positions. The student will be supported on the faculty advisor's

grant through their PhD. The faculty member will discuss their current and projected funding record with the QGSC, and will work out an agreement with their Department leadership for bridge funding if needed.

Research infrastructure support: Students in the new program will benefit from and contribute to the strong culture of collaborative and interdisciplinary research at OSU that is nurtured by OSU Centers, including CQISE, the Ohio State University Institute for Materials and Manufacturing Research, and the OSU Center for Emergent Materials (CEM). The research by QuGIP students will benefit from the extensive network of equipment and computational facilities at OSU. Examples include the Ohio Supercomputing Center (OSC), NanoSystems Laboratory (NSL), Semiconductor Epitaxy and Analysis Laboratory (SEAL), Center for Electron Microscopy and Analysis (CEMAS), Nanotech West Laboratory (NTW), the NSF NeXUS facility, the Campus Chemical Instrumentation Center (CCIC). These Centers and Facilities are discussed in more detail here.

PROGRAM NARRATIVE - BASIC CHARACTERISTICS

Purpose

The National Quantum Initiative Act was signed into law in 2018 "to accelerate quantum research and development for the economic and national security of the United States." Representing a community consensus developed through subsequent workshops and planning roundtables, the 2022 U.S. National Strategic Overview for Quantum Information Science and Engineering (QISE) calls for (*i*) QISE to be recognized as its own discipline, calling for new faculty, programs and initiatives, (*ii*) a *science-first approach* fostering collaboration across disciplines to solve Grand Challenges in QISE, and (*iii*) *deepened engagement* with industry for workforce development.

To meet this national need, we propose to launch one of the ***first*** interdisciplinary QISE PhD programs in the U.S. at The Ohio State University. This program leverages and will reinforce federal, university and regional investments in QISE. These include an NSF-funded training award to OSU, the OSU Center for QISE, cross-cutting faculty hires in quantum science, and partnership programs such as StarLab and the OSU/Air Force Institute of Technology Intercity Quantum Network. As QISE spans algorithms, fundamental physics, and hardware implementations from atoms to architectures, a new approach to graduate education is needed so that students in physics, chemistry, mathematics and engineering (electrical, computer, and materials) can combine efforts to solve complex Grand Challenges in the field. Our program will build a common vernacular to overcome structural barriers to interdisciplinary graduate education, is developed with evidence-based methods from the start and will accelerate the transition to experiential learning through research and industry internships. In addition to technical content learning outcomes, the program places equal priority on our students developing communication skills and a moral compass for 'quantum ethics', so they can become leaders in industry, government and academia.

Program focus

The proposed graduate program will provide students with foundational coursework and accelerate their transition to experiential learning through quantum science research and industry graduate internships. Not only will these students have the interdisciplinary and professional skills needed for the quantum workforce, but they will also help OSU faculty who are interested in pivoting some of their research activity into this field. The proposed curriculum will feature a compact core of four graduate-level QISE courses with content specifically designed to accommodate students with Bachelor's degrees in Chemistry, Physics, Math, Computer Science and Engineering, Materials Science Engineering or Electrical and Computer Engineering. Students will be recruited into one of four program specializations that integrate advanced elective courses, research rotations and experiential learning opportunities. The Quantum Computing specialization is focused on the development, implementation and scaling of

quantum algorithms for solving complex problems and error correction. The Quantum Networking and Communication specialization is focused on the transportation and multiplexing of quantum information using elements such as photonics and microwave cavities. The Quantum Simulation specialization is focused on quantum-enabled methods to better understand physical systems whose complexity exceeds even the best classical high performance computing algorithms. Lastly, the Quantum Materials and Sensing specialization is focused on the physical materials (solid state and molecular) used for quantum bits, sensors and storage. These specializations will be included on student diplomas to highlight the specific content and experiential knowledge students gain in the program.

Rationale

Graduate degrees in Quantum Information Science and Engineering demonstrate proficiency in an interdisciplinary curriculum that requires strong communication skills and an active growth mindset for continued learning as the field evolves. PhD students will have demonstrated the sustained ability to generate new knowledge and identify future directions in quantum science and engineering. The degree and specialization certifications will be attractive for employers in industry, government and academia.

Duration of Program

Example curricula for PhD students are discussed in more detail here.

Course requirements: A minimum of 90 credit hours will be required for PhD degree recipients. These requirements are consistent with the OSU Graduate School, and national expectations for graduate education in related STEM fields. Of these credit hours, at least 9 credit hours will be for foundational graduate coursework, at least 6 credits will be for seminar-style professional development courses (ethics, writing, journal club), and at least 50 credit hours will be for experiential learning (research, internships).

Time to degree: With its focus on original research, PhD degrees typically take 15-18 semester terms (5-6 academic years). The time to degree will be similar for the four program Specializations. PhD students will enter the program in a cohort taking the graduate core courses and seminars, but will progress through the program at rates determined by their career goals and research program. PhD students will be required to pass a candidacy exam with written and oral components before they can focus on dissertation-related research (~ 12-15 terms), and will also have an internship experience (1-2 terms). Students will be enrolled in the program full-time, and will be supported with fellowships in their first year, and with Research or Teaching Assistantships in following years, depending on the Departmental affiliation of their primary faculty advisor. These degree times and support models are typical for STEM programs at OSU and nationally.

Admission timing

The program will recruit one cohort of students per year, to start classes in Autumn semester. The admissions application will be launched the preceding Autumn semester, and review of the applications will be conducted by a Graduate Admissions Committee on a rolling basis after the application submission deadline (Dec 15th). PhD applications will be considered for a number of slots that will be based on program priorities as determined by the QuGIP Director and *Graduate Studies Committee*.

Primary target audience

PhD work necessarily requires a substantial and focused full-time commitment, but the PhD program will be open to traditional and non-traditional students who are willing and able to make this commitment. While PhD research in QISE (both experimental and theoretical) requires on campus engagement to work in labs and collaborations, the program will support dynamic work options based on student needs.

Admissions will be conducted through the OSU Office of Graduate Education, and students will meet Graduate School requirements, including a 3.0 GPA and an official transcript showing proof-of-degree completion. As there are few Bachelors degree programs in QISE, students recruited into the program will typically have Bachelors degrees and minors in the related disciplines: Physics, Chemistry, Mathematics, Engineering (Electrical and Computer, Materials Science, Computer Science). The admissions process will include a rubric-based review of written applications which will include a personal statement describing student motivations for applying to the program, challenges overcome and future goals and at least three letters of recommendation. All international applications whose native language is not English will be required to take the TOEFL test and provide an official score report. In addition to the written materials, admissions will be based on Zoom interviews conducted by the Graduate Admissions Committee. These interviews will help assess student non-cognitive factors, research interests and identify potential faculty advisors.

During the NSF-funded launch phase of the program (up to AY28/29), applicants must be eligible for NRT Fellowship funding, which stipulates that trainees are US Citizens, nationals or permanent residents. International students may come in self-funded, or with their own fellowship funding.

Recruiting plan: Our recruiting goal is to consistently attract a pool of applicants from a wide range of backgrounds to the QISE program by leveraging our substantial existing networks. For example, the Physics and Chemistry Departments draw on the NSF IGEN network, which provides a nationwide, free, common application. In 2025, the IGEN pool featured 186 applications, with at least 30 students expressing interest in QISE or related areas. OSU is also a founding member of the Open Quantum Initiative summer research program hosted by the Chicago Quantum

Exchange network. In 2025, there were 350+ applications from students all over the country, coming from large R1 research institutions, as well as smaller colleges, with majors including Physics, Engineering and double majors with various combinations (Physics/Math, Computer Science/Physics etc.). OSU has hosted 12 summer students since the program launched in 2021.

Retention through graduation: The participating Departments in QuGIP have demonstrated a commitment to degree attainment, with an average of over 70% of students achieving their PhD degrees, while maintaining a time-to-degree consistent with disciplinary national averages. To achieve our target of at least 80% degree attainment, QuGIP will leverage and uniformly apply mentoring best practices that have grown from OSU engagement with networks such as the National Math Alliance and the APS IDEA. For example, peer, near peer and faculty mentoring networks will be established for each student when they first arrive on campus, ensuring they have a broad support system that has been proven critical for degree attainment. Students will also assemble a dissertation committee that will conduct annual reviews with the student to ensure steady progress to degree and help navigate difficult discussions with the primary faculty advisor that may arise.

PROGRAM NARRATIVE - INSTITUTIONAL PLANNING

Physical Infrastructure

Organizational infrastructure: The OSU Center for Quantum Information Science and Engineering (CQISE) will serve as the administrative home of the new graduate program. Sufficient office space for the program students will be provided by the participating departments. Student research needs (e.g. primary laboratory space, computing clusters etc.), will be provided as per their dissertation advisor. Participating faculty (c.f. Appendix A) have the extensive infrastructure already in place for cutting-edge research in quantum information science and engineering.
Students in the new program will benefit from and contribute to the strong culture of collaborative and interdisciplinary research at OSU among the participating departments. For example, CQISE sponsors a variety of community-building programs, including seminars, project seed funding, and networking events with regional industries. In addition to CQISE, the Ohio State University Institute for Materials and Manufacturing Research is a campus-wide, multidisciplinary institute that facilitates, promotes and coordinates research activities and infrastructure related to the science and engineering of materials throughout The Ohio State University. IMR's community-building activities include a Distinguished Lecture series, and the annual Materials Week conference, which draws several hundred attendees from both academia and industry. Students will also benefit from externally-funded centers, such as the OSU Center for Emergent Materials (CEM), one of the flagship materials centers sponsored by the NSF which has 20+ participating faculty at OSU in Physics, Chemistry and Biochemistry, Materials Science and Mechanical Engineering. CEM hosts a variety of seminar speakers, technical workshops, outreach events and professional development opportunities.

New opportunities in quantum infrastructure: QuGIP students will have the opportunity to contribute to regional investments in quantum infrastructure. For example, a team at OSU is leading the development of an intercity quantum network with the Air Force Institute of Technology (AFIT) in Dayton. This project has just received a congressionally-directed three year, $1M award. Quantum communication may also play a role in the new StarLab venture, led by a team comprising OSU, The Universities Space Research Association, Zin Technologies, and the International Association of Science Parks and Areas of Innovation. This effort has been chosen by Voyager Space to build terrestrial analogue laboratories to help guide the development of a commercial space station.

OSU research user facilities: The dissertation research by QuGIP students will benefit from the extensive network of equipment and computational facilities at OSU. Examples include the Ohio Supercomputing Center (OSC), NanoSystems Laboratory (NSL), Semiconductor Epitaxy and Analysis Laboratory (SEAL), Center for Electron Microscopy and Analysis (CEMAS), Nanotech West Laboratory (NTW), the NSF NeXUS facility, the Campus Chemical Instrumentation Center (CCIC). These user facilities employ technicians and engineers to support training and project execution as needed by the research community. Some examples of relevant capabilities for student researchers in the quantum graduate program include:

- The Ohio Supercomputer Center empowers researchers via high performance computing, advanced networking, and training resources; partners with leading scientific

investigators in developing joint proposals to regional, national, and international organizations; and leads research activities of strategic interest to OSC, the state, and the country.

- NSL has a 1,500 sq. ft. class 1000 cleanroom and operates the following instruments: 1) an optical lithography maskless aligner, 2) a Kurt Lesker sputtering/ion-milling/e-beam evaporation system, 3) an ICP-RIE, 4) an FEI Helios dual-beam FIB/SEM with e-beam lithography, 5) a Bruker triple-axis x-ray diffraction system, 6) two AFM/MFM systems, 7) two Quantum Design 7-T SQUID magnetometers, 8) a Quantum Design 14-T PPMS, 9) a Magneto-Optical Kerr Effect Microscope, 10) a diamond CVD System, 11) a low-temperature flow cryostat magneto-transport system, 12) a Montana Instrument cryogen-free magneto-optical system, 13) a Bruker Electron Paramagnetic Resonance (EPR) spectrometer, 14) a suite of microwave instruments including network analyzers, signal generators, and amplifier.
- SEAL is OSU's primary facility for MBE and is located within the 4,000 sq. ft. Dreese Lab Cleanroom. SEAL houses 6 state-of-the art MBE chambers each dedicated to different, complementary material systems, including group IV and III-V (III-As, III-P, III-N, and III-Sb) semiconductor epitaxial heterostructures, and TMD 2D materials for both basic studies and true device development.
- CEMAS operates two FEI Titan Scanning Transmission Electron Microscopes (S/TEM), one FEI Tecnai S/TEM, one FEI Tecnai G2 TEM, two Apreo Scanning Electron Microscopes (SEM), one FEI SEM, Two FEI dual-beam FIB/SEMs, and two Rigaku XRD systems.
- NTW is the largest nanotechnology user facility in Ohio and supports more than 100 research and development projects per year for commercial, government, and academic clients including many external users. NTW consists of a 6,000 sq. ft. class 100 cleanroom and possesses the following capabilities for 4" wafers: MOCVD, ALD, LPCVD, PECVD, e-beam evaporation and sputter deposition, ICP-RIE, ashing, and wet chemical etching.
- NSF NeXUS is a first-of-its-kind facility for ultrafast science, funded and maintained at OSU in partnership with the National Science Foundation. A kW-class laser drives the generation of extreme ultraviolet (XUV) and soft x-ray pulses with durations from femtoseconds to attoseconds. NeXUS has a "beamline" arrangement so that three distinct XUV beams, each with its own time and spectral characteristics, can be generated from a single laser. The laser and XUV pulses are then coupled into an "end station" that directly support user measurements. The NeXUS System is being built with multiple end stations to support user measurements of angle-resolve photoelectron spectroscopy (ARPES), element-specific scanning tunneling microscopy (STM), x-ray absorption spectroscopy (XAS), x-ray reflection spectroscopy (XRS), attosecond science, and laser induced electron diffraction (LIED). All of these measurements can be time resolved using combinations of the laser and XUV pulses.
- The CCIC hosted by the Department of Chemistry and Biochemistry hosts a wide range of analytical equipment for magnetic resonance, surface analysis, x-ray crystallography, mass spectrometry and ultrafast dynamics measurements.

Market Demand

Though this will be the one of the first stand-alone PhD programs in QISE in the U.S., there is ample evidence that others will soon follow, and will be in demand to meet societal need and student interests. At the societal level, the National Quantum Initiative Act signed into law in

2018 represents an 'all of government' approach to develop quantum technologies for future economic growth and national security. Substantial federal investments in QISE have been made through the NSF, DOE and DOD, and include awards for fundamental research, technology transfer and workforce development. These investments are matched by industry research and development, including by leading information technology companies such as Intel, Google, IBM, Microsoft, Amazon, and Meta. A variety of other large companies such as JP Morgan Chase, Corning, Applied Materials, and Boeing and startups are interested in recruiting talent in this area as well. To grow this 'quantum ecosystem', regional hubs have been established in recent years, led for example by the Chicago Quantum Exchange, which facilitates exchange among academic (including OSU), national lab and industry partners. Recent job postings attest to the rapidly growing opportunities in this field.

The growing employment opportunities (c.f. Appendix) and rapid progress publicized in the media (such as IBM's 1000 qubit report (12/4/2023) and Google's quantum supremacy report (10/23/2019) are catalyzing growing student interest in QISE. This is directly evidenced by one of the recruiting pools OSU faculty has helped establish: the Open Quantum Initiative (OQI). Launched in 2021, the OQI is an innovative, multi-institution summer research program for undergraduate students interested in QISE. For example, there were 350+ applicants to OQI summer research program in 2025 from all over the country, with 30% annual growth in the number of applications since the program started in 2022. These students applied from a variety of institutions, ranging from large R1 universities (Berkeley, Illinois) to primarily undergraduate institutions (Rhodes College, Kenyon College), and had a range of majors, including Physics, Mathematics, Computer Science, Electrical Engineering, with many double-majoring in various combinations. In addition to the ~ 20 OQI Fellows per year selected to participate in the program, we can draw on the full applicant pool for recruiting students to the proposed graduate program at OSU.

Ohio State's mission for undergraduate and graduate education plays a crucial role in connecting societal needs and student interests. OSU is leading the development of a quantum minor program at the undergraduate level through the NSF-funded QuSTEAM network (https://qusteam.org/). QuSTEAM is a non-profit, membership-based organization serving a network of academic institutions and industry employers. The purpose is to facilitate the national scale-up of equitable and effective undergraduate quantum education by building and supporting a collaborative network of academic institutions (currently 30+), private sector employers, and a community of instructors. Ohio State has also invested heavily in QISE, including the establishment of CQISE in 2022 and faculty cluster hiring in Physics, Math, Chemistry and Biochemistry and Computer Science Engineering. The establishment of a graduate QISE degree program will help integrate and expand these efforts. Not only will the program spur the development of new QISE courses that will be available for STEM graduate students, but the

dissertation research of MS and PHD students in the program will lead to a growing portfolio of new experiential learning opportunities including industry internships.

PROGRAM NARRATIVE - STATEWIDE ALTERNATIVES

Faculty leaders have been polled at other universities in Ohio, including University of Cincinnati, Case Western Reserve and Ohio University. None of these universities currently have QISE degree programs, although all have developed QISE-related courses.

QuGIP will be one of the first dedicated and interdisciplinary PhD programs in the U.S., but there are a number of related programs that have launched in the last few years which provide models for the proposed program (c.f. Table). The closest program is the University of Chicago's degree program in Molecular Engineering, which has a QISE-related degree Specialization. Like our proposed program, the Chicago program is highly interdisciplinary. Other programs are usually housed in traditional departments like Physics, and/or only offer the Masters degree or Graduate Minors/Certificates. Thus, the establishment of a stand-alone PhD QISE program at a land-grant institution such as Ohio State will provide a national model for graduate education in this field.

Institution	Degree name	Host Unit (if applicable)	Comments
Univ. Chicago	PhD in Quantum Science and Engineering	Pritzker School of Molecular Engineering	stand-alone, interdisciplinary, launched 2021
Harvard	PhD in QSE	n/a	stand-alone, interdisciplinary, first cohort in AY22-23
USC	MS in QIS	ECE	takes in BS from Chem, CS, ECE, Math, Physics
Univ. Washington	Grad Certificate in QISE	n/a	participating faculty in Phys, Chem, ECE, CSE, MSE
Univ. Wisconsin - Madison	MS Physics - Quantum Computing Specialization	Physics	separate admissions from Physics PhD program, can finish program in 1 calendar year
Univ. Arizona	MS in QISE	Optical Sciences	Specialization within program
George Mason	MS in Physics w/ QISE concentration	Physics	
UCLA	MS of Quantum Science and Technology	Physics & Astronomy	
CO School of Mines	MS in Quantum Engineering	n/a	has hard/soft specializations, also Thesis, nonthesis, certificate versions
Univ. Rhode Island	MS in Quantum Computing	Physics	

Duke	Master of Science, Master of Engineering	ECE	Quantum Software/Hardware specializations as part of the two MS programs

1. **Address appropriateness of specific locale for the new program.**

OSU is centrally located in Ohio, both geographically and scientifically and is a top 10 producer of STEM graduate degrees. OSU also benefits from and contributes to nearby technology hubs, including the new Intel semiconductor fabrication plants in Columbus, and the quantum technology hub being developed with the Chicago Quantum Exchange. Ohio State faculty have a broad portfolio of externally-funded QISE research that will form the basis for dissertation work by students in the new program. These students will also benefit from OSU engagement in emerging institutional networks in QISE, including the Chicago Quantum Exchange, and QuSTEAM, which OSU leads. Lastly, OSU has made substantial investments in this field, including the Center for QISE (launched in 2022), and cluster faculty hiring in QISE (Physics, Chemistry and Biochemistry, Computer Science Engineering, Electrical and Computer Engineering, Mathematics).

2. Address opportunities for inter-institutional collaboration.

There are numerous opportunities for collaboration, both in terms of curricular development, and in terms of QISE-related research. At the curricular level, QuGIP faculty will be encouraged to share best practices with other institutions seeking to launch similar programs. There is already a culture of this in the participating departments, evidenced by the QuSTEAM network for example, which develops undergraduate minor curricula and is disseminating these to network partners, including 10+ universities. The breadth of opportunity and the collaborative environment at OSU will ensure that the OSU program maintains unique aspects that will help us compete for students as the number of programs in this field grows.

QuGIP participating faculty have a broad network of research collaborations in QISE-related research, including institutions in Ohio, in the U.S. and internationally. This will provide QuGIP students with a broad variety of research options, and help prepare them to be leaders in the field by being able to collaborate across traditional disciplines.

PROGRAM NARRATIVE - GROWTH OF THE PROGRAM

We currently have NSF training grant funding to launch the program and fund 25 x 1 year fellowships, including full stipend and tuition. These funds are sufficient to launch initial cohorts. The training grant includes funds for staff support, curriculum development and program evaluation. We have funded a number of current OSU graduate students to help pilot program components (e.g. courses, professional development, internships), providing feedback that has informed this program proposal. Our target for sustaining the program after the launch period will be to matriculate 20 *self-funded* Masters students and 6 PhD students into the program per year. Masters students will be either self- or employer-funded, or will have won a University Fellowship. Returned tuition from Masters students, industry sponsorships and leveraging for external funding will help defray program costs.

	AY24-25	AY25-26	AY26-27	AY27-28	AY 28-29	Sustained (≥AY29-30)
Masters						
# NSF funded students	0	0	2	2	0	0
# self-, OSU- or employer-funded students	0	0	6	10	16	20
PhD						
# NSF funded students	1	5	5	5	5	0
# OSU funded students	0	0	0	0	0	6

CURRICULUM AND INSTRUCTIONAL DESIGN

Program Learning Goals

Learning Goals for Ph.D.

At the end of the program, the student will be able to:

1. Demonstrate fundamental knowledge in quantum information science and engineering (QISE)

Learning objectives to be assessed:

   a. Describe quantum systems using linear algebra, and conversely, describe the physical meaning of a linear algebraic expression.
   b. Compare and contrast classical vs. Quantum algorithms and their suitability for real-world problems
   c. Describe pros and cons of leading physical systems for implementing qubits (e.g., coherence and decoherence).
   d. Describe pros and cons of different approaches for multi-qubit entanglement.
   e. Explain and implement different approaches to error correction.

2. Demonstrate the ability to use analytical and computational methods to solve QISE problems (e.g., Python, Qiskit, LMS (e.g., qBraid), IBM Composer).

Learning objectives to be assessed:

   a. Design and implement quantum circuits on a quantum computer.
   b. Demonstrate computational methods focused in a particular subdiscipline of QISE

3. Work with an industry connection to connect coursework and research with a real-world application at a company.

Learning objectives to be assessed:

   a. Be able to explain process for identifying markets
   b. Consider development of quantum technologies with an ethical mindset

4. Conduct independent and interdisciplinary research in QISE.

Learning objectives to be assessed:

   a. Explain their new contribution to knowledge in their respective area
   b. Disseminate their contributions through peer-reviewed publications and scientific presentations
   c. Develop a plan for future studies

5. Demonstrate professional skills for learning and research

Learning objectives to be assessed:

   a. Interdisciplinary communication: Be able to discuss course concepts and present research with a broad STEM community, orally, in writing and in presentations
   b. Team work: be able to work in interdisciplinary teams to learn course content and contribute to interdisciplinary research projects
   c. Ethics: conduct research according to ethics standards in the field.
   d. Demonstrate growth mindset to learn new content in rapidly developing field.

New graduate courses in QISE (c.f. Appendix for course syllabi). These courses will be cross-listed in the participating departments and will be run as one of these listings depending on the primary instructor. For example, QISE 7100 will run as PHY 7100 when a physics faculty member teaches it, but as MATH 7100 when a math faculty teaches it. This ensures that faculty can count this course against their assigned teaching load.

QISE 7100 - Foundations in QISE (3 cr) will focus on the foundational mathematics and physics needed to describe quantum information and related phenomena.

QISE 7101 – Quantum Circuits and Algorithms (3 cr) is designed to provide students with a broad introduction to quantum computing. Using tools such as IBM Quantum Composer, students will visualize quantum computing concepts, and compare them with classical computing models.

QISE 7102 – Grand Challenges in QISE (3 cr) will focus on grand challenges toward realizing quantum computers, including scalable multi-qubit entanglement, long-distance networking, error correction and algorithms, with a particular focus on physical platforms and their pros/cons.

QISE 7111 – Graduate seminar: Journal Club (1 cr): This student-led seminar-style course will meet once weekly during the term, and will feature regular presentations by students on a journal article of current interest. Students will gain experience in presenting technical content to a multi-disciplinary audience.

QISE 7112 – Graduate seminar: Professional Development (1 cr): This seminar-style course will feature a variety of discussions including aspects of professional skills (e.g., writing and presentation skills, literature research) and ethical questions posed by QISE (e.g. quantum cryptography).

QISE 7113 – 1st year research rotation (1.5 credits): This course will introduce students to research techniques through a 7 week experience with one of the QuGIP faculty advisors. This course may be repeated in 1.5 credit increments for multiple rotations, or taken for 3 or 4.5 credits for a more sustained effort during one rotation.

Degree Requirements - PhD in QISE

Course requirements: A minimum of 90 credit hours will be required for PhD degree recipients. These requirements are consistent with the OSU Graduate School, and national expectations for graduate education in related STEM fields. Of these credit hours, 10 credit hours will be for foundational graduate coursework, at least 6 credits will be for seminar-style professional development courses (ethics, writing, journal club), and at least 6 credits will be for elective courses within a menu for the designated specialization. At least 40 credit hours will be for experiential learning (research, internships). All of the courses will be delivered in person. All PhD students are required to take GRADSCH 8000 to develop a solid foundation for responsible conduct in research.

Time to degree: With its greater focus on original research, PhD degrees will typically take 15-18 semester terms (5-6 academic years). Though there are some variations in the number of required elective courses by program Specialization, these will not impact the overall time to degree for the students. PhD students will be required to pass a candidacy exam with written and oral components. To take this exam, students must have completed the three required core courses plus the computational course with at least a 3.0 GPA and have an 'S' grade in at least 6 credits of QISE 8998. Depending on their preparation, students will typically take the candidacy exam during their 2nd year in the program. This will qualify them for a non-thesis based Masters degree. After candidacy, they can focus on dissertation-related research (~12-15 terms). In accordance with Ohio Department of Higher Education (ODHE) policy, this will total 16-30 credit hours. Students will be enrolled in the program full-time, and will be supported with fellowships in their first year, and with Research or Teaching Assistantships in following years, depending on the Departmental affiliation of their primary faculty advisor. These degree times and support models are typical for STEM programs at OSU and nationally.

Required core courses for degree: PhD		
course # (red = new course)	**Course Title**	**Credits**
QISE 7100 (and cross-lists)	Foundations in QISE	3
QISE 7101 (and cross lists)	Quantum Circuits and Algorithms	3
QISE 7102 (and cross lists)	Grand Challenges in QISE	3
PHY 6810, CHEM 6540, MATSCEN 6756.72, CSE 6321, ECE 5510, MATH 6601	Computational/Numerical Methods	1
QISE 7111	Journal club	5
QISE 7112	Professional development seminar	2

QISE 7113	1st year Research Rotations	12
GRADSCH 8000	Responsible conduct in research	1
XXXX-8998	Research (pre-candidacy)	20+
XXXX-8999	Research (post-candidacy)	30+

Specializations: While the core course requirements are the same for all students in the program, choice of specialization will guide the choices of the required computational methods course, elective courses and the faculty advisors for research rotations. Students will choose from one of four transcriptable specializations:

1) The *Quantum Computing* specialization is focused on the development, implementation and scaling of quantum algorithms and associated hardware for solving complex problems and error correction.

Specialization	**Example electives (# cr)**
Quantum Computing	CSE 6429 Advanced Computer Architecture (1-3); ECE 7005 Information Theory (3); MATH 6251 Theory of Probability (4), MATH 5801 General topology and knot theory (3), ECE 6531 Semiconductor Devices (3), ECE 7022 Advanced RF integrated circuits (3), MATSCEN 6295 Superconducting Materials and Properties (2), PHY 5680 Big Data Analysis in Physics (3),

2) The *Quantum Networking and Communication* specialization is focused on the transportation and multiplexing of quantum information using elements such as photonics and microwave cavities.

Specialization	**Example electives (# cr)**
Quantum Networking and Communication	ECE 6511 Nonlinear Optics (3), CSE 6469 Advanced Studies in Computer networking (1-3); CSE 6422 Advanced Computer Architecture (3), Physics 8820 Special topics: Atomic, molecular and optical physics (3), MATSCEN 6777 Electronic properties of materials (2), ECE 6010 EM Field Theory (3), ECE 6101 Computer Communication Networks (3)

3) The *Quantum Simulation* specialization is focused on quantum-enabled methods to better understand physical systems whose complexity exceeds even the best classical high performance computing algorithms.

Specialization	**Example electives (# cr)**

Quantum Simulation	MATH 6801 Algebraic Topology (3); MATH 6151 Commutative Algebra (3); PHY 8820 Special Topics: Quantum information theory (3), ECE 5200 Digital Signal Processing (3), ECE 5307 Machine Learning (4), MATSCEN 6756 Computational Materials Modeling (2), CSE 6521 Artificial Intelligence (3),

4) The *Quantum Materials and Sensing* specialization is focused on the physical materials (solid state and molecular) used for quantum bits, sensors and storage.

Specialization	**Example electives (# cr)**
Quantum Materials and Sensing	MATSCEN 7835 Point Defects in Crystalline Materials (2); PHY 8806 Topics in Condensed Matter Physics (3); CHEM 6510 Quantum Mechanics and Spectroscopy (1.5) , CHEM 6540 Electronic Structure (1.5), CHEM 7370 Nanochemistry and Nanomaterials (1.5), ECE 5033 Surfaces and Interfaces of Electronic Materials (3),

PhD students are required to take two elective courses from these lists for their chosen specialization. These tables are not an exhaustive list of courses, and requests for additional courses supported by the students' advisor will be reviewed by the QGSC each semester.

Example progress for PhD program:

	# cr		# cr		# cr		# cr		# cr		# cr
Y1-Au		Y1-Sp		Y1-Su		Y2-Au		Y2-Sp		Y2-Su	
QISE 7100	3	QISE 7101	3	QISE 7111	1	Elective	3	Elective	3	QISE 7111	1
Comp. Methods	3	QISE 7102	3								
QISE 7111	1	QISE 7111	1	QISE 8998	14	QISE 8998	12	QISE 8999		QISE 8999	2
QISE 7112	1	QISE 7112	1								
QISE 7113	6	QISE 7113	6			*Candidacy exam*					
GRADSCH 8000	1										
Total cr	15		14		15		15		3		3
Cumulative	15		29		44		59		62		65

Y3 (Au+Sp+Su)		Y4 (Au+Sp+Su)		Y5 (Au+Sp+Su)	
QISE 7111	1			QISE 7111	1
Research and Electives	8	Research and Electives	9	Research and Electives	8
		Internship			
Credits	9		9		9
Cumulative	74		83		**92**

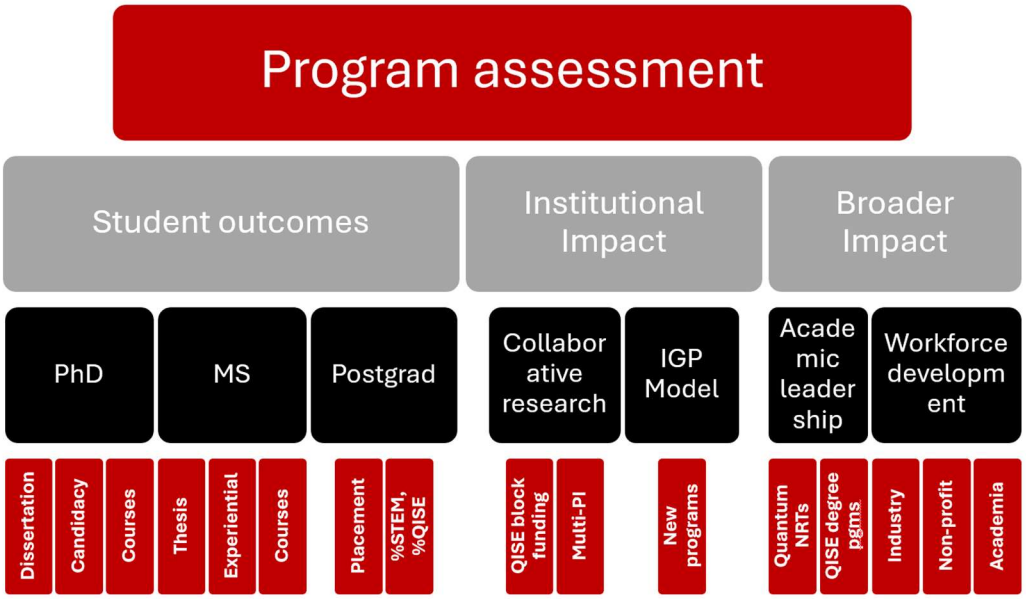
Culminating experience

PhD in QISE: In addition to the course requirements discussed above, PhD recipients will have completed a sustained body of original research. By this stage, it's common for PhD students to have presented their research at international scientific conferences, and authored one or more peer-reviewed journal publications featuring their main results. QuGIP PhD students will also be required to participate in an internship experience aligned with their future career goals.

Examples include an industry-sponsored internship (either working remotely or on-site), or an extended stay at a national lab or other research center. The doctoral dissertation will integrate these experiences into a coherent document, thus placing the candidates' work in the context of the field as a whole. Chapters of the dissertation will include an Introduction which provides context for non-experts, one or more chapters of main results, a chapter summarizing the internship experience, a concluding chapter summarizing key results and open questions, and one or more appendices with technical content or more preliminary results. Once the dissertation document is deemed suitable in an iterative process with the faculty advisor, candidates will defend the document to their dissertation committee, comprising 3-4 program faculty. In accordance with Graduate School policy, the dissertation defense will feature a public presentation, followed by a closed session with the committee.

Program Assessment Plan

As shown here, the QuGIP program will be assessed in terms of *student outcomes*, *institutional impact* within OSU, and *broader impact* at the national level. For example, PhD student outcomes will be assessed through course grades, a proposal-based candidacy exam, PhD dissertation and defense. Both formative and summative rubrics will be used for candidacy exam, thesis/ dissertation and defense (discussed further below). Institutional impact will be assessed by tracking extramural funding among QuGIP participating faculty and students, including programs in QISE and non-QISE. More broadly, program components will be disseminated through workforce and academic networks, thus contributing to a rapidly-developing, nationwide



infrastructure for QISE.

Assessment data will be compiled by several QuGIP stakeholders. The QuGIP *Graduate Studies Committee* will be tasked with assessing the quality of the applicant pool and curating collected data including demographic information, applicant institutions, Bachelors fields of study, GPAs, prior research experience, and Specialization interest. These data will be collected by the QuGIP *Program Coordinator.*

In addition, the NSF NRT award has subaward funding reserved for the development of initial program assessment by Strategic Evaluations, Inc. (SEI). SEI is a HUB-certified evaluation consulting firm located in Durham, North Carolina specializing in evaluating science education grants, particularly training grants. SEI will help the QuGIP team develop an assessment infrastructure that can then be sustained locally after the NSF NRT award ends in AY28-29, such as the following:

Expected Student, Faculty Teaching, and Institutional Competencies and Outcomes: The program leaders will work with SEI to document and measure targeted competencies and outcomes for stakeholders such as:

Trainees

- Increase QISE knowledge and technical skills
- Increase skills in ethics, technical writing, and communication
- Increase students' self-efficacy, science identity and sense of belonging
- Increased growth mindset

Faculty Instruction/Mentorship

- QISE courses and research opportunities utilize best practices and pedagogies, and are aligned to students' long-term career interests (via Drake Institute)
- Instruction promotes a growth mindset across faculty and trainees in the QISE graduate program
- High quality mentorship (research mentors required to participate in mentorship training)
- Increased recruitment and training of students in QISE research projects in faculty labs
- Strengthened interdisciplinary research/course development

Institution

- Development of a QISE Graduate Interdisciplinary Program at OSU
- Industry partnerships result in graduate internships and sponsored research
- Relationships between participating departments are strengthened

During Year 1, the evaluation team will work closely with project leaders to further develop a project logic model and related evaluation framework that will serve as the guide for activities and the key metrics for documenting outcomes.

Table 2. Evaluation framework for QuGIP Logic Model

Sample Evaluation Questions for OUTCOMES	Possible Indicators/Measures	Possible Data Collection Methods and Information Sources
1. To what extent is the program able to garner buy-in from participating departments and industry partners? 2. Is the program able to obtain approvals from all the necessary groups and in a timely manner to launch new courses? 3. To what extent to the members/key stakeholders work together towards effectively and efficiently a common goal? 4. Is the program able to recruit its targeted number trainees, and retain these trainees to obtain terminal degrees (20% Master's/60%PhD/20%Other)? 5. Do students who participate in QISE courses exit with more confidence, stronger lab abilities, greater content knowledge, and higher interest in completing a degree/certificate program in QISE? 6. To what extent does participation increasae students' ethics, technical writing, and communication skills? 7. Does participation in the QISE interdisciplinary degree program lead to a sense of belonging and greater confidence that students are well prepared for the emerging careers in QISE? 8. To what extent are QISE courses inclusive and based on a "growth mindset"? 9. To what extent are trainees provided inclusive and convergent QISE	• Documentation of approval of QuGIP courses/curriculum • Documentation of trainees in OSU labs/industry partner training • Documentation of numbers of students enrolled in QISE courses and of students' obtaining QISE degrees, certifications, etc. • Documentation of job application data • Student self-report of content knowledge, research skills, job competitiveness, and career interest (pre/post) • Research mentors/industry mentors' ratings of trainees' QISE knowledge and skills and career preparedness • Student and course instructors' ratings of the inclusiveness of the courses and extent to which courses include a "growth mindset" (post course) • Student self-report of interest in QISE careers • Measure of working of the program partnership (Partnership self-assessment tool)	OSU Departments/Graduate School ▪ Records of approval of QuGIP courses/curriculum ▪ Records of departments accepting trainees in research labs/training ▪ QISE course enrollment records ▪ Records of QISE degrees/certificates earned Industry Partners ▪ Records of partners accepting trainees in labs/training Student Trainees ▪ Document course enrollment ▪ Track students' thoughts on program, growth in research self-efficacy, sense of belonging, growth in knowledgge and career interests and preparedness on pre- and post-surveys ▪ Document students' thought on the inclusiveness of courses and extent to which courses include a "growth mindset" (post-course survey and focus group interviews) ▪ Qualitively document quality and impact of courses/research opportunties as well as suggested improvement through focus group interviews Research Mentors/Industry Mentors ▪ Document students' growth in QISE knoweldge, skills and job preparedness via surveys Course Instructors ▪ Document students' thought on the inclusiveness of courses and extent to

The evaluation timeline of performance measures is presented in the Table below:

Performance Measures Timeline	Yr1	Yr2	Yr3	Yr4	Yr5
Finalizing of logic model / competency tools to be embedded in project	X				
Structuring of Year-by-year evaluation plan in alignment with logic model (with monthly calendar of deliverables)	X	X	X	X	X
Document analysis (e.g. participation, degrees earned, internal course evaluations, student interests, industry needs, curriculum development)		X	X	X	X
Instrument development (e.g., trainees' baseline survey, trainees' annual/exit survey, research/industry mentors survey, partnership survey, trainees' and course instructors' focus group protocols)		X			
Partnership self-assessment	X		X		X
Trainees' surveys/assessments (baseline upon entering and annually until exiting)			X	X	X
Research/industry mentors' surveys (end of every trainee's internship/IDP)			X	X	X
Faculty surveys (when piloting a new course)			X	X	X
Focus group in-depth feedback on new course from trainees (after first implementation)			X		
Focus group in-depth feedback on new course from instructors (after second implementation to specialization improvements)				X	
Reporting/Communicating Evaluation Results (website, IAC meetings annually, etc.)	X	X	X	X	X

Feedback Mechanisms for Improving Practice: Four reporting and data sharing strategies will be included in the evaluation to facilitate QuGIP leaders' ability to assess progress in a timely manner, make any necessary mid-course adjustments, and report findings to outside stakeholders.

- Monthly Evaluation Update Calls - The evaluation team will lead monthly update calls in which program data will be shared across the partnership.
- Formative Evaluation Data Throughout – There are several surveys and focus group interviews planned across the 5 years. Data tables with evaluator's comments will be shared with the program at the conclusion of each data collection period (e.g., annually for partnership self-assessment survey, once a year with each new cohort for baseline trainee survey, etc.)
- Annual Summative Evaluation Report - As is customary, the evaluation team will prepare annual executive summary reports detailing all evaluation activities and findings, along with recommendations from stakeholders for improvement. At the end of the final project year, the external evaluation team will submit a summative evaluation report detailing the extent to which the project achieved its goals.

Program Academic Assessment Plan

As discussed in the Program Learning Goals above, we have identified a specific series of Learning Goals for PhD students. The extent to which these goals are met by students in the program will be assessed in several ways.

Course assessments: Each course (c.f. course syllabi in the Appendix) has its own set of learning goals and a concrete plan for how these will be assessed through course components such as presentations, written exams and homework problems.

Candidacy exam: A formative rubric (c.f. Appendix) will be used to assess student progress toward meeting the Program Learning Goals, and to identify specific areas for improvement / attention during the remainder of the PhD studies.

Annual review reports: These annual reports (c.f. Student Advising Sheets in Appendix) will be compiled by the student, the student's research advisor, and the advisory committee. Milestones such as research accomplishments, conference presentations, professional development activities, mentoring and submitted/published papers will be tracked in the reviews.

PhD Dissertation: A dissertation rubric and a dissertation defense rubric (c.f. Appendix) will be used to assess the extent to which the PhD dissertation and oral Defense reflects Program Learning Goals. For example, the dissertation introduction and defense presentation should include context so a broad, multidisciplinary audience can understand the student's contribution and its relevance to the broader field of QISE.

The table here illustrates how program components provide targeted assessment of the program learning goals articulated above.

	PhD
Program Component	Learning Goals
QISE 7100	1a, 5a,b,d
QISE 7101	1b, 2a,b, 5a,b,d
QISE 7102	1c,d,e , 2a,b, 5a,b,d
QISE 7111	1a-e, 3a-b, 4a, 5a-d
QISE 7112	3b, 5c
QISE 7113	5a,b,d
XXX-8998/9 research	4a-c
Computational	2a-b
Professional	5a,b
Candidacy	1a-e, 2a-b, 5a,d
Internship	3a-b
Dissertation / Thesis	1-5

INSTITUTIONAL STAFFING, FACULTY AND STUDENT SUPPORT

Faculty

As listed in the Appendix, we have assembled a team of 30+ participating faculty during this initial phase of the program, drawn from the six participating Departments. These faculty were selected based on their track records of QISE-related research (including externally-funded programs), commitment to evidence-based teaching and curriculum development, and all have 'P' status for graduate advising. This broad participation is essential for matching applicant interests to faculty advisors' expertise and availability. Although no faculty will be hired as a result of this new graduate program, there are significant synergies with recent cluster hiring in quantum science in the participating departments, including new hires in Chemistry and Biochemistry (Prof. Joe Zadrozny), Math (Prof. Kaifeng Bu), and Physics (Prof. Kevin Singh), and anticipated searches in Electrical and Computer Engineering, and Computer Science Engineering. Faculty wishing to join the program will submit an application detailing their QISE-related research experience or future interests, and their track record or plans for external funding and graduate advising. These applications will be reviewed by the QuGIP Graduate Studies Committee.

Administration and support

The OSU Center for Quantum Information Science and Engineering (CQISE) will be the administrative home for the new graduate program. The Program Director (Professor Jay Gupta, Physics) will be the lead program manager, responsible for fund raising, unit MOUs and stakeholder reporting. The principal administrative staff will be a Program Coordinator (position housed in CQISE), whose duties will include program financial and progress reporting, admissions, website maintenance, event planning and team communication. Admissions will be conducted by a Graduate Admissions Committee, comprising faculty from each of the six participating Departments. Student progress monitoring will be the responsibility of a Graduate Studies Committee, also comprising faculty from the participating Departments, as well as 1-2 student representatives. Oversight of the program will be provided by (i) an OSU Advisory Board, comprising unit leaders at the Department, College, Grad School and OAA levels and (ii) an Independent Advisory Board (Chair, Dr. Chris Porter, IBM Quantum) comprising external leadership in academia, industry and national labs.

Sufficient funding for the program through AY 28-29 is provided through an NSF training grant (budget: $3M / 5 years from 2023-2028 + planned 1 year no-cost extension). As described in the Appendix, NSF funding includes 1 yr fellowships for 25 trainees over the 5 year launch phase, the program coordinator position, curriculum development (faculty teaching buyout, OSU Drake Institute of Teaching and Learning) and program evaluation (Strategic Evaluations LLC.). Following their fellowship year, students will be supported by Graduate Teaching Assistantships (GTAs) or Graduate Research Assistantships (GRAs). Common in the participating Departments, faculty advisors will be expected to support QuGIP students as GRAs or confirm GTA support with

their Department Chair. In subsequent years, returned tuition from self-funded Masters students will be used to defray program expenses, including PhD fellowships and staff and instructional support.

APPROVAL TO ESTABLISH A MASTER OF ENERGY SUSTAINABILITY

IN THE SUSTAINABILITY INSTITUTE

Synopsis: Approval to establish a Master of Energy Sustainability in the Sustainability Institute is proposed.

WHEREAS the Master of Energy Sustainability program will be an interdisciplinary program involving the colleges of Arts and Sciences, Engineering and Food, Agricultural and Environmental Sciences and will be facilitated through the Sustainability Institute with administrative authority in the Office of Academic Affairs; and

WHEREAS this proposal is an outcome of the ongoing efforts of Ohio State's Sustainability Institute to enhance and expand sustainability education, research and community outreach; and

WHEREAS employer feedback has highlighted both need and demand for degree programs focused on sustainability and energy related to continued technology expansion and workforce development; and

WHEREAS this program will draw upon expertise of faculty engaged in basic and applied energy-related research and directing or teaching energy-related courses; and

WHEREAS the program will include a minimum of 34 credit hours, including 19 for foundational graduate coursework, 12 for general courses and an experiential learning capstone; and

WHEREAS the proposal was reviewed and approved by the Council on Academic Affairs at its meeting on January 14, 2026; and

WHEREAS the University Senate approved this proposal on January 29, 2026:

NOW THEREFORE

BE IT RESOLVED, That the Board of Trustees hereby approves the proposal to establish a Master of Energy Sustainability degree program in the Sustainability Institute.

Proposal for an Interdisciplinary Graduate-Level Professional Degree: *Master of Energy Sustainability* (MES) (34 semester credits)

Submission Date of Original Final Proposal: January 30, 2025
(GS/CAA Committee Approved 11/24/25 . . .
Resubmitted for CAA Review w/ Recommended Changes November 26, 2025)

Goal

The overarching goal is to launch a new interdisciplinary graduate-level professional *Master of Energy Sustainability* (MES) degree using a framework to initially offer an MES degree *Generalist Pathway* curriculum and eventually add various curricula for MES degree *Specialist Pathways.* All pathways to earn the MES degree will align with 10 *Foundational Competencies* and the associated 19 semester credits of *Foundational Courses*. The plan is to launch the proposed 34 semester credit *Generalist Pathway* curriculum by academic year 2026-2027. Graduates from the program will demonstrate knowledge, skills, and attitudes to prepare them for careers across the spectrum of energy resource and technology sectors.

Facilitating Units

- **Ohio State University Sustainability Institute**
  - **Sustainability Education and Learning Committee** (represented by Co-Chairs Elena Irwin and Michael Bisesi and its **Graduate and Professional Education Subcommittee**)
- **Graduate School** (represented by Maria Miriti)

Collaborating and Sponsoring Academic Units (represented by their respective Graduate and Professional Education Subcommittee members/proposal co-authors)

- **College of Arts and Sciences** (represented by David Cole and Max Woodworth)
  - Department of Geography
  - School of Earth Sciences
- **College of Engineering** (represented by Daniel Gingerich and Rajiv Ramnath)
  - Department of Civil, Environmental, and Geodetic Engineering
  - Department of Computer Science and Engineering
  - Department of Mechanical and Aerospace Engineering
- **College of Food, Agricultural, and Environmental Sciences** (represented by Jeremy Brooks, Jonathan Fresnedo Ramirez, and Brent Sohngen)
  - School of Environment and Natural Resources
  - Department of Agricultural, Environmental, and Development Economics
  - Department of Horticulture and Crop Sciences

Executive Summary

This proposal to develop and implement the new *Master of Energy Sustainability* (MES) degree represents one of several actions and outcomes from the coordinated and collaborative efforts at The Ohio State University, via its Sustainability Institute (SI), to enhance and expand sustainability-related education, research, and community engagement. The focused visioning initiative, led by SI Faculty Director Elena Irwin, was officially launched during January 2023 and involved applicable groups of faculty and administrators. The first product from the initiative is the document *Advancing Education at Ohio State: Education and Workforce Development* that was completed and released during June 2023. The document, found here https://oaa.osu.edu/sustainability, shares a vision to *promote the health, justice and well-being of people, biodiversity, and the environment of Ohio, the nation, and the world by educating and empowering sustainability leaders, practitioners, and change agents across the lifespan of learning at The Ohio State University.* In relation to this, the document summarizes plans for actions and outcomes specifically focused on sustainability-related education and workforce development at Ohio State.

A Graduate and Professional Education Subcommittee (GPES), under the SI Sustainability Education and Learning Committee (SELC) established in 2018, was organized and launched during January 2024 as one of four subcommittees to implement the plan and applicable education initiatives. This specific proposal was developed by the GPES members with the goal to launch an interdisciplinary graduate-level professional *Master of Energy Sustainability* (MES) degree at Ohio State during the 2026-2027 academic year. This effort aligns well with the United Nation Sustainable Development Goal #7 *Ensure access to affordable, reliable, and sustainable and modern energy for all*.[1] The conceptual framework and model for this program is shown in Figure 1 and summarized in more detail throughout the proposal.

The proposed MES degree program is interdisciplinary involving three Colleges and will leverage the Ohio State *EmPOWERment* program, which started in 2019 as a National Science Foundation funded National Research Traineeship. The overarching aspiration is to contribute to meeting the societal challenge of fostering a sustainable energy future. To date, the Ohio State *EmPOWERment* program has 46 affiliated faculty members, a 14-member internal advisory council, plus a 7-member external advisory council.

Rationale for Developing and Implementing the New MES Degree

The world is experiencing an energy revolution focused on the dual challenges of meeting a growing global demand for energy and reducing the impact of energy generation and utilization. Presently, the spectrum of technologies is vast and ranges from conventional fossil fuel-based technologies to alternatives that do not use fossil fuel as an energy resource. *Sustainable energy* includes a foundational provision of energy to meet the needs of the present without compromising the ability of future generations to meet their needs. However, inherent to sustainable energy requires going beyond energy technologies and energy generation. It requires building a more holistic sustainable energy system that

[1] United Nations (2015). *Transforming Our World: The 20230 Agenda for Sustainable Development*. https://sdgs.un.org/publications/transforming-our-world-2030-agenda-sustainable-development-17981

includes the additional focus areas of energy resources plus energy transmission, distribution, demand, and use.

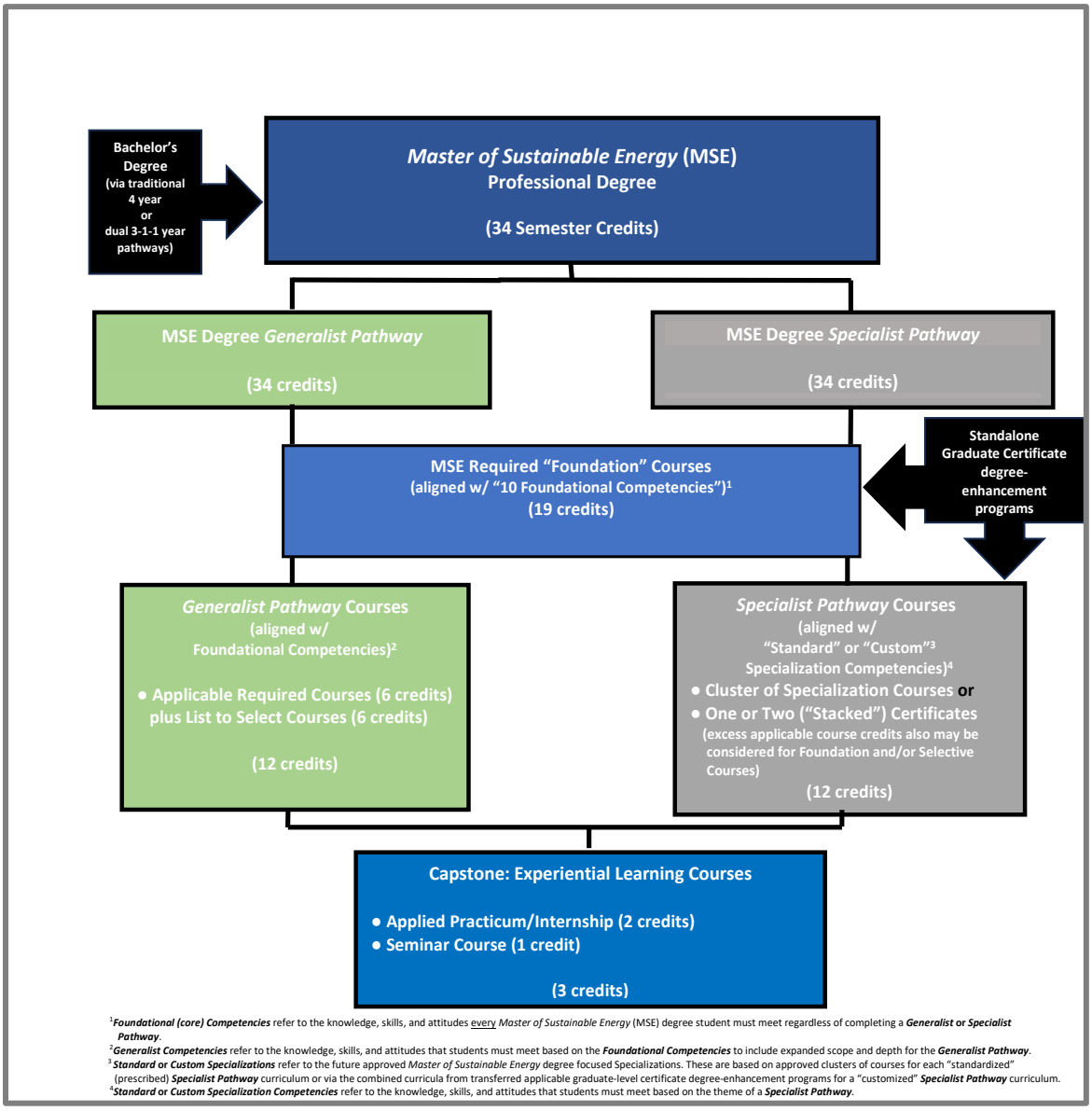


Figure 1. Model for the MES Degree *Generalist* and *Specialist Pathways*

The transition to a more sustainable energy system will require understanding and evaluating technical and non-technical interventions throughout the entire system, from generation-to-distribution-to-use. Evaluating and implementing these technologies, with the overarching goal of ensuring that society's energy needs are met without adversely affecting the natural or social environment, requires a foundation in applied energy sciences while also leveraging and integrating skills and techniques developed in a variety of complementary disciplines. Likewise, maximizing the impact of technological developments will require a deeper understanding of the complex socio-economic, cultural, and political factors that adequately foster or hinder widespread distribution of sustainable energy production and

transmission facilities as well as consumer needs and demand for sustainable energy and products that are dependent on it.

The MES Degree and Workforce Development

An Ohio State University Workforce Development Committee led by Vice Provost Randy Smith and co-led by former Vice Dean Michael Bisesi created and adopted a framework for workforce development summarized in the document *The Conceptual Elements for Framing and Defining Workforce Development at The Ohio State University*. Within the framework document that was completed and released during May 2020 two major workforce categories are defined as follows:

1) The *emerging workforce* category are those focusing exclusively on full-time pursuit of a degree program that upon completion will lead to applicable employment and a career. The education and training required is exclusively academic credit-based.
2) The *present workforce* category refers to those who are focused primarily on working full-time as well as those who are interested in working full-time but are underemployed or unemployed. This group may have an interest in pursuing academic part-time education and training to earn a credential in the form of an academic credit-based degree or certificate program to enhance their knowledge and skills to meet present and/or future needs or wants. This same group may be interested in pursuing other shorter education and training in the form of non-credit modules, short courses, and workshops.

As an extension of this effort plus to prepare the *Advancing Education at Ohio State: Education and Workforce* document, a Sustainability Education Visioning Committee (SEVC) collected applicable employer stakeholder data by 1) conducting a survey distributed to 100 external recipients, 2) hosting 3-hour listening sessions to allow for more comprehensive details about and understanding of survey responses, and 3) facilitating individual interviews for those unable to participate in the scheduled listening sessions. These coordinated integrated efforts resulted in a collection of 1,100 data points, from which nine primary areas of emphasis emerged:

1) Employers are thinking about sustainability and are concerned about related issues such as the political climate, the circular economy and waste reduction, environmental justice, climate change, net zero emissions, population growth, the regulatory environment, and technology.
2) Sustainability touches all jobs, and employers expect their employees to have a base level of sustainability knowledge that is supplemented with in-house job training.
3) Employers need knowledge and expertise regarding policy/regulatory processes, waste, and materials management, ESG knowledge, and expertise in areas such as climate change, energy purchasing, and information systems.
4) Employees need to be able to work in interdisciplinary environments and with teams.
5) Employees need to possess both hard and soft skills, including subject matter expertise, a sustainability mindset, training in basic STEM, project management, communication, policy, regulation, and engineering/manufacturing processes.
6) Job candidates ideally come with real-world experiences, and these can be gained through capstones, internships and other interactions with practitioners and alumni inside and outside the classroom.
7) There is a need for training to keep up with technological change and changes in jobs.
8) Employers believe that Ohio State has an opportunity to better prepare its students by providing experiential learning, teaching interdisciplinary and systems thinking, promoting diversity and social sustainability, and integrating sustainability throughout the curriculum.

9) Employers believe Ohio State can help better prepare existing employees by creating alternative credentials such as certificates, training programs, and modular videos, fostering real world experiences, creating partnerships, and teaching critical thinking and communication.

The nine areas of emphasis align with a need and demand for the proposed sustainability-related MES degree and are further emphasized, as examples, by the following employer stakeholder responses to applicable questions: 1) 90% of respondents said "yes" when asked, *Is there a basic level of knowledge about sustainability that you would like all your employees to possess?* 2) 80% answered "yes" to *Do any positions in your organization require more specialization related to sustainability?* and 3) 80% responded "yes" to *Looking ahead, are there any sustainability-related knowledge and/or skills you expect your organization to need in the future?*

Indeed, there are both need and demand for degree programs focused on sustainability and energy related to continued technology expansion and workforce development. These are global needs, as reported for examples, in the International Energy Agency (IEA). *World Energy Outlook*[2] and the International Renewable Energy Agency (IRENA) *Renewable Energy and Jobs – Annual Review*[3].

The applicable public and private employment sectors are engaged in energy-related activities ranging from exploring novel sources of energy to developing and deploying generation, distribution, and conservation of energy efficient technologies. Understanding their impact on the environment and society requires that both the *emerging workforce* and *present workforce* are appropriately and adequately educated in the energy-related natural and social sciences and professions (e.g., engineering, business). Although the employment of graduates from The Ohio State University is not limited geographically to only Ohio, representatives from various energy sectors located in Ohio have stated that there is a demand for an appropriately and adequately educated workforce.

Phases for the Proposed Master of Energy Sustainability (MES) Degree Program

The framework of the MES degree model (Figure 1) reflects pathways for developing and implementing *generalist* and *specialist* curricula that align with identified societal and workforce needs and wants applicable to all aspects of sustainable energy. The first phase is to launch the 34-semester credit Master of Energy Sustainability (MES) degree *Generalist Pathway* to provide an opportunity for both the emerging workforce and the present workforce to expand and enhance their knowledge, skills, and attitudes through completion of a sustainability-themed curriculum. The curriculum will emphasize and focus primarily, but not exclusively, on a variety of applicable energy topics. The Generalist Pathway curriculum was developed by first establishing ten *Foundational Competencies* (listed later in Table 2) and then aligning courses and course content with these competencies (shown later in Table 3).

[2] International Energy Agency (2024). *World Energy Outlook*. https://www.iea.org/reports/world-energy-outlook-2024
[3] International Renewable Energy Agency (2024). *Renewable Energy and Jobs – Annual Review*. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2024/Oct/IRENA_Renewable_energy_and_jobs_2024.pdf

While this initial phase focuses on the MES degree *Generalist Pathway*, the second phase will involve the SI SELC Graduate and Professional Education Subcommittee working with academic units to catalyze and facilitate planning for and developing "standardized" and "customized" *Specialist Pathways*. Curriculum development for all MES degree pathways will embed the more general ten *Foundational Competencies* and the aligned required *Foundational Courses* (18-credits). The *Specialist Pathways*, however, will also include developing three to five *Specialization Competencies* and aligning them with *Specialization Courses* for each of the respective specialist curricula. For example, the MES degree specializations can be developed and offered across a spectrum of focus areas including business and economics, policy, environmental and geological (e.g., subsurface), energy engineering technology, among other areas.

The second phase will also include concurrently developing applicable graduate-level certificate programs. The vision is to provide all students with sufficient foundational content, but also choices for "standardized" (prescriptive) energy-focused specializations as well as options for others to apply individual or combined ("stacked") energy-related certificates for competency-based "customized" specializations. For example, some may initially pursue and complete a certificate program. The framework of the MES degree model will allow those students to apply one or even stack two applicable certificate programs and count some or all the completed courses toward the *Generalist Pathway*, a "standardized" *Specialist Pathway*, or a "customized" *Specialist Pathway*.

Options for the MES degree *Generalist Pathway* and *Specialist Pathways* align with responses from employer stakeholders collected during the SEVC visioning process when participants were asked, *What types of positions within your organization require more specialized sustainability-related knowledge and skills?* For one example, 10 of 39 (26%) respondents indicated that "energy planning management" required more specialization. Indeed, in Ohio, and beyond, there has been and continues to be emphasis on expanding and enhancing sources of and technologies for generating energy that is sustainable from natural resource, economic, and environmental perspectives. The proposed options for MES degree pathways will create opportunities for offering curricula with applicable scope and depth to meet the needs and wants of the emerging workforce and present workforce while simultaneously aligning employers' interests as well.

Examples of Other Applicable Graduate-Level Degree Programs in the Big Ten plus Ohio

Given the global (i.e., regional, national, and international) needs and demands regarding resources for, sources of, and technology for sustainable energy, it is encouraging to know that there are several universities within Ohio and the Big Ten that presently offer master-level degree programs that align with sustainability and emphasize energy resources, technologies, and their impact (Table 1). Most of the universities listed that have already developed and implemented applicable graduate-level degree programs have focused on the engineering aspects. The Master of Energy Sustainability (MES) degree proposed here is similar but not the same as those degree programs listed in Table 1. As described earlier in this proposal, the framework of the Ohio State MES degree model initially allows for a more general sustainable energy pathway/curriculum plus eventually varieties of specialized sustainable energy-related pathways/curricular offerings.

Although Ohio State is behind in having a specific master-level degree in this space, the University presently has several units with faculty engaged in conducting high-level basic and applied energy-related research and directing/teaching energy-related courses. In addition, representative faculty from these units are contributing to the EmPOWERment project funded by the National Science Foundation. Indeed, there is a need for expansion with an emphasis on education and research beyond this, with sustainable energy focus, which allows for more interdisciplinary collaboration and cooperation. Leveraging faculty knowledge and skills plus other resources across academic units, as proposed here, will lead to more efficient and effective education and training of students. Indeed, given its size, scope, and depth, Ohio State alone and in collaboration and cooperation with other applicable agencies, organizations, companies, and universities, is well-positioned to be among the leaders in sustainability, including energy-focused education and research.

Table 1. Examples of Similar Degree Programs at Big Ten and Ohio Universities.

University	Degree Offered	Number of Semester Credits	Examples of Curricular Requirements
Big 10 Universities			
University of Illinois	Master of Engineering in Energy Systems	32	Professional development requirement (practicum, project, or coursework)
Indiana University	Master of Science in Environmental Science - Energy and Climate Change	42	Capstone or Thesis. Internship required over the summer.
University of Maryland	Master of Engineering in Energy Systems Engineering	30	Coursework-only
Penn State University	Master of Professional Studies in Renewable Energy and Sustainability Studies	33	3-credit capstone or unique topics research
Purdue University	MSChE – Energy Systems and Fundamentals	30	Capstone
Rutgers University	Master of Engineering in Energy Systems Engineering	30	3 credit credits in industry internship or a hands-on project
University of Michigan	MSE in Energy Systems and Sustainability Engineering	30	Thesis (6 credits) or additional coursework
University of Wisconsin	Engineering MS: Energy Engineering Concentration	30 (thesis) or 31 (non-thesis)	Thesis or non-thesis. Non-thesis requires capstone or comprehensive exam
Ohio Universities			
University of Cincinnati	Master of Engineering in Sustainable Energy	30	Capstone
Ohio University	Master's degree Engineering - Sustainable Energy	30	Thesis or non-thesis.
University of Dayton	MS - Renewable and Clean Energy Engineering	30	Thesis (24 credits of coursework, 6 credits research) or non-thesis.
University of Toledo	Master of Energy Engineering	30	Coursework or project option (fewer courses with a work-related project w/ employer/advisor)

University	Degree Offered	Number of Semester Credits	Examples of Curricular Requirements
Cleveland State	MS Mechanical Engineering – Sustainable Energy Systems	33	Project
Wright State	MSE Renewable and Clean Energy	30	Thesis or non-thesis

Accordingly, the Ohio State MES degree model proposed here will provide a sustainable energy-focused and versatile framework for graduate students to complete contemporary education and training that will lead to opportunities for applicable employment and/or more advanced studies. In addition, as mentioned, the proposed MES degree program at Ohio State will be collaboratively and cooperatively interdisciplinary. This approach will provide students with a broader scope of perspectives from the faculty engaged in sustainable energy research sustainable energy as well as related technologies, economics, issues, challenges, and solutions. Given the global needs and demands, there is room for this new degree program from Ohio State plus the other similar (but not the same) energy-focused master's degree programs offered by the other universities listed above in Table 1.

Ten *Foundational Competencies* for the MES Degree *Generalist Pathway* and *Specialist Pathways*

The proposed curriculum aligns with the nationally-established sustainability competencies that have been adopted by the Ohio State Sustainability Institute's (SI's) Sustainability Education and Learning Committee (SELC). In turn, the curriculum aligns with one or more of SI's *Six-Dimensions of Sustainability*. Accordingly, the proposed MES degree program is categorized as a sustainability-related degree program based on national and local categorizations. However, central to this proposed MES degree, ten sustainable energy-focused competencies were established to develop the curriculum required to earn the MES degree (Table 2). These ten competencies and the aligned curriculum are the basis for the required energy-focused knowledge, skills, and attitudes that the students will acquire while pursuing and upon successful completion of the MES degree program.

Table 2. MES Degree *Foundational Competencies* Based on Identified Needs for Applicable Sustainable Energy Knowledge, Skills, and Attitudes

Foundational Competencies for MES Degree
1 - Compare the types and characteristics of major conventional and emerging technologies used or proposed to generate electricity in a low-impact future.
2 - Articulate the social and behavioral features of energy use and transitions and the factors that may influence technical and non-technical solutions to energy conservation and the move to lower-impact energy systems.
3 - Summarize the mechanisms by which conventional and emerging technologies for energy extraction and generation create environmental and ecological impacts.
4 - Determine the impact of local, national, and international governmental and non-governmental institutions and global governance in promoting sustainable energy and mitigating climate change.

Foundational Competencies for MES Degree
5 - Summarize and apply theories and principles of economics, business, finance, policy, ethics and law as each relates to sustainable energy systems.
6 - Communicate a definition of sustainable energy systems that draw upon elements from different disciplinary perspectives and definitions of sustainability.
7 - Describe the ways that society currently and may in the future transport, store, and use energy.
8- Describe trends in demand for energy over time and explore how the relationship between changes in energy demand and energy production can aid in identifying pathways to sustainable energy through social, behavioral, and other mechanisms that generate overall energy demand.
9 - Acquire software, analysis, modelling, and computation skills to address sustainable-energy problems.
10 - Assess the opportunities and uncertainties in the sustainable energy landscape to develop solutions plus determine market needs and growth to develop potential technical and business strategies.

The Curricular Framework for the Master of Energy Sustainability (MES) Degree *Generalist Pathway*

The curriculum required to complete and earn the proposed Master of Energy Sustainability (MES) degree program *Generalist Pathway* consists of a set of foundational courses (19 semester credits), applicable general courses (12 semester credits), and an experiential learning capstone and seminar (3 semester credits). A total of 34 semester credits are required for the degree curriculum (Table 3.1). A general Plan of Study for completing the MES Degree Generalist Pathway within 12-months is shown in Table 3.2. Course descriptions for the Foundational Courses plus selections for the General Pathway courses are shown in Appendix A. The only course that needs to be developed is the Practicum in Sustainable Energy, which will be developed by the three Program Co-Directors (once named), or they may identify an applicable practicum course from their respective units. The first offering of the Practicum in Sustainable Energy course will be Summer 2027.

The non-thesis experiential learning capstone requires most students to complete an applied practicum placement or rotations at applicable public or private agencies or organizations. Students with their faculty advisor will identify three major Foundational Competencies that align with the experiential learning capstone. Students will be responsible for documenting major activities completed, alignment with the identified competencies, and summarizing the experience in a narrative document that is due upon completion of the practicum. While most students will pursue the required non-thesis experiential learning capstone as a practicum, some students may be eligible for substituting a research thesis or project or waving the 3-credit practicum/internship requirement. Examples include but are not limited to: (i) Students who may already have one-year or more applicable work experience may have the option to use competency-aligned and documented experience for the capstone. (ii) Students without reasonable access to an internship site may be permitted to complete a research project instead. This will be determined by the MES degree Program Co-Directors and Admission Committee faculty members on a case-by-case basis.

Table 3.1 Curriculum for the MES Degree *Generalist Pathway*: Courses and Aligned General *Foundational Competencies*

Courses	Credits	Colleges (Units)	Aligned Foundational Competencies
Foundational Courses (19 credits)			
AEDE 6320 Energy Economics	3	CFAES (AEDE)	3,5
AEDECON 6500/ ENVENG 6020/ FABENG 6020/ISE 6020 /PUBAFRS 6020/ GEOG 6020 Foundations of Data-Driven Sustainable Energy Systems	3	CFAES/COE/ GCPA/ASC	1,2,4,5,6
PUBAFRS 8620 Innovating for Sustainable Energy Systems	4	GCPA	2,7,10
GRADTDA 5621 Big Data Computing Foundations 1	3	TDAI/COE(CSE)	9
Select 6 Credits: **ENR 7150** Environmental Risk and Decision-Making **ENR 7430** Sustainability Psychology **MECHENG 5194** Comparative Energy	6	 CFAES (SENR) CFAES (SENR) COE (MECH)	 2,8 8 1,7,8
Sub-Total Foundational Course Credits	**19**		
General Pathway Courses (12 credits)			
ENVENG 5170 Sustainability and Circular Economy	3	COE (CEGE)	3,5
GEOG 5802 Globalization and Environment	3	ASC (GEO)	4
Select 6 Credits: **MECHENG 6526** Combustion **MECHENG 5194** Comparative Energy **MATSCEN 5572** Materials for Energy Technology **AEDECON 6300** Environmental Resource Economics **GEOG 5900** Weather, Climate, and Global Warming **GRADTDA 5620** Practical Learning and Mining for Big Data **CIVILEN 6211** Simulation of Building Energy Performance **ISE 5043** Power Systems-Analysis and Operation **CRPLAN 5550** Financing Sustainability **ENR 7400** Communicating Environmental Risk **GEOG 5301** Sustainable Transportation	6	 COE (MAE) COE (MAE) COE (MES) CFAES (AEDE) ASC (GEOG) TDAI/COE (CSE) COE (CEGE) COE (ISE) COE (CRPPLAN) CFAES (SENR) ASC (GEO)	 1,3 1,7,8 1,3 5 3 9 9 3,5,9 5 2,6,8 4,9
Sub-Total General Pathway Course Credits	**12**		
Capstone Courses (3 credits): Experiential Learning + Selectives + Seminar			
<insert alpha code> Practicum in Sustainable Energy	2	Interdisciplinary	identify 3 competencies
EARTHSC 8860 Seminar in Energy Resources	1	ASC (SES)	Identify 3 competencies
Sub-Total Capstone Course Credits	**3**		
TOTAL MES Degree Curriculum Credits	**34**		

Table 3.2 General Plan of Study Completing the MES Degree within 12-months.

Courses	Credits	Delivery Mode
Autumn Semester		
AEDE 6320 Energy Economics	3	Online
AEDECON 6500/ENVENG 6020/FABENG 6020/ISE 6020 /PUBAFRS 6020/ GEOG 6020 Foundations of Data-Driven Sustainable Energy Systems	3	In-Person
GRADTDA 5621 Big Data Computing Foundations 1	3	Online
Select a 3-credit course from the three listed courses that follow: **ENR 7150** Environmental Risk and Decision-Making or **ENR 7430** Sustainability Psychology or **MECHENG 5194** Comparative Energy (see prerequisites)	3	In-Person
GEOG 5802 Globalization and Environment (**or during Spring**)	3	In-Person
Selective Course (**or during Spring or Summer**)		

Spring Semester		
PUBAFRS 8620 Innovating for Sustainable Energy Systems	4	In-Person
Select a 3-credit course from the three listed courses that follow: **ENR 7150** Environmental Risk and Decision-Making or **ENR 7430** Sustainability Psychology or **MECHENG 5194** Comparative Energy (see prerequisites)	3	In-Person
ENVENG 5170 Sustainability and Circular Economy	3	In-Person
GEOG 5802 Globalization and Environment (**or during Autumn**)	3	In-Person
EARTHSC 8860 Seminar in Energy Resources	1	In-Person
Selective Course (**or during Autumn or Summer**)		
Summer Term		
Practicum in Sustainable Energy	2	Off-Site
Selective Course (**or during Autumn or Spring**)	3	

Administrative Oversight

The administrative oversight, admissions, curriculum, assessment, and advisement for the MES degree *Generalist Pathway* will be provided and conducted by representatives from each of the three sponsoring colleges (College of Arts and Sciences; College of Engineering; and College of Food, Agriculture, and Environmental Sciences). Each of the three collaborating and cooperating colleges will have a designated faculty member serving as the interdisciplinary degree Program Co-Director. In turn, these individuals will coordinate with applicable faculty members from their respective units to engage in collaborative intercollege activities including application and admissions reviews, MES Generalist Pathway curriculum, program and student assessment, course scheduling, and student advisement. Application for admission, tracking for student retention, and graduation will be centralized administratively via the Graduate School. General program operations will be facilitated and centralized via the Sustainability Institute and a central Program Coordinator working with the respective Program Co-Directors.

Admissions and Graduation

The MES degree *Generalist Pathway* Admissions Committee, consisting of applicable faculty representation from each of the three collaborating colleges, will use the criteria specified in the Ohio State *Graduate School Handbook* Section 2.2 Admission Criteria (https://gradsch.osu.edu/graduate-school-handbook-gsh/gsh-section-2-admissions#section2.2). In addition to the Graduate School Admission criteria listed below, MES degree admission will require completion of a college-level foundational course in calculus with grade C or higher.

Admission Criteria for All Applicants:

- The equivalent of a four-year bachelor's or advanced degree from a regionally accredited college or university, earned by the expected date of entry into the graduate program.
- Calculus with grade C or higher.
- A minimum 3.0 cumulative GPA (on a 4.0 scale or equivalent) for the last bachelor's or advanced degree earned.
- Transcripts or other credentials documenting that prerequisite academic work has been completed.

Note: A standardized GRE test score is required only if:

- Applicant's degree is from an unaccredited college or university *and* your program requires the score.
- Applicant's cumulative GPA is below 3.0 for the last bachelor's or advanced degree earned *and* the program requires the score.

Additional Admission Criteria for International Applicants:

Success at Ohio State depends upon your ability to converse in, write and understand English. The university requires official TOEFL, Duolingo or IELTS Academic test scores from all international applicants, except:

- Applicants who are citizens of, or who have received a bachelor's degree or higher by the time of matriculation from, one of the countries or territories exempt from the English proficiency requirement (see exemptions below).
- Applicants who have held U.S. permanent resident, asylee or refugee status for more than one year by the start date of the first term of enrollment.

Note: If applicants' courses were taught in English but they do not meet either of the above exceptions, they are still required to submit proof of English proficiency. Refer to https://gpadmissions.osu.edu/intl/additional-requirements-to-apply.html for additional details and minimum test score criteria.

In relation to admission, the criteria for retention and graduation will follow those specified in Sections 4, 5, and 6 of the *Graduate School Handbook* (https://gradsch.osu.edu/graduate-school-handbook-gsh).

Anticipated Enrollment for the MES Degree *Generalist Pathway*

It is estimated that initially there will be ten students enrolled during year one for the MES degree Generalist Pathway. Estimated future enrollment is 30 or more students per year (Table 4). The anticipated enrollment numbers are estimates based on the increased public awareness of plus need and demand for professionals in the sustainable energy related sector. It is projected and expected that enrollments will increase during subsequent years with expanded program awareness plus general and targeted program marketing and student recruitment. In addition, the overall MES degree enrollments will increase too when curricula options are added for students to pursue one of several choices for MES degree Specialist Pathways. Detailed information on how students will be informed of the MES degree program is summarized in Appendix B: Program Implementation.

Table 4. Five-Year Estimated Annual MES Degree *Generalist Pathway* Student Enrollments.

Academic Year	Estimated Number New Students
2026-27	10
2027-28	15
2028-29	20
2029-30	25
2030-31	30

Assessment

The overall assessment plan will use specific evaluation tools to collect both direct and indirect measures of several components. The overall process will collect, organize, interpret, summarize, and report quantitative and qualitative outcome measurement data as program, including student, performance indicators, and, for continuous quality improvement. The MES degree Program Co-Directors plus the Program Coordinator will oversee the Assessment Plan including the annual data collection, review, and reporting.

The program assessment plan consists of two parts. Part 1 is focused on overall program evaluations and measures related to admissions through program completion and alumni job placements (Table 5.1.). Part 2 involves conducting specific evaluations to assess whether students meet each of the ten MES degree *Foundational Competencies* aligned with the specific topic modules within the required *Foundational Courses* (Tables 5.2 and 6).

Table 5.1. Part 1 - Admission through Graduation

Indirect Measures for MES Degree Program Evaluation and Assessment
• Number of Applications • Quality of Applicant Pool • Admissions (Rubric/Summary) • Survey Students (Satisfaction w/ Program and Program Support for Continuous Quality Improvement) • Student Evaluation of Instruction (Satisfaction w/ Course and Instruction for Continuous Quality Improvement) • Retention (% Retained) and Graduation Rates (Cumulative GPA ≥3.0/4.0, % Graduated, Time-to-Degree) • Survey Graduating Students (Satisfaction w/ Program and Program Support for Continuous Quality Improvement) • Survey Alumni (Applicable Employment/Use of Degree)

Table 5.2. Part 2 - Alignment of Competencies with Required Foundational Courses and Student Evaluation Modes.

Direct Measures for Student Evaluation and Assessment
• Case Studies/Applied Case-Based Scenarios) • Problem Sets • Presentations (oral and poster) • Papers • Quizzes • Exams • Facilitated Discussions (e.g., Seminar) • Cumulative Course Performance

One or more of the required *Foundational Courses* is/are aligned with each of the ten MES degree program *Foundational Competencies*. See page 8 for the list of competencies and Table 3 on page 9 showing the required *Foundational Courses* and for each course the aligned *Foundational Competencies*. The MES degree graduate students are expected to score ≥80% for each evaluation mode that corresponds with the courses and the specific course module topic(s) within that align with each respective competency.

Table 6. Alignment of Competencies with Required Foundational Courses and Student Evaluation Modes.

Ten Foundational Competencies (see pp. 7-8 and Table 2)	Applicable Required Foundation Courses (credits)	Applicable Student Evaluation Modes per Course (i.e., Quizzes; Exams; Problem Sets; Applied Case Studies; etc.)	Measurement to Demonstrate Acquired Competency
Foundational Competency 1	**AEDECON 6500/ ENVENG 6020/ FABENG 6020/ISE 6020 /PUBAFRS 6020 (3 cr.)** Foundations of Data-Driven Sustainable Energy Systems	Case Study Paper	Score ≥80% per Evaluation Mode
Foundational Competency 2	**PUBAFRS 8620 (3 cr.)** Innovating Sustainable Energy Systems	Paper; Presentation	Score ≥80% per Evaluation Mode
Foundational Competency 3	**AEDE 6320 (3 cr.)** Energy Economics	Quiz; Exam	Score ≥80% per Evaluation Mode
Foundational Competency 4	**AEDECON 6500/ ENVENG 6020/ FABENG 6020/ISE 6020 /PUBAFRS 6020 (3 cr.)** Foundations of Data-Driven Sustainable Energy Systems	Case Study Paper	Score ≥80% per Evaluation Mode
Foundational Competency 5	**AEDE 6320 (3 cr.)** Energy Economics	Quiz; Exam	Score ≥80% per Evaluation Mode
Foundational Competency 6	**AEDECON 6500/ ENVENG 6020/ FABENG 6020/ISE 6020 /PUBAFRS 6020 (3 cr.)** Foundations of Data-Driven Sustainable Energy Systems	Case Study Paper	Score ≥80% per Evaluation Mode
Foundational Competency 7	**PUBAFRS 8620 (3 cr.)** Innovating Sustainable Energy Systems	Paper; Presentation	Score ≥80% per Evaluation Mode
Foundational Competency 8	**ENR 7150 (3 cr.)** Environmental Risk and Decision-Making or **ENR 7430 (3 cr.):** Sustainability Psychology	Paper; Presentation Paper; Project	Score ≥80% per Evaluation Mode
Foundational Competency 9	**GRADTDA 5621 (3 cr.)** Big Data Computing Foundations 1	Case Studies; Project	Score ≥80% per Evaluation Mode
Foundational Competency 10	**PUBAFRS 8620 (3 cr.)** Innovation for Sustainable Energy Systems	Paper; Presentation	Score ≥80% per Evaluation Mode

Appendix A

Descriptions, Prerequisites, Modes of Delivery, and Terms Offered for the MES Degree Foundational and General Pathway Courses

Courses	Credits	Colleges (Units)	Course Descriptions	Course Prerequisites	Modes of Delivery / Semester
Foundational Courses (19 credits)					
AEDECON 6320 Energy Economics	3	CFAES (AEDE)	Explores the economics of the energy sector. It addresses key drivers of demand for energy, sources of energy supply, the pace of technological change in energy production and use, critical externalities of energy production, and governmental approaches to regulate the energy sector.	None	Online Autumn
AEDECON 6500/ ENVENG 6020/ FABENG 6020/GEOG 6020 / ISE 6020 /PUBAFRS 6020 Foundations of Data-Driven Sustainable Energy Systems	3	CFAES/COE/ ASC/GCPA	Introduction to issues impacting sustainable energy systems across technology, law and policy, business models, resilience, data, geospatial, and decision sciences.	Not open to students with credit for AEDECON 6500, ENVENG 6020, FABENG 6020, GEOG 6020, or PUBAFRS 6020. (Cross-listed in AEDECON 6500, ENVENG 6020, FABENG 6020, GEOG 6020, or PUBAFRS 6020.)	In-Person Autumn
PUBAFRS 8620 Innovating for Sustainable Energy Systems	4	GCPA	Provides students with the design tools and a framework to understand complex problems and develop within weeks minimal viable products or solutions that address energy-sector needs. Through an intense process of stakeholder interviews and continuous feedback, students acquire experience in systematic innovation, refining problem-statements, and navigating public and private sector organizations.	None	In-Person Spring
GRADTDA 5621 Big Data Computing Foundations 1	3	TDAI/COE(CSE)	Professionals must be able to locate, scrape, ingest and clean data sources to produce useful information for exploration and visualization to address work-related challenges. The course is on programming in JavaScript and Python and tools like	None	Online Autumn

Courses	Credits	Colleges (Units)	Course Descriptions	Course Prerequisites	Modes of Delivery / Semester
			Hadoop and Scala. This two-semester sequence is to be taken in parallel with a two-semester sequence on fundamental statistical data analytic methods.		
Select 6 Credits: **ENR 7150** Environmental Risk and Decision-Making **ENR 7430** Sustainability Psychology **MECHENG 5194** Comparative Energy	3	CFAES (SENR) COE	ENR 7150: Theory of individual and participatory decision-making processes under risk and uncertainty and applications to improve decision making in environmental risk management contexts. ENR 7430: This course helps students expand their understanding of the psychological bases of environmental problems. It focuses on leveraging psychological tools to address such problems. Students learn about theories and methods relevant to behavior change, explore the applicability of these approaches to changing environmental behaviors, and gain practical experience doing this with real-world problems. Understand the principle and energy efficiency of renewable energy technologies and prepare engineering students for evaluating and developing those technologies. The course will be a combination of technological examples, fundamental principles, and project-based deep dive into renewable energy technologies. Technologies covered include wind electricity, hydroelectricity, geothermal, solar thermal, hydrogen, CO2 capture, battery, capacitors, fuel cell, solar photovoltaic, magnetocaloric cycle, electrocaloric cycle, and thermoelectric cycle. Target audience: junior/senior undergraduates and graduate students. Recommended preparation: introductory energy technology or introductory thermodynamics knowledge.	ENR 7150: Not open to students with credit for 8150. ENR 7430: Graduate standing plus any ONE of the following: • Any undergraduate- or graduate-level psychology course • ENR 3400 • ENR 5400 • **Instructor permission** 3500, 3501, AEROENG 2405, MATSCEN 2251, CBE 3508, CHEM 4310, FABE 3120, Grad Standing in Engineering, or Grad Standing in Chemistry.	7150: In-Person Autumn 7430: In-Person Spring 5194: In-Person Spring

Courses	Credits	Colleges (Units)	Course Descriptions	Course Prerequisites	Modes of Delivery / Semester
Sub-Total Foundational Credits	**19**				
General Pathway Courses (12 credits)					
ENVENG/ENVSCI 5170 Sustainability and Circular Economy	3	COE (CEGE) CFAES (SENR)	An introduction to life-cycle thinking and the circular economy with emphasis on quantitative sustainability assessment and decision-making.	3200, or Grad standing in Engineering, or permission of instructor. Not open to students with credit for ENVSCI 5170. Cross-listed in EnvSci.	In-Person Spring
GEOG 5802 Globalization and Environment	3	ASC (GEO)	Transnational dimensions of changes to the natural environment; ways that global economic activity, international institutions, and global environmentalism contribute to environmental problems and solutions.	Not open to students with credit for 635.	In-Person Autumn and Spring
Select 6 Credits:					
MECHENG 6526 Combustion	3	COE (MAE)	MECHENG 6526: Fundamentals of energy conversion through combustion, thermodynamics and chemical kinetics of combustion, premixed flames, deflagration vs. detonation waves, diffusion flames, droplet combustion, and thermal ignition.	MECHENG 6526: 3503, 3504 (504), or 4510 (510), or permission of instructor. Not open to students with credit for 726.	MECHENG 6526: In-Person Spring
MATSCEN 5572 Materials for Energy Technology	3	COE (MES)	MATSCEN 5572: Structure property relationships of materials in energy applications. Photovoltaic materials, solid state photonic materials, electrochemical devices such as batteries, fuel cells and chemical sensors, superconductors, memory and nuclear materials.	MATSCEN 5572: 2241, and 3271 or ECE 2300; and enrollment as MATSCEN-BS major; or Grad standing; or permission of instructor.	MATSCEN 5572: In-Person Autumn
AEDECON 6300 Environmental Resource Economics	2	CFAES (AEDE)	AEDECON 6300: Application of economic theory and methods to current problems in environmental and resource economics.	AEDECON 6300: 4001 (500) or Econ 4001 (501). Not open to students with credit for 831.	AEDECON 6300: In-Person Spring
GEOG 5900 Weather, Climate, and Global Warming	3	ASC (GEOG)	GEOG 5900: An introduction to the fundamental physical and mathematical principles governing both day-to-day weather and the average of weather, or climate. Objectives are to understand the physical	GEOG 5900: Not open to students with credit for 520 or AtmosSc 2940 (230).	GEOG 5900: Online Autumn
GRADTDA 5620 Practical Learning and Mining for Big Data	3	TDAI/COE (CSE)			
CIVILEN 6211 Simulation of Building Energy Performance	3	COE (CEGE)			
ISE / ECE 5043 Power Systems-Analysis and Operation	3	COE (ISE / ECE)			
CRPLAN 5550 Financing Sustainability	3	COE (CRPPLAN)			
ENR 7400 Communicating Environmental Risk	3	CFAES (SENR)			
GEOG 5301 Sustainable Transportation	3	ASC (GEO)			

Courses	Credits	Colleges (Units)	Course Descriptions	Course Prerequisites	Modes of Delivery / Semester
			processes of the earth-atmosphere system, describe its weather features and climate characteristics today, and outline how they might change in the future because of global warming.		
			GRADTDA 5620: Building computational and interpretative skills in data analytics and computing foundations, students will explore practical ways to create data mining and machine learning workflows. Students will learn to mine associations and patterns, to classify, and build predictive models and recommendation systems for data and questions in the context of enterprises.	GRADTDA 5620: Enrolled in TDAI or MES degree program.	GRADTDA 5620: Online Summer
			CIVILEN 6211: Simulation of building energy consumption under various design or retrofit scenarios. Prediction of the impact of design decisions and energy conservation measures on building energy consumption. Employment of EnergyPlus and OpenStudio, free but sophisticated and open-source building energy modeling tools, to develop and simulate a model of a real building.	CIVILEN 6211: Grad standing in the College of Engineering, or permission of instructor.	CIVILEN 6211: In-Person Spring
			ISE / ECE 5043: Power systems analysis and operations, including steady-state analysis, state estimation, and economic operation.	ISE 5043: 3040, and ECE major; or Sr standing and ISE major; and MATH 2568; or Grad standing in engineering or biological sciences or math and physical sciences.	ISE 5043: In-Person Spring
			CRPLAN 5550: This course examines sustainability through the lens of financing. The primary foci are two essential elements of green infrastructure - food systems and clean energy. Students will explore the systems and industry behind food and energy and develop comprehensive road maps that	CRPLAN 5550: CRPLAN 3400, Grad standing, or permission of instructor.	CRPLAN 5550: Uncertain; has not been offered recently but could be offered with

Courses	Credits	Colleges (Units)	Course Descriptions	Course Prerequisites	Modes of Delivery / Semester
			communities can use to build robust and financially supported sustainability systems for food and energy. ENR 7400: Introduction to the design and implementation of public-focused risk communication as it relates to environmental, agricultural and public health contexts. GEOG 5301: Sustainable transportation generates accessibility while minimizing harm to people and the natural environment. This course examines the problems associated with transportation, including climate change, air quality, non-renewable resources, safety, congestion and social equity. We will also examine solutions to these problems, including pricing, planning, policy and technology.	ENR 7400: Graduate standing or permission of instructor GEOG 5301: None listed	demand (per Dr. Conroy) ENR 7400: In-Person Spring GEOG 5301: In-Person Spring
Sub-Total General Pathway Credits	**12**				
Capstone Courses (3 credits): Practicum + Seminar					
<insert alpha code> Practicum in Sustainable Energy	2	Interdisciplinary	Experiential learning opportunity with a public or private organization of agency.	Completion of a minimum of 12 credits of the curriculum	
EARTHSC 8860 Seminar in Energy Resources	1	ASC (SES)	Study of selected deposits of subsurface energy resources.	Permission of instructor. Repeatable to a max 12 cr.	Spring In-Person
Sub-Total Capstone Credits	**3**				
TOTAL MES Degree Curriculum Credits	**34**				

Appendix B

Program Implementation

1. **How will students be informed of the program?**

   There are multiple ways students will be informed of the program. We plan to:

   - Inform academic and faculty advisors of the opportunity to share with their undergraduate students in the three associated colleges, College of Food, Agricultural, and Environmental Sciences (Schol of Environment and Natural Resources), College of Arts and Sciences (School of Earth Sciences), and College of Engineering. Advisors in adjacent colleges (College of Public Health, Fisher College of Business, and the Glenn College of Public Affairs.
   - Create an accessible, dynamic webpage as part of the Sustainability Institute's website
   - Utilize internal Ohio State marketing –
     - Ohio State today
     - Advisor Beat (academic advising newsletter)
     - Sustainability Institute newsletters (faculty and external)
     - Sustainability Institute's Student Advisory Board
     - Sustainability Education and Learning Committee (SELC)
     - Honors and Scholars
     - Information for energy-related faculty to share in classes
     - CABS advertisement
   - Host student engagement activities focused on building the sustainable energy community
     - Sustainable Energy Accelerator (week-long competition where students work on a real-world challenge facing industry)
     - Sustainable Energy Networking Events (partnership with the Battelle Center for Science, Engineering, and Public Policy)
     - Battelle Center Student Community of Practice and Engagement events (hosted by Battelle Center)
   - Leverage external channels to communicate with prospective students
     - Sustainability Institute's external advisory board (when established)
     - Handshake events for internal and external audiences
     - Otterbein, Denison, Capital, Ohio Wesleyan, etc.

2. **How will students be advised regarding the opportunities and challenges associated with the option?**

   Prospective students will have access to information from the Sustainability Institute Website and will also be directed to the Program Coordinator and MES Program Co-Directors. Matriculated students will be provided with general advisement via Program Coordinator and posted Webpage information, plus designated faculty members, including but not limited to Program Co-Directors involved with the MES degree program.

3. **Describe how the success of the program will be assessed?**

   Refer to "Assessment" section of the proposal pages 12-14.

4. Specific actions and any corollary issues (positive and negative) that will arise from implementation. Frequently addressed issues include but are not limited to the following:

a) How will the proposal affect specific groups/constituencies (faculty, graduate/undergraduate students, staff, alumni, accrediting organizations, etc.)?

The Master of Energy Sustainability (MES) degree program will enhance opportunities to address employment needs and demands for the current and emerging energy workforce. In addition to pursuing the MES degree as a standalone degree program, undergraduate students will have the opportunity to take courses to prepare for the MES with the possibility of a 3+2 (AKA 4+1+1) combined BS-MES degree program. One of the goals of the MES degree program is to offer available and accessible pathways to energy careers for people from varied academic backgrounds. Faculty conducting applicable energy research projects at Ohio State will have a place to direct interested students. Additionally, since only one new course is being developed for the Generalist Pathway, associated faculty will not see a significant shift in their teaching obligations.

b) What programmatic changes will take place internally?

Three MES degree Program Co-Directors, one from each of the collaborating colleges, will be named to administer the program in partnership with the MES degree Program Coordinator housed in the Sustainability Institute.

c) How will the program affect students, faculty, and staff outside the proposing unit?

Since the MES degree program is interdisciplinary, there will be initial and eventual opportunities to expand the collaborative and cooperative partnerships with other academic units. This will occur naturally as new Specialization Pathways are developed and implemented as part of the MES degree program model as shown in Figure 1.

d) Does the content of the proposal overlap in scope or substance with the interests of other units?

The focus and content of the MES degree program does not conflict with or encroach on programs offered by other academic units. The degree program model, beginning with this initial MES degree Generalist Pathway, is designed to enhance expand opportunities for students as well as faculty members at Ohio State. In addition, as summarized on pages 6 and 7, the new MES degree program will be complementary to, not the same as, other graduate-level energy-related programs in the State.

e) A summary of the adequacy and availability of resources including but not limited to fiscal impact statements, commitments of funding from any sources, and memoranda of understanding between collaborating units.

An MOU will be developed with each collaborating unit to leverage and optimize the efficient use of essential resources in the form of people (e.g., faculty; staff), places (e.g., classrooms; labs), and things (e.g., funding; marketing/recruitment).

The Ohio State University
Board of Trustees

February 19, 2026

AMENDMENTS TO THE *RULES OF THE UNIVERSITY FACULTY*

Synopsis: Approval of the following amendments to the *Rules of the University Faculty* are proposed.

WHEREAS the University Senate, pursuant to rule 3335-1-09 of the Administrative Code, is authorized to recommend through the president to the Board of Trustees the adoption of amendments to the *Rules of the University Faculty* as approved by the University Senate; and

WHEREAS rule 3335-5-47.3 details the membership, duties and responsibilities of the Rules Committee of the University Senate; and

WHEREAS proposed amendments would enhance the continuity of the committee's work by updating term lengths for faculty and staff committee members to three years, renewable once for a total of six years, and also creating a chair-elect role to support leadership succession; and

WHEREAS rule 3335-13-08 sets forth the definition of research misconduct as defined by federal law, as well as the requirement that the university maintain a policy ensuring research integrity across the institution; and

WHEREAS rule 3335-5-04.2 outlines the process for complaints involving research misconduct made against faculty members; and

WHEREAS the rules and policies are required by, and must be aligned with, federal law as overseen by the Office of Research Integrity on behalf of the secretary of Health and Human Services; and

WHEREAS recent title changes at the university and updates to timelines and terminology in federal policy necessitate revisions to rules 3335-13-08 and 3335-5-04.2 to ensure alignment with federal law and current institutional practices; and

WHEREAS the proposed amendments were approved by the University Senate during its meeting on January 29, 2026:

NOW THEREFORE

BE IT RESOLVED, That the Board of Trustees hereby approves that the attached amendments to the *Rules of the University Faculty* be adopted as recommended by the University Senate.

The Ohio State University Board of Trustees
Academic Affairs & Student Life Committee

Topic:
Amendments to the *Rules of the University Faculty*

Summary:
The University Senate has recommended revisions to the *Rules of the University Faculty* in two areas:

1. **3335-5-47.3: Membership of the Rules Committee of the University Senate.**

    a. The Rules Committee is responsible for the monitoring of the *Rules of the University Faculty* and ensuring rules and bylaws within the Senate's purview are to up to date by making recommendations to the Senate and ultimately through the president to the Board of Trustees for approval.
    b. The current rule on membership of the Rules Committee defines three-year terms for faculty representatives and two-year terms for staff.
    c. The committee believes that three-year terms for both faculty and staff, renewable once for a total of six continuous years, would enhance continuity and support leadership and mentoring.
    d. The committee has also proposed electing a chair-elect every spring to better support leadership transition and continuity of the committee's work.

2. **3335-13-08 and 3335-5-04.2: Alignment of text related to research misconduct.**

    a. The proposed amendments to 3335-13-08 (Research misconduct) and 3335-5-04.2 (Procedures for complaints of research misconduct made against faculty members) would align titles, timelines and language with federal law and current institutional practices.
    b. Aside from a minor timeline change related to the window for faculty response to a preliminary investigative report, the procedure in 3335-5-04.2 is unchanged.

3335-5-47.3: Membership of the Rules Committee of the University Senate

3335-5-47.3 Rules committee.

(A) Membership.

The rules committee shall consist of eleven members.

1. Six faculty senators appointed by the executive committee of the faculty council
2. Three student~~s~~ senators.
    a. One graduate student.
    b. One professional student.
    c. One undergraduate student.
3. One staff senator, appointed by the university staff advisory committee.
4. The secretary of the university senate.
5. Three non-voting, ex-officio members.
    a. Executive vice president and provost or designee.
    b. Senior vice president and general counsel or designee.
    c. Recording secretary of the university senate

(B) Terms of Service

1. Faculty members shall serve three-year terms and are eligible for immediate reappointment to a second term. Faculty may serve no more than two consecutive terms (six years) on the committee.
2. Staff members shall serve three ~~two~~-year terms and are eligible for immediate reelection or reappointment to a second term. Staff may serve no more than two consecutive terms (six years) on the committee.
3. Student members shall serve one-year terms.
4. Members shall be senators during the first year of their term but may continue to serve on the rules committee after their senate term concludes.
5. ~~Members who are senators are eligible for immediate reelection or reappointment to a second term. Following that they are ineligible for reelection or reappointment until one full year has elapsed.~~
5. The chair shall be a faculty member and may not serve as chair for more than three successive years.
6. A chair-elect is elected every spring to serve as chair-elect during the following academic year. The chair-elect serves as chair the academic year thereafter.

(C) Duties and responsibilities.

1. Be responsible, in cooperation with the secretary of the university senate, for the monitoring of the "Rules of the University Faculty" and of all statutes and bylaws pertaining to the senate.
2. Ensure that all published rules and bylaws within the senate's purview are up to date, and

recommend their republication at such intervals as may be desirable.

3. Make recommendations for the revision of the procedural rules of the senate.
4. Before senate action, the committee shall receive all proposed new rules and changes in existing rules. It shall review them and recommend such editorial or other changes it deems necessary to avoid conflict with other rules, to enhance clarity and precision, and to avoid ambiguity.
5. Initiate rules or changes in existing rules and recommend them to the steering committee for scheduling for senate action.
6. The secretary of the university senate in agreement with the rules committee may make non-substantive corrections in diction and grammar, and is authorized to correct names of offices, officers, units, credentials or constituents in the bylaws and in the rules without deliberation by the university senate nor by the board of trustees.

(D) Organization.

As a standing committee of the senate, this committee is also governed by the provisions of rule 3335-5-46 of the Administrative Code.

3335-13-08 and 3335-5-04.2: Alignment of text related to research misconduct.

3335-13-08 Research misconduct.

The university shall have a policy on research misconduct ("the policy") issued and maintained by the university research committee. "~~r~~Research misconduct" means fabrication, falsification or plagiarism in proposing, performing, or reviewing research, or in reporting research results. Research misconduct does not include honest error or differences of opinion.

(A) Objectives.

1. The policy shall aim to protect both the integrity and the reputation of research and scholarship produced by members of the university community.
2. The policy shall aim to protect the integrity and reputation of the university and its scholars from false or unproven allegations of research misconduct. For this reason, the university assumes that a person accused of research misconduct is innocent of any allegations until the contrary has been established by a final decision reached under the policy and the applicable disciplinary rules or procedures. The procedures undertaken pursuant to the policy are intended to be investigatory, not adversarial.

(B) Jurisdiction.

1. The policy shall apply to all university personnel who may be involved with research activities, including faculty members, staff, students, research associates and fellows, post-doctoral fellows, and other research trainees.
2. The policy shall therefore apply to all research and scholarship conducted within the University community, irrespective of the funding source, if any, which supports the research or

scholarship.

3. The terms “research” and “scholarship” shall be broadly construed, including activities ranging from scientific experimentation to artistic expression to research and scholarship in the humanities.
4. All persons to whom the policy applies, including those accused of research misconduct, have a duty to cooperate with all proceedings under the policy as well as any subsequent investigations. Such cooperation shall include providing research records and other relevant information to the vice president for research and/or their designee.

(C) Confidentiality.

To the extent possible within the law and in accordance with the need to conduct a thorough inquiry, all participants in the actions initiated pursuant to the policy shall keep confidential all information regarding allegations and proceedings until the university process, including any disciplinary action, has concluded and all avenues of appeal under the university rules (if pursued) have been exhausted. ~~The vice president for research~~ The research integrity officers, in consultation with the institutional deciding official, shall be the university officials responsible for determining when a release of information is necessary or appropriate.

(D) Administration of the policy.

1. ~~The vice president for research~~ The research integrity officers shall be responsible for disseminating the policy to the research community and handling all allegations of research misconduct. In order to foster broad familiarity with the policy, as well as its flexibility regarding changing standards external to the university, the full policy document shall be publicized by the office of academic affairs, the graduate school, the office of human resources, the enterprise for research, innovation and knowledge, the office of research, the university research committee, the office of undergraduate research and creative inquiry, and the university senate.
2. ~~The vice president for research~~ The institutional deciding official shall designate ~~a coordinator to assist in~~ the research integrity officers as the responsible officials for administering the policy. ~~The person appointed as coordinator~~ The research integrity officers shall not be university counsel acting in that capacity, but shall consult with university counsel to ensure that the requirements of the law and university policy are being satisfied.

(E) Administrative Actions.

~~The vice president for research~~ The institutional deciding official may, during proceedings under the policy or any subsequent investigation, take whatever administrative actions that are in their judgment needed to ensure the integrity of the investigation and to protect research funds, material, ~~or~~ equipment, or records, or the legitimate interest of research subjects, patients, ~~or~~ clients, or research animals.

(F) Definitions.

The key terms for the policy shall be defined in the policy document.

(G) Procedures.

1. The policy shall describe procedures pertaining, but not limited to: assessing whether an allegation has been made in good faith and has merits; investigating pursuant to such findings; the role of administrators and other individuals in the process; the time line for such investigations; protecting data; reporting to sponsors and clients; and sanctions.
2. A finding of research misconduct requires that:
    a. There be a significant departure from accepted practices of the relevant research community;
    b. The misconduct be committed intentionally, knowingly, or recklessly; and
    c. The allegation be proved by a preponderance of the evidence.

3335-5-04.2 Procedures for complaints of research misconduct made against faculty members.

(A) This rule applies to complaints involving research misconduct made against faculty members. A faculty member may be disciplined up to and including termination for violations established under this rule. Research misconduct is defined in rule 3335-13- 08 and the Research Misconduct policy.

(B) ~~Preliminary a~~Assessment and inquiry.

1. Complaints alleging research misconduct must be filed with or referred to the Office of Research Compliance.
2. The Office of Research Compliance shall ensure that an ~~preliminary~~ assessment is performed in accordance with the Research Misconduct policy to determine whether the complaint alleges research misconduct as defined in the policy and is sufficiently credible and specific so that research misconduct may be identified.
3. If the ~~preliminary~~ assessment concludes that the allegations in the complaint meet the definition of research misconduct and are sufficiently credible and specific so that potential evidence of research misconduct may be identified, the Office of Research Compliance shall proceed to an inquiry review in accordance with the Research Misconduct policy to determine whether the allegations have sufficient substance to warrant an investigation.
4. If the inquiry concludes that the allegations have sufficient substance and that an investigation is warranted in accordance with the Research Misconduct policy, an investigation shall be initiated as set forth in section (C) of this rule. All other procedural steps, including but not limited to appeals, shall be performed in accordance with the Research Misconduct policy.
5. In both the ~~preliminary~~ assessment and inquiry steps, complainants and respondents shall be afforded procedural rights, including but not limited to the rights to review documentary evidence, submit evidence, be accompanied by an advisor, review and file a written response to reports, and make appeals, as specifically defined in the Research Misconduct policy.

(C) Investigation and sanctioning.

1. If a complaint is referred for investigation, the Office of Research Compliance shall convene an investigation and sanctioning committee consisting of a minimum of three voting members from the Research Integrity Standing Committee in accordance with the Research Misconduct policy.

2. The committee shall examine all the documentation and conduct formal interviews, when possible, of the respondent, the complainant, and others who may have information relevant to the complaint, but shall strive to maintain the confidentiality of the proceedings.
3. The respondent shall be given copies of any documentary evidence provided to the committee as part of the investigation and be given an opportunity to respond to all such documentation.
4. At the conclusion of the investigation, the committee shall prepare a preliminary report in accordance with this rule and the Research Misconduct policy. Findings and conclusions shall be based on the preponderance of the evidence standard. The respondent shall have ~~fourteen~~ thirty days to respond and to identify any alleged errors or omissions in the preliminary report.

….

7. After receipt of any comments from the respondent, the committee shall complete its investigation and submit its final report to the Institutional Deciding Official set forth in the Research Misconduct policy in accordance with that policy. If the committee concludes that research misconduct occurred, the respondent shall have the right to submit an appeal of that decision to the Institutional Deciding Official in accordance with the Research Misconduct policy.
    a. If a finding of research misconduct is confirmed following review of the report and any appeals by the Institutional Deciding Official, the case shall be referred to the respondent's dean for further proceedings under section (D) of this rule. If no finding of research misconduct is made following such review, the case shall be dismissed.

….

The Ohio State University
Board of Trustees

February 19, 2026

ADOPTION OF RESOLUTION SPECIFYING CONDITIONS FOR EXEMPTIONS TO THE CIVIC LITERACY COURSE REQUIREMENTS IN OHIO SENATE BILL 1, THE ADVANCE OHIO HIGHER EDUCATION ACT

Synopsis: Adoption of resolution specifying conditions for exemptions to the civic literacy course requirements in Ohio Senate Bill 1, the Advance Ohio Higher Education Act.

WHEREAS Ohio Senate Bill 1 (SB1), the Advance Ohio Higher Education Act, took effect on June 27, 2025; and

WHEREAS SB1 provides that, among other things, undergraduate students who will graduate beginning in the spring semester of 2030 must complete a course on civic literacy unless the president of the university or his designee has granted an exemption as permitted by law pursuant to R.C. 3345.382; and

WHEREAS House Bill 96 (HB96) requires the Board of Trustees to adopt a resolution specifying the conditions upon which an exemption from the civic literacy course requirements may be granted in accordance with law; and

WHEREAS, to fulfill these requirements, the president or his designee may only grant an exemption from the civic course requirement to an undergraduate student when they determine that the student has completed one of the following alternative requirements set forth in R.C. 3345.382(D):

- A course offered under the college credit plus program established under Chapter 3365 of the Revised Code that satisfies the content requirements set forth in R.C. 3345.382(B) and has been approved as an alternative by the chancellor of the Ohio Department of Higher Education (ODHE);
- An advanced placement course and examination that satisfies the content requirements set forth in R.C. 3345.382(B) and has been approved as an alternative by the chancellor of the ODHE, provided that the student received a score of three or higher on that examination; or
- A three-or-more credit hour course or equivalent in a course in the subject area of American history or American government that includes the study of the documents set forth in R.C. 3345.382(B)(1)-(7), provided that this alternative does not apply after the 2030-2031 academic year.

WHEREAS the board recognizes that these are the only exemptions that may be granted to the civic literacy course requirement pursuant to SB1:

NOW THEREFORE

BE IT RESOLVED, That the Board of Trustees hereby adopts this resolution to specify the conditions for exemptions to the civic literacy course requirement set forth in R.C. 3345.382, and directs the president to take all required steps to submit this resolution to the chancellor of higher education as required by law.

The Ohio State University
Board of Trustees

February 19, 2026

ADOPTION OF RESOLUTION ESTABLISHING PROCESS TO REVIEW AND APPROVE NEW ACADEMIC PROGRAMS, DEGREE PROGRAMS, CURRICULA/COURSES, GENERAL EDUCATION REQUIREMENTS, COLLEGES, DEPARTMENTS, SCHOOLS, CENTERS AND INSTITUTES

Synopsis: Adoption of resolution establishing process to review and approve new academic programs, degree programs, curricula/courses, general education requirements, colleges, departments, schools, centers and institutes.

WHEREAS Ohio House Bill 96 (HB96), the 2025 Ohio budget bill, provides in R.C. 3345.457 that the Board of Trustees "has ultimate authority to establish new academic programs, schools, colleges, institutes, departments, and centers at the institution" and "may not delegate [its] authority to adopt a curricular approval process under this section or to approve or reject academic programs"; and

WHEREAS R.C. 3345.457(C) further requires the board to adopt an approval process for the above matters that grants the University Senate or a comparable representative body the ability to provide advice, feedback and recommendations on an advisory basis but that reserves final, overriding internal approval authority for the board itself; and

WHEREAS the university currently has different review and approval processes for these matters that vary based on the nature of the matter at issue; and

WHEREAS, to fulfill the above requirements, the board adopts the following approval processes for each specified item, with all steps prior to board review being advisory in nature and subject to the board's final, overriding authority:

- New curricula/course proposals must be submitted to: (1) the applicable college for review at the departmental level (where applicable) and by the college curriculum committee; (2) the Office of Academic Affairs (OAA) for review; and (3) the board for review and final approval;
- New academic program proposals must be submitted to: (1) the applicable college for review; (2) the University Senate (Senate) Council on Academic Affairs (CAA) for review; (3) the board for review and final approval; and (4) the Ohio Department of Higher Education (ODHE) for its review and approval;
- New degree program proposals must be submitted to: (1) the applicable college for review; (2) CAA for review; (3) the Senate Faculty Council (FC) for review; (4) the Senate for review; (5) the board for review and final approval; and (6) ODHE for its review and approval;
- New general education program proposals must be developed by the University-Level Advisory Committee for General Education (ULAC-GE) and submitted to: (1) CAA for review; (2) FC for review; (3) Senate for review; and (4) the board for review and final approval;
- New college, department and school proposals must be submitted to: (1) CAA for review; (2) FC for review; (3) the Senate for review; and (4) the board for review and final approval;
- New university-level center proposals must be submitted to: (1) CAA for review; (2) FC for review; (3) the Senate for review; and (4) the board for review and final approval; and
- New college-level center proposals must be submitted to: (1) the relevant dean(s) for review; (2) CAA for review; and (3) the board for review and final approval.

NOW THEREFORE

BE IT RESOLVED, That the Board of Trustees hereby adopts the above approval processes to satisfy the requirements of R.C. 3345.457 and directs the president to take all required steps to submit this resolution to the chancellor of higher education as required by law.

FACULTY PERSONNEL ACTIONS

BE IT RESOLVED, That the Board of Trustees hereby approves the faculty personnel actions as recorded in the personnel budget records of the university since the December 4, 2025, meeting of the board, including the following appointments, appointments/reappointments of chairpersons, faculty professional leaves and emeritus titles:

Appointments

Name:	ROBERT BAKER
Title:	Professor (Andrei Baronov and Ratmir Timashev Professorship in Chemical Physics)
College:	Arts and Sciences
Term:	January 1, 2026, through December 31, 2029

Name:	JOHN BOZINOVSKI
Title:	Professor-Clinical (The Gerard S. Kakos, MD and Thomas E. Williams, Jr., MD, PhD, Professorship)
College:	Medicine
Term:	March 1, 2026, through June 30, 2030

Name:	JESSICA MERLIN
Title:	Professor (The Julius F. Stone Chair in Cancer Research)
College:	Medicine
Term:	January 1, 2026, through June 30, 2030

Name:	AMY MOORE
Title:	Interim Dean
College:	Medicine
Term:	January 20, 2026

Name:	DANIEL PREVEDELLO
Title:	Professor (Dr. John M. McGregor Department of Neurosurgery Professorship)
College:	Medicine
Term:	January 1, 2026, through June 30, 2030

Name:	W. KIMRYN RATHMELL
Title:	Professor and Chief Executive Officer (Jeri B. Block and Robert H. Schottenstein Distinguished Chair in Cancer)
College:	Medicine
Term:	May 27, 2025, through May 26, 2030

Name:	CURTIS ROTH
Title:	Associate Professor (Robert S. Livesey Professor in Architecture)
College:	Engineering
Term:	January 1, 2026, through June 30, 2027

Name:	TRIPARNA SEN
Title:	Professor (The Max Morehouse Chair in Cancer Research)
College:	Medicine
Term:	January 1, 2026, through June 30, 2030

Name:	STEPHANUS VILJOEN
Title:	Associate Professor-Clinical (The William E. Hunt, M.D. and Charlotte M. Curtis Chair in Neuroscience)
College:	Medicine
Term:	March 1, 2026, through June 30, 2030

Name:	LIN ZHU
Title:	Assistant Professor (Elizbeth McKeever Ross Professorship Fund)
College:	Medicine
Term:	November 1, 2025, through June 30, 2028 (Correction of dates from last meeting)

Reappointments

Name:	ERIC GREEN
Title:	Professor (Excellence in Veterinary Care Diagnostic Imaging Chair)
College:	Veterinary Medicine
Term:	March 5, 2026, through June 30, 2027

Name:	AYANNA HOWARD
Title:	Dean and Monte Ahuja Endowed Dean’s Chair
College:	Engineering
Term:	July 1, 2026, through June 30, 2031

Name:	DANA RENGA
Title:	Professor (Divisional Dean for Arts and Humanities)
College:	Arts and Sciences
Term:	July 1, 2026, through June 30, 2031

Name:	CARROLL ANN TROTMAN
Title:	Dean
College:	Dentistry
Term:	July 1, 2026, through June 30, 2031

Name:	LYDIA WALKER
Title:	Assistant Professor (Seth Andre Myers Chair in Global Military History)
College:	Arts and Sciences
Term:	December 4, 2025, through August 14, 2027

Extensions

*New Hire

Appointments/Reappointments of Chairpersons

SUE SUTHERLAND, Interim Chair, Department of Human Sciences, January 1, 2026, through July 31, 2027

**Reappointment
*New Hire

Faculty Professional Leaves

JAIDEEP ANAND, Professor, Department of Management and HR, FPL for Spring 2027

DANIEL CHOW, Professor, College of Law, FPL for Spring 2027

TIMOTHY JUDGE, Professor, Department of Management and HR, FPL for Fall 2026 and Spring 2027

EWA SLETTEN, Associate Professor, Department of Accounting and MIS, FPL for Spring 2027

Faculty Professional Leave Changes/Cancellations

SAM DAVANLOO, Associate Professor, Department of Integrated Systems Engineering, Cancellation of FPL for Spring 2026

AYMAN FAYED, Professor, Department of Electrical and Computer Engineering, Cancellation of FPL for Spring 2026

RATTAN LAL, University Distinguished Professor, School of Environment and Natural Resources, Cancellation of FPL for Spring 2026

KELLY PURTELL, Associate Professor, Department of Human Sciences, Cancellation of FPL for Spring 2026

Emeritus Titles

ALISON ARMSTRONG, University Libraries, with the title of Associate Professor Emeritus, effective January 1, 2026

ARVED ASHBY, School of Music, with the title of Professor Emeritus, effective January 1, 2026

VALERIE BERGDALL, Department of Veterinary Preventive Medicine, with the title of Professor-Clinical Emeritus, effective July 1, 2025

GREGORY CALDEIRA, Department of Political Science, with the title of Professor Emeritus, effective January 1, 2026

JOAN CASHIN, Department of History, with the title of Professor Emeritus, effective June 1, 2026
DAVID CASTELLANO, Department of Ophthalmology and Visual Sciences, with the title of Assistant Professor-Clinical Emeritus, effective February 2, 2026

PHILIP DIAZ, Department of Internal Medicine, with the title of Professor Emeritus, effective April 1, 2026

PHILIP GRANDINETTI, Department of Chemistry and Biochemistry, with the title of Professor Emeritus, effective January 1, 2026

ANN GRIFFEN, College of Dentistry, with the title Professor Emeritus, effective January 1, 2026

REBECCA GUTMANN, Department of Anesthesiology, with the title of Assistant Professor-Clinical Emeritus, effective July 1, 2026

J. ALBERT HARRILL, Department of History, with the title of Professor Emeritus, effective January 1, 2026

ROBERT HOFFMAN, Department of Pediatrics, with the title of Professor Emeritus, effective March 1, 2026

EUGENE LEYS, College of Dentistry, with the title of Professor Emeritus, effective January 1, 2026

ROBERT LIVINGSTON, Department of Comparative Studies, with the title of Associated Faculty Emeritus, effective January 1, 2026

SUE OAKES, Marion Campus, with the title of Associated Faculty Emeritus, effective January 1, 2026

NARASIMHAM PARINANDI, Department of Internal Medicine, with the title of Associate Professor Emeritus, effective July 1, 2026

DONNA PASTORE, Department of Human Sciences, with the title of Professor Emeritus, effective August 1, 2026

JIM PECK, Department of Economics, with the title of Professor Emeritus, effective June 1, 2026

JAMES HARRY SANDERS III, Department of Arts Administration, Education and Policy, with the title of Associate Professor Emeritus, effective September 1, 2025

ERIC SCHNELL, University Libraries, with the title of Professor Emeritus, effective January 1, 2026

CLARE SIMMONS, Department of English, with the title of Professor Emeritus, effective June 1, 2026

2025/2026 Hires

COLLEGE OF ARTS AND SCIENCES
CLINICAL

DIVISION OF ARTS AND HUMANITIES

REAPPOINTMENT

Blosser, C. Andrew, School of Music, August 15, 2026
Brown, Christopher, Classics, August 15, 2026
Brown, Steven, Philosophy, August 15, 2026
Burns, Miriam, School of Music, August 15, 2026
Dawson, Hope, Linguistics, January 1, 2027
Funk, Clayton, Arts Administration, Education and Policy, January 1, 2027
Labaki, Marie-Therese, Near Eastern and South Asian Languages and Cultures, August 15, 2026
Myers, Helen, Slavic and East European Languages and Cultures, August 15, 2026
Patel, Ketal, Arts Administration, Education and Policy, January 1, 2027
Portune, Laura, School of Music, January 1, 2027
Richards, Kevin, Germanic Languages and Literatures, January 1, 2027
Saul, Jordan, School of Music, January 1, 2027
Scott, Deborah, Design, January 1, 2027
Singleton, Lynn, School of Music, August 15, 2026
Smith, Michael, School of Music, January 1, 2027
Taketa, Edward, Dance, January 1, 2027
Taylor, Christopher, Art, Newark, August 15, 2026
Torres, Michael, School of Music, August 15, 2026
Weintritt, April, French and Italian, August 15, 2026

DIVISION OF NATURAL AND MATHEMATICAL SCIENCES

REAPPOINTMENT

Poole, Daniel, Mathematics, August 15, 2026
Ramsey, Bobby, Mathematics, August 15, 2026

DIVISION OF SOCIAL AND BEHAVIORAL SCIENCES

REAPPOINTMENT

Bromwich, David, Geography, August 15, 2026
Cravens-Brown, Lisa, Psychology, January 1, 2027
Hoglund, Evelyn, Speech and Hearing Science, August 15, 2026
Kraft, Nicole, School of Communication, August 15, 2025
Sonntag, Amy, Speech and Hearing Science, May 20, 2026
Sterenberg, Mary, School of Communication, August 15, 2026
Trask, Lexine, Anthropology, January 1, 2027

COLLEGE OF ENGINEERING
CLINICAL

REAPPOINTMENT
Soto-Caban, Sandra, Electrical and Computer Engineering, August 15, 2026

COLLEGE OF MEDICINE

PROMOTION TO PROFESSOR WITH TENURE
Donia, Marco, Internal Medicine, February 1, 2026
Evans, Steven, Psychiatry and Behavioral Health, December 1, 2025
Gold, Jennifer, Biomedical Education and Anatomy, December 1, 2025
Kim, Harrison, Radiology, December 3, 2025
Smith, Bryan, Molecular Medicine and Therapeutics, January 22, 2026

PROMOTION TO ASSOCIATE PROFESSOR WITH TENURE
Hughes, Jennifer, Psychiatry and Behavioral Health, January 1, 2026

PROMOTION TO ASSOCIATE PROFESSOR WITHOUT TENURE
Kawasumi, Masaoki, Dermatology, January 1, 2026
Lin, Qing, Surgery, December 3, 2025
Nho, Richard, Internal Medicine, January 12, 2026

COLLEGE OF MEDICINE
RESEARCH

REAPPOINTMENT
Daruwala, Samantha, Psychiatry and Behavioral Health, July 1, 2026
Dorayappan, Kalpana, Obstetrics and Gynecology, July 1, 2026
Mishra, Sanjay, Pathology, August 15, 2026

HONORARY DEGREE

Synopsis: Approval of the honorary degree listed below is proposed.

WHEREAS pursuant to paragraph (A)(3) of rule 3335-1-03 of the Administrative Code, the president, after consultation with the Steering Committee of the University Senate, recommends to the Board of Trustees the awarding of the honorary degree as listed below:

E. Roe Stamps IV	Doctor of Public Service, *honoris causa*

NOW THEREFORE

BE IT RESOLVED, That the Board of Trustees hereby approves the awarding of the above honorary degree.

E. Roe Stamps IV

FOUNDER
STAMPS SCHOLARS PROGRAM

E. Roe Stamps, **IV** of Coconut Grove, FL, is a private investor and co-founder of the Boston-based private investment company Summit Partners. He is a former Lieutenant in the United States Navy Reserve, an Industrial Engineering graduate of Georgia Tech, and an MBA graduate from Harvard Business School.

Since his relocation to South Florida in 1993, Roe, along with his wife Penny, has devoted significant time and resources to philanthropic causes in the community. Their interest in South Florida is deeply rooted, as they have been long time supporters of the University of Miami, the Grayvik Animal Care Center, Fairchild Tropical Garden, the Make-A-Wish Foundation of Southern Florida, Miami Lighthouse for the Blind, Community Partnership for the Homeless, Ransom Everglades School, Breakthrough Miami and a number of other charities throughout the region.

Through the Strive Foundation, formed by Penny and Roe in 1986, they have shown their deep commitment to education, supporting projects and scholarships at more than 40 universities nationwide. And with its Stamps Scholars initiative, the family Foundation has created innovative scholarship programs currently supporting nearly 1,000 students.

Roe is a Trustee Emeritus of the Georgia Tech Foundation, and a Trustee at the University of Miami, the John S and James L Knight Foundation and several other distinguished organizations. At Georgia Tech, Roe served the Foundation for over 16 years. He has received the Distinguished Alumnus Award from the School of Industrial and Systems Engineering and the Joseph Mayo Pettit Alumni Distinguished Service Award, the highest award conferred by the Georgia Tech Alumni Association. He was inducted into Georgia Tech's Engineering Hall of Fame in 2001 and received an honorary Doctor of Philosophy in 2014.

In 2010, Roe was honored by the American Red Cross South Florida Region as the Humanitarian of the Year. In 2012, he was honored by Harvard Business School, receiving its most prestigious award, the Alumni Achievement Award.

Roe now dedicates his time to his personal interests, which include fly-fishing, bird hunting, flying, boating, jazz piano and spending time with his family.

Adapted from stampsscholars.org

DEGREES AND CERTIFICATES

Synopsis: Approval of Degrees and Certificates for spring term 2026 is proposed.

WHEREAS pursuant to paragraph (E) of rule 3335-1-06 of the Administrative Code, the Board of Trustees has authority for the issuance of degrees and certificates; and

WHEREAS the faculties of the colleges and schools shall transmit, in accordance with rule 3335-9-29 of the Administrative Code, for approval by the Board of Trustees, the names of persons who have completed degree and certificate requirements:

NOW THEREFORE

BE IT RESOLVED, That the Board of Trustees hereby approves the degrees and certificates to be conferred on May 10, 2026, to those persons who have completed the requirements for their respective degrees and certificates and are recommended by the colleges and schools.