A Robotics Engineering Major

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Research in Robots for Education
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Major Contributors

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- Michael A. Demetriou, ME
- Brad A. Miller, ME
- Yiming Rong, ME
- Lance E. Schachterle, HUA & Associate Provost
- Kenneth A. Stafford, ME
- Grétar Tryggvason, ME
Motivation for Robotics Major

Growth in importance of Robotics

- Push of tech capability \(\uparrow\) & cost \(\downarrow\)
- Pull of consumer, defense, entertainment, elder care, med

K-12 interest in Robotics

- Offer students what they want

Great fit for WPI

- Strong CS, ECE, ME
- Project-based curricula
- FIRST Team 190 tradition

Lead

- Who are Schmied, Marmet, Reist, von Gunten?
Principles

- Clearly articulated objectives
- Broadly-based program
- Flexible
- Accreditable
- 4 years
- Consistent w/ WPI educational philosophy
Program Objectives

- Have a basic understanding of the **fundamentals** of CS, ECE, ME, and Systems Engineering.
- **Apply** these abstract concepts and practical skills to design and construct robots and robotic systems for diverse applications.
- Have the imagination to see how robotics can be used to improve society and the **entrepreneurial** background and spirit to make their ideas become reality.
- Demonstrate the **ethical behavior and standards** expected of responsible professionals functioning in a diverse society.
Other Principles

Broadly-based Program
- **ECE**: Embedded Computing Systems
- **CS**: Algorithms and Software Engineering
- **ES/ME**: Statics and Controls

Flexibility
- **Electives**: Robotics & unrestricted
- **Paths**: Multiple
Other Principles

Accreditable
- Adds credibility for students, faculty
- FPE Exam, ROTC

4 years
- Fits better in 5, but…

WPI Philosophy
- “Lehr und Kunst” — Theory and practice
- Project-based learning
## Curriculum 1.0

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Where’s the Robotics?
Curriculum 2.0

MA, Physics ➔ Intro to Robotics

CS, ECE, ES/ME ➔ Unified Robotics I: Power

Intro courses ➔ Unified Robotics II: Sensing

Complete dependency graph more complicated, but still a DAG

Unified Robotics III: Manipulation

Unified Robotics IV: Navigation

Robotics electives & Project
## Typical Program

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Lessons Learned

- Need vision & passion… & a business plan
- Bottom-up approach better than top-down
- Stick to one’s principles
- Be open to compromise on anything else
- Communicate
- Be bold!
Questions?