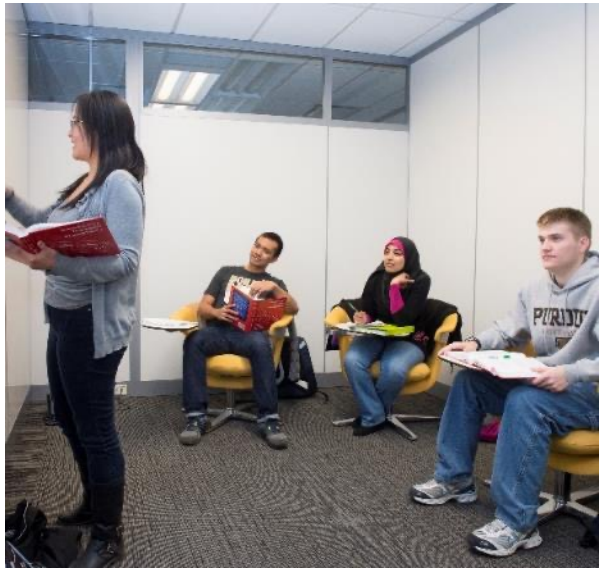
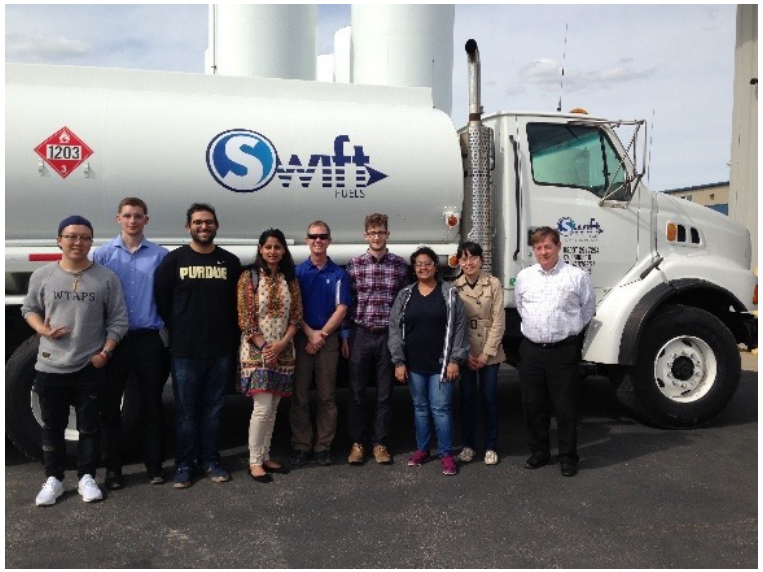
Chemical Engineering Professional MS Program





Dr. William Clark

Professor of Practice
Director, Professional MS Program
Davidson School of Chemical Engineering
Purdue University

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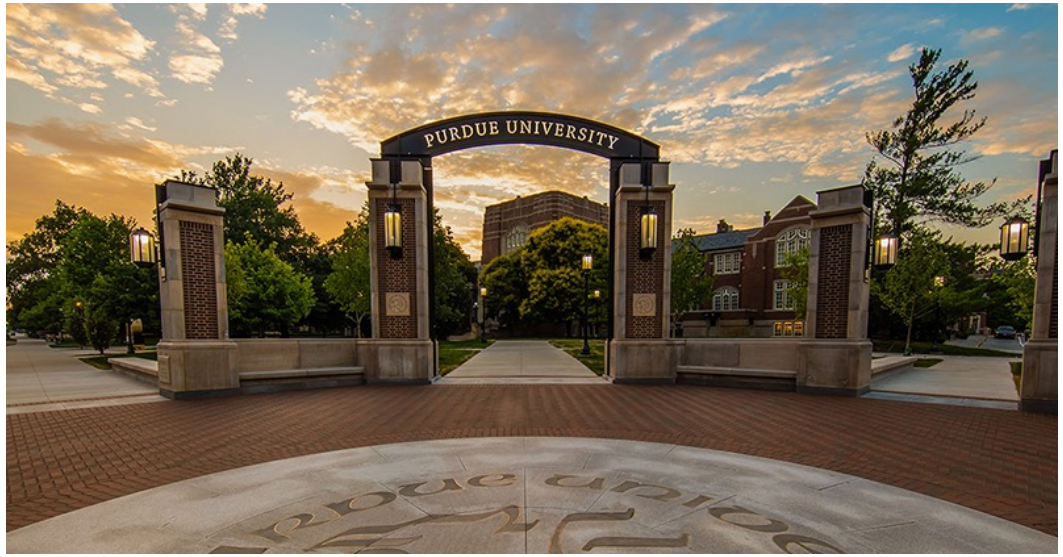
Overview of Professional Master's Program (PMP)

- Designed to supplement students' undergraduate education with a curriculum that prepares them for success in technical management and advanced degree programs
- Curriculum consists of core chemical engineering courses along with business courses, including operations and project management
- PMP graduates derive significant benefit from their connection to Purdue University and its Top 5 College of Engineering



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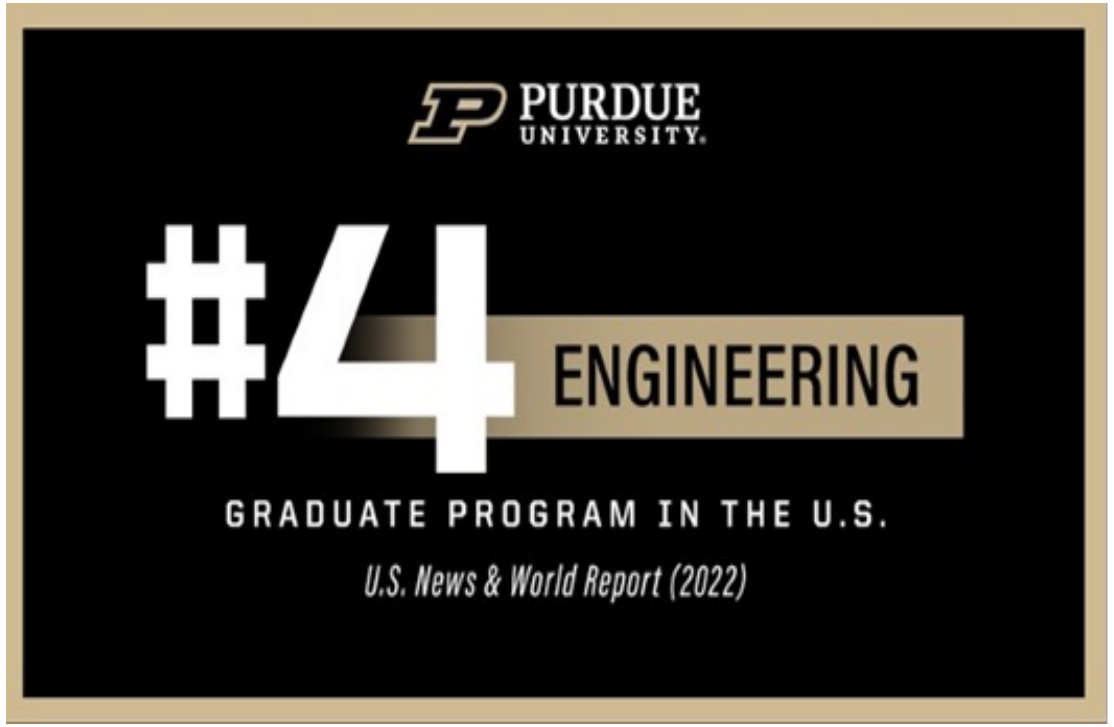

Davidson School of Chemical Engineering and Purdue

- Chemical engineering undergraduate program
  - Total enrollment (across three classes for years 2, 3, and 4) of ~600 students
  - Annual salary upon graduation: $75,000 - $80,000
- Chemical engineering PhD program
  - 25-30 new students typically accepted each year
  - Current total enrollment: 166
  - Average annual salary upon graduation: $113,200
- Purdue College of Engineering (all engineering disciplines): *"Excellence at Scale"*
  - Graduate programs ranked #4 by *US News and World Report* (2022)
  - Undergraduate programs ranked #9 by *US News and World Report* (2022)
  - Top 5 among US public universities as choice for international students

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The Program is Scheduled for 1 Year in Duration*

Plan of Study

- 6 ChE Core Credits (2 Courses)
- 9 Concentration Core Credits (3 Courses)
- 9 Management Credits (3 Courses)
- 6 Capstone Research Project Credits (1 Dedicated Summer Course)

**: This applies to students with an undergraduate chemical engineering degree. The duration for students with other undergraduate degrees is typically 1.5 years (see next slide).*

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Professional Master's Program Degree Map

MSChE – Biochemical Engineering

30 credits required for graduation
Students must have a graduation index of 2.7 (B-) or higher
Students must earn a "C" or better in all graduate-level coursework
Students must complete at least 15 credits of coursework with a CHE prefix

Degree Map

Fall Semester (12 credits)

___ (3) CHE 69700 – Statistical Methods in Chemical Engineering *OR* (3) CHE 59700 – Engineering Math
___ (3) MGMT 62000 – Marketing Management
___ (3) Concentration Selective Course *(chosen from the list below)*
___ (3) Concentration Selective Course *(chosen from the list below)*

Spring Semester (12 credits)

___ (3) CHE 54000 – Transport Phenomena
___ (3) CHE 59700 – Financial Analysis & Management of Projects
___ (3) MGMT 65000 – Strategic Management I *OR* (3) MGMT 66000 – Intro to Operations Management
___ (3) Concentration Selective Course *(chosen from the list below)*

Summer Semester (6 Credits)

___ (6) CHE 59700 – Prof. MS Capstone Project

Potential Concentration Selective Courses:

___ (3) ABE 55500 – Bio & Food Processing Unit Ops
___ (3) ABE 55800 – Process Design for Food & Bio Sys
___ (3) ABE 56000 – Biosensors
___ (3) ABE 58000 – Process Eng of Renewal Resources
___ (3) ABE 68000 – Bioseparations & Bioprocess Eng
___ (3) BCHM 56100 – General Biochemistry I
___ (3) BME 69500 – Polymers in Bio & Pharma Sys
___ (3) CHE 52500 – Bioprocess Engineering
___ (3) CHE 55800 – Bioseparations
___ (3) CHE 59700 – Analytical Methods in Healthcare
___ (3) CHE 59700 – Eng Applications of Bio Molecules
___ (3) CHE 59700 – Medical Devices Dev & Application
___ (3) CHE 59700 – Pharma Process Dev & Design
___ (3) CHE 59700 – Principles of Pharma Design
___ (3) CHE 62300 – Advanced Separations
___ (3) CHE 69700 – Metabolic Engineering
___ (3) CHM 53300 – Introductory Biochemistry
___ (3) CHM 53400 – Biochemistry II
___ (3) CHM 53800 – Molecular Biotechnology
___ (3) IPPH 58300 – Biopharmaceutics

Sample Curriculum for Non-ChE Major

Plan of Study

- 11 Pre-Req Credits (3 Courses)
- 6 ChE Core Credits (2 Courses)
- 9 Concentration Core Credits (3 Courses)
- 9 Management Credits (3 Courses)
- 6 Capstone Research Project Credits (1 Dedicated Summer Course)

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Professional Master's Program Degree Map

MSChE – Biochemical Engineering – 16 month Track

30 credits required for graduation
Students must have a graduation index of 2.7 (B-) or higher
Students must earn a "C" or better in all graduate-level coursework
Students must complete at least 15 credits of coursework with a CHE prefix

Degree Map

Fall Semester 1 (10 credits)

___ (4) CHE 20500 – Chemical Engineering Calculations
___ (3) CHE 69700 – Statistical Methods in Chemical Engineering *OR* (3) CHE 59700 – Engineering Math
___ (3) Concentration Selective Course (from the list below)

Spring Semester 1 (13-16 credits)

___ (3) CHE 30600 – Separations Processes
___ (4) CHE 34800 – Reaction Engineering
___ (3) CHE 54000 – Transport Phenomena
___ (3) CHE 59700 – Financial Analysis & Management of Projects
___ (3) MGMT 65000 – Strategic Management I *OR* (3) MGMT 66000 – Intro to Operations Management

Summer Semester 1 (6 Credits)

___ (6) CHE 59700 – Prof. MS Capstone Project

Fall Semester 2 (9 Credits)

___ (3) MGMT 62000 – Marketing Management
___ (3) Concentration Selective Course (from the list below)
___ (3) Concentration Selective Course (from the list below)

Potential Concentration Selective Courses:

___ (3) ABE 55500 – Bio & Food Processing Unit Ops
___ (3) ABE 55800 – Process Design for Food & Bio Sys
___ (3) ABE 56000 – Biosensors
___ (3) ABE 58000 – Process Eng of Renewal Resources
___ (3) ABE 68000 – Bioseparations & Bioprocess Eng
___ (3) BCHM 56100 – General Biochemistry I
___ (3) BME 69500 – Polymers in Bio & Pharma Sys
___ (3) CHE 52500 – Bioprocess Engineering
___ (3) CHE 55800 – Bioseparations
___ (3) CHE 59700 – Analytical Methods in Healthcare
___ (3) CHE 59700 – Eng Applications of Bio Molecules
___ (3) CHE 59700 – Medical Devices Dev & Application
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___ (3) CHM 53300 – Introductory Biochemistry
___ (3) CHM 53400 – Biochemistry II
___ (3) CHM 53800 – Molecular Biotechnology
___ (3) IPPH 58300 – Biopharmaceutics

Most Recently Added Concentration: Data Science

- Biochemical engineering
- Pharmaceutical engineering
- Energy systems
- Gas and petroleum engineering
- Kinetics/catalysis
- Polymer engineering
- **Data science**

Industry Sponsors for 2022 Capstone Projects

Program Differentiation

- Purdue is the only public institution offering a large-scale ChE PMP.
- Our large faculty roster allows for students to enroll in 1 of 7 concentrations, so that they can take courses tailored to their future career goals. This also allows for significant flexibility in the schedule.
- The 3 required management courses provide a clear difference between our program and other well-established professional MS programs.
- Our 1-year timeline for ChE undergraduates and 1.5-year timeline for science majors is an attractive component.
- Similar to the MIT Practice School, the opportunity for students to collaborate with industry mentors during the capstone projects is a cornerstone of the program.

"End-to-End" Student Opportunities

- In addition to academic excellence, a consistent focus on career goals
  - Multiple engagement possibilities to learn about industry opportunities throughout the year as part of a Professional Development series
  - Mentoring
  - Internships
- While most capstone projects are collaborations with industry, academic (lab-based) capstone projects with a faculty member are available for students considering a PhD pathway.
- Engagement with our department's Center of Excellence in process safety (Purdue Process Safety Assurance Center; P2SAC: https://engineering.purdue.edu/P2SAC) through capstone and other research projects
- Post-graduate research associate positions at our department's Center of Excellence in lyophilization (LyoHUB; https://pharmahub.org/groups/lyo) for international students
- Established pipelines for employment opportunities at companies participating in our capstone program

Graduate Spotlight: Yashashree Watkar (2019)

Yashashree Watkar

McKinsey || Nestle HealthScience || Purdue BoilerMaker

View full profile

Yashashree Watkar • 1st
McKinsey || Nestle HealthScience || Purdue BoilerMaker
2h • Edited •

After almost 2.8 years with Nestlé, especially in Nestle Health Science, I believe I am ready and confident to take the next giant leap in the industry. NHSc at EC has been nothing but an inspiration and immensely knowledgeable stepping stone in my career. I hope to take these learnings forward and apply them in the most innovative ways possible. Thank you everyone at Nestle for making me this capable!!!
I now look forward to embark on a new journey with McKinsey & Company.
Someone rightly said, the best time for new beginnings is now !

#changeisconstant #Nhsc #nestlé #mckinsey #operations

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Graduate Spotlight: Vito Maglio (2020)*

Experience

Senior Associate Scientist, Formulation

Pfizer · Full-time

Sep 2020 – Present · 1 yr 1 mo

Andover, Massachusetts, United States

Capstone Project

Purdue University · Full-time

May 2020 – Aug 2020 · 4 mos

West Lafayette, Indiana, United States

Generated a python model to predict the primary drying for several formulations, vial sizes, and fill volumes. As a result of the computation I generated product temperature design space and sublimation rate design space with a wide range of shelf temperatures and chamber pressures commonly used in commercial freeze dryers.

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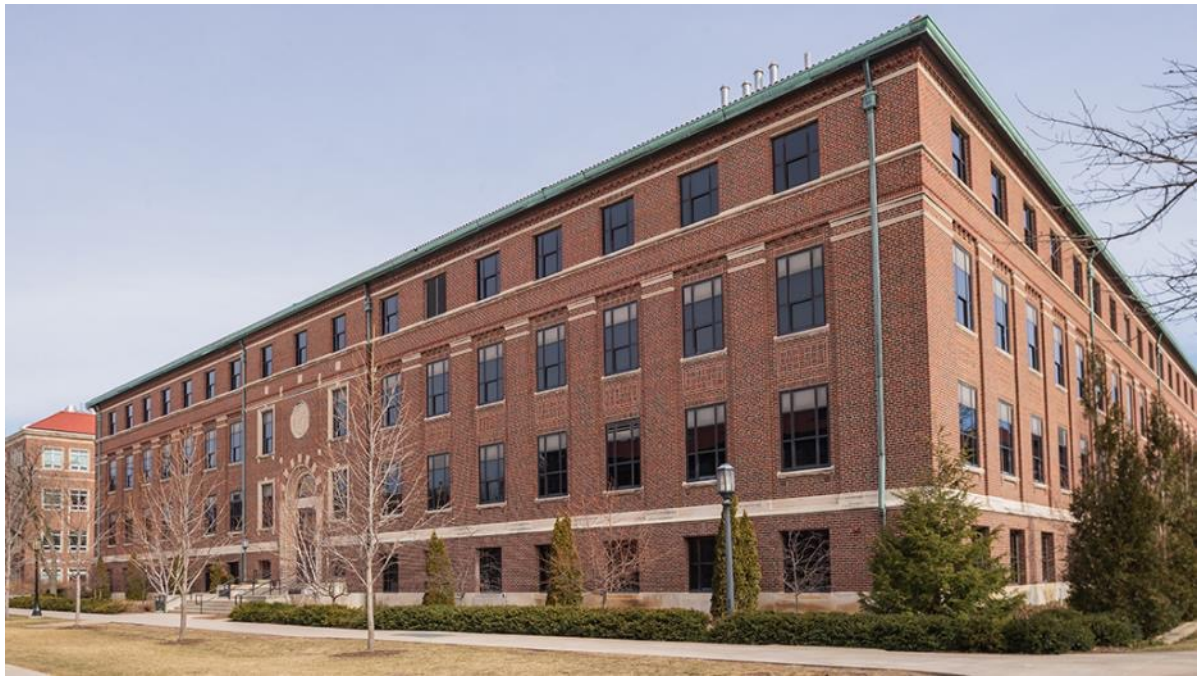
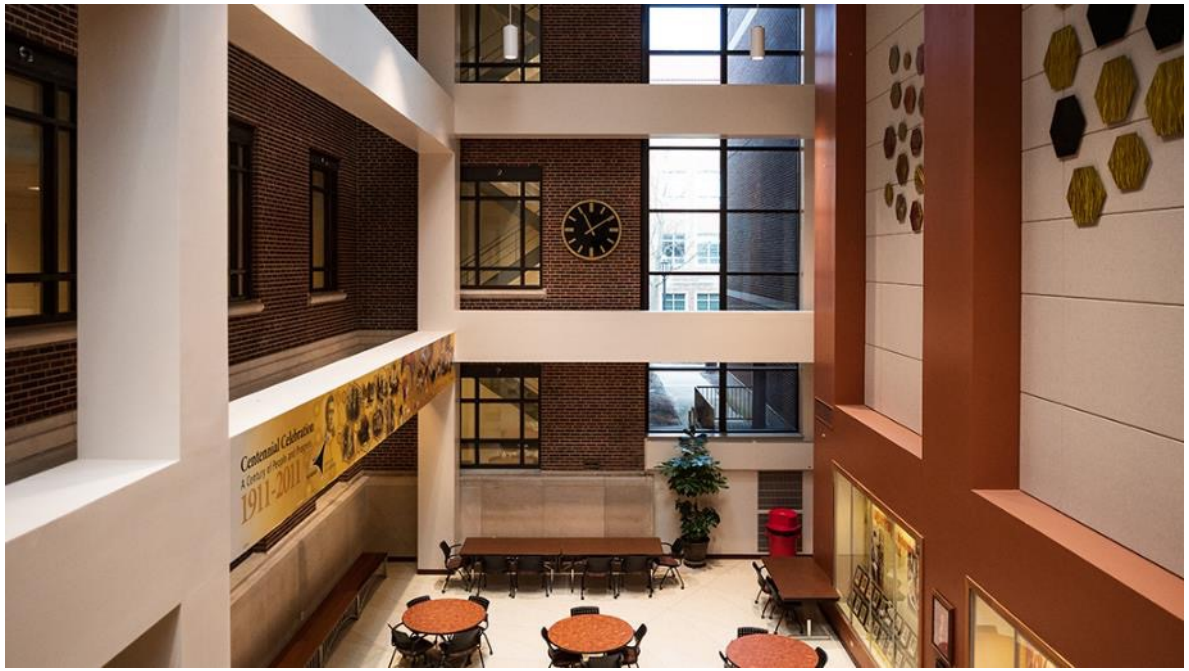
***: Capstone project was Pfizer/Allergan collaboration established through LyoHUB**

Thank You!





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https://engineering.purdue.edu/ChE/academics/graduate/masters

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