Managing Product Design (MPD)

EGRMGMT 590.01

Greg Twiss

A. Overview

Successful product design and development involves choreographing the interplay between multiple business and technical disciplines. From early customer needs understanding and conceptual design to detailed design, manufacturing , and delivery, development teams must consider and choose from many competing tradeoffs and development options. While academic courses often delve deeply into single disciplines, it is also valuable to appreciate, understand, and ultimately experience the ambiguities and complexities that thrive in the “horizontal” layer running across disciplines in product design and development.

Managing Product Design (MPD) is an opportunity to gain hands-on practical experience managing a business and engineering design team, and producing a real product under realistic cost, schedule, and performance constraints. Students form business teams producing coherent business and technical plans and delivering a functional product prototype. Teams will be assisted in their work through managing external technical resources and receiving guidance through an advisor.

B. Goals and Outcomes

- Provide participants a **“real-life as possible” end-to-end product design and development management experience** with responsibilities in business operations and technical management, spanning conceptual design to detailed design, delivery, and presentation.

- Opportunity to **gain realistic experience building a tangible and functional software and electromechanical consumer product** under market, technical, schedule, and budgetary constraints.

- Offer **project-based experience directly collaborating with technical personnel**.

- **Provide direct experience in considering and managing “Design-for-X” (DfX)** tradeoffs including, cost, manufacturability, repair/reuse, and environmental factors.

C. Organization

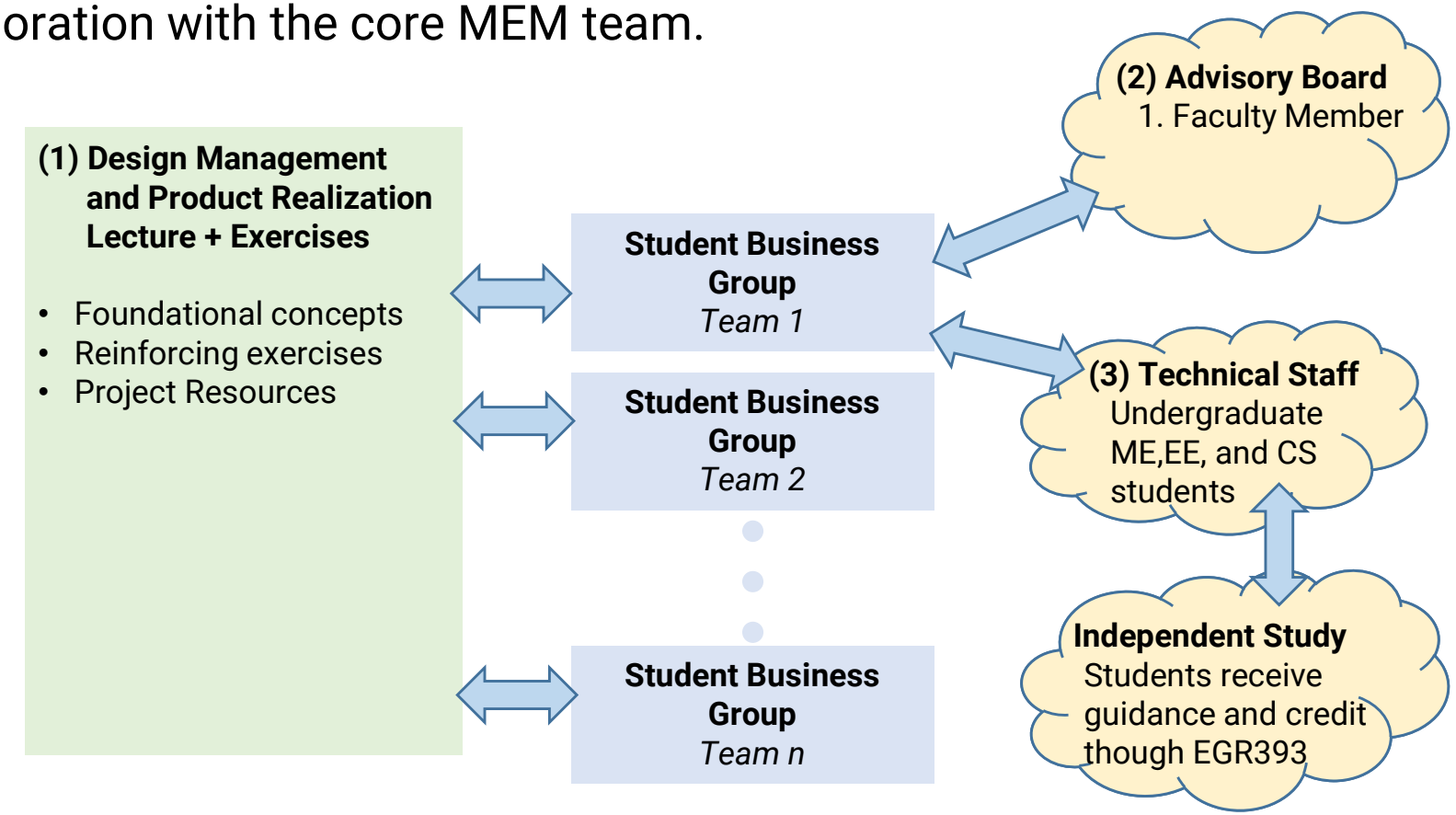
Lecture Format
The course is presented in a weekly lecture, discussion, and activity format covering a range of business and technical topics that directly support student team business and product development success throughout the semester. Each weekly session will also include in-class exercises and team experiences to reinforce key concepts.

Design Sprints
The semester is segmented into a dozen focused one- and two-week “design sprints”. These sprints are structured to achieve specific development milestones that serve as building blocks for successful overall project completion.

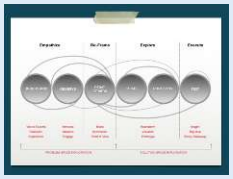
Team Presentations
Student teams will have multiple opportunities to display, discuss, and present their work throughout the semester, culminating in a public “Trade Show” showcasing their final product prototype.

C. Organization, Cont'd

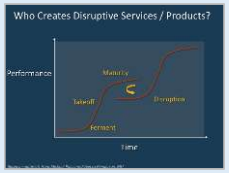
Student business teams will be assisted and supported in three ways throughout the semester: (1) Weekly lecture material and in-class exercises will cover and reinforce foundational concepts, (2) an advisory faculty member who provides guidance and feedback, and (3) dedicated senior undergraduate "technical team" to provide mechanical design, prototyping, electrical design, and coding collaboration with the core MEM team.



D. High-Level Topic Sequence

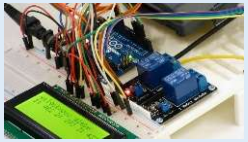


Team Formation + Project Launch

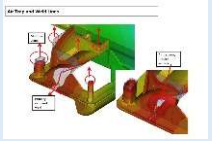


Disruptive Innovation and the Value Chain

Materials, Manufacturing and Prototyping



Basic Electronics, Coding, and Microcontrollers



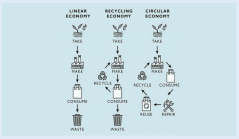
Design for “X”: Trading Cost, Manufacturability

User Testing, Design for Safety

Product Benchmarking

HW and SW Quality

Product Packaging



Design for Repair/Reuse, Green/Circular Economy

Supply Chain Fundamentals

Business presentations and Demos

E. Grading

All major assignment grading is team-based and tied directly to your student company's performance on interim and final deliverables. In addition, your personal team performance matters: part of your individual grade is based directly on feedback from your MEM and UG Technical teammates.

1. Weekly Sprint Milestones	15%
2. Design Review 1	10%
3. Design Review 2	10%
4. Final Presentation and Trade Show Performance	35%
5. Final Documentation and Portfolio	15%
6. Individual Course Engagement	5%
7. Peer Assessment (two polls at DR#1 and Trade Show)	5%
8. UG Technical Team Feedback	5%
	100%

F. Class Etiquette = Mutual Respect

General principle: please treat lectures sessions with the courtesy and respect that you would expect for an important business or client meeting.

What this means to you more specifically is:

1. NO electronic devices, i.e. cell-phones, iPods/iPads, or laptops, should be in operation during class (you won't need them) unless otherwise instructed,

2. For planned absences, please notify the instructor by email at least one week in advance,

3. For unplanned absences, please notify the instructor **AND** your business team of your situation, planned return, and arrangements for covering assigned work,

4. Please be punctual for class – the instructor will start and end class meetings on-time

G. Audit Policy

Given the team- and project-based nature of the course, a formal audit option is not offered.

Access to all Canvas course materials and recorded lectures is available, however, if there is sufficient student interest.

H. Product Trade Show Examples

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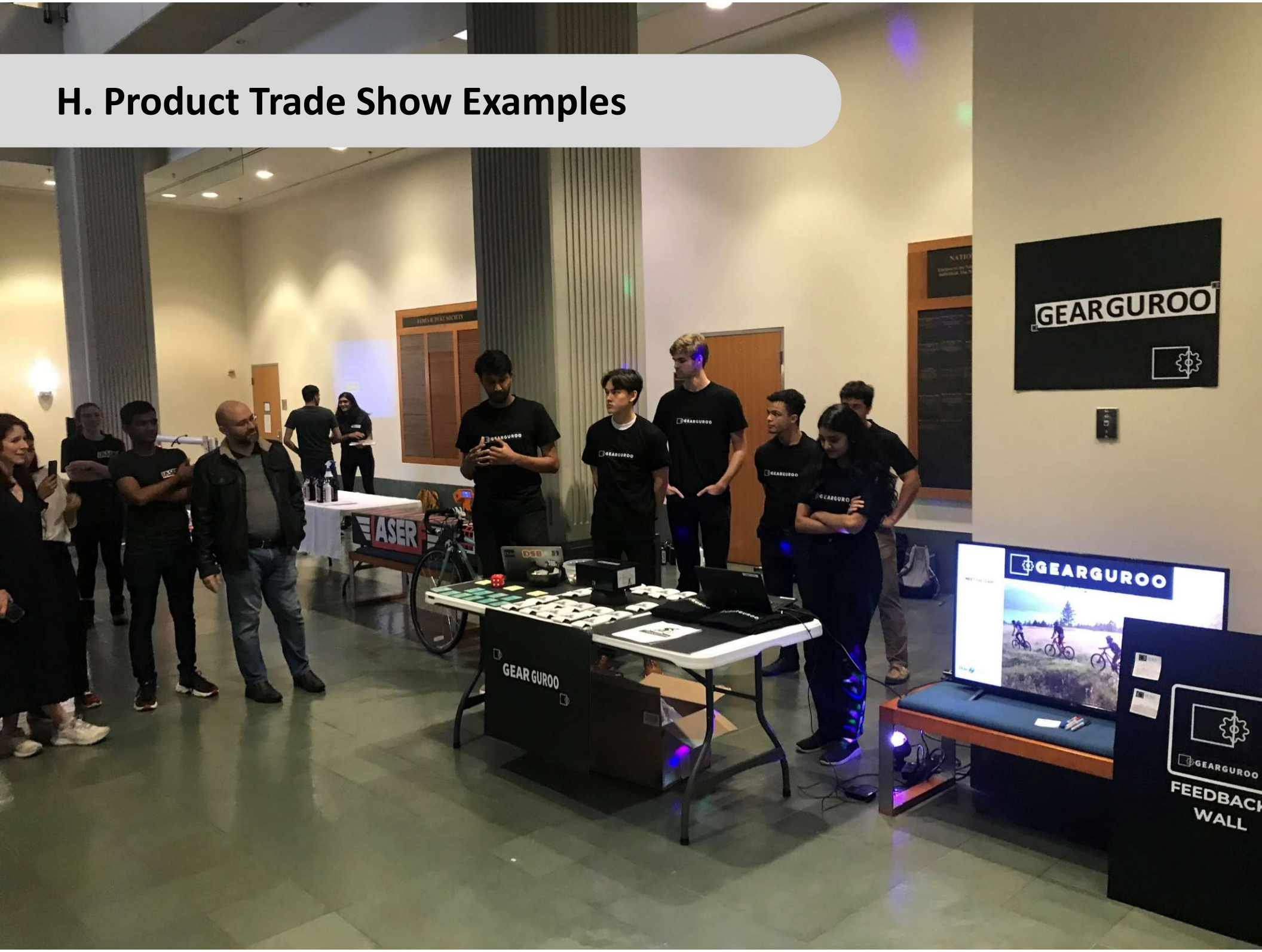

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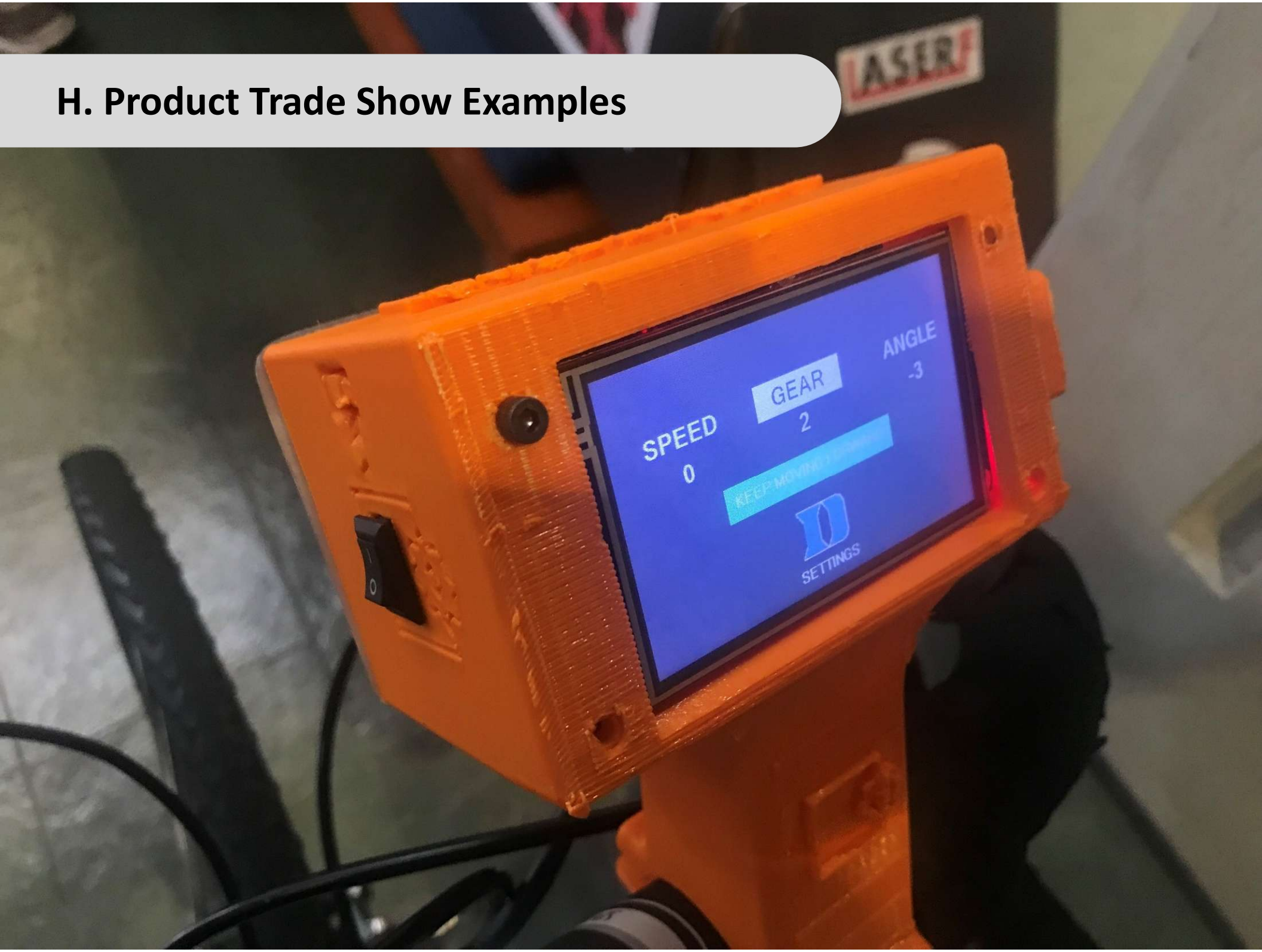

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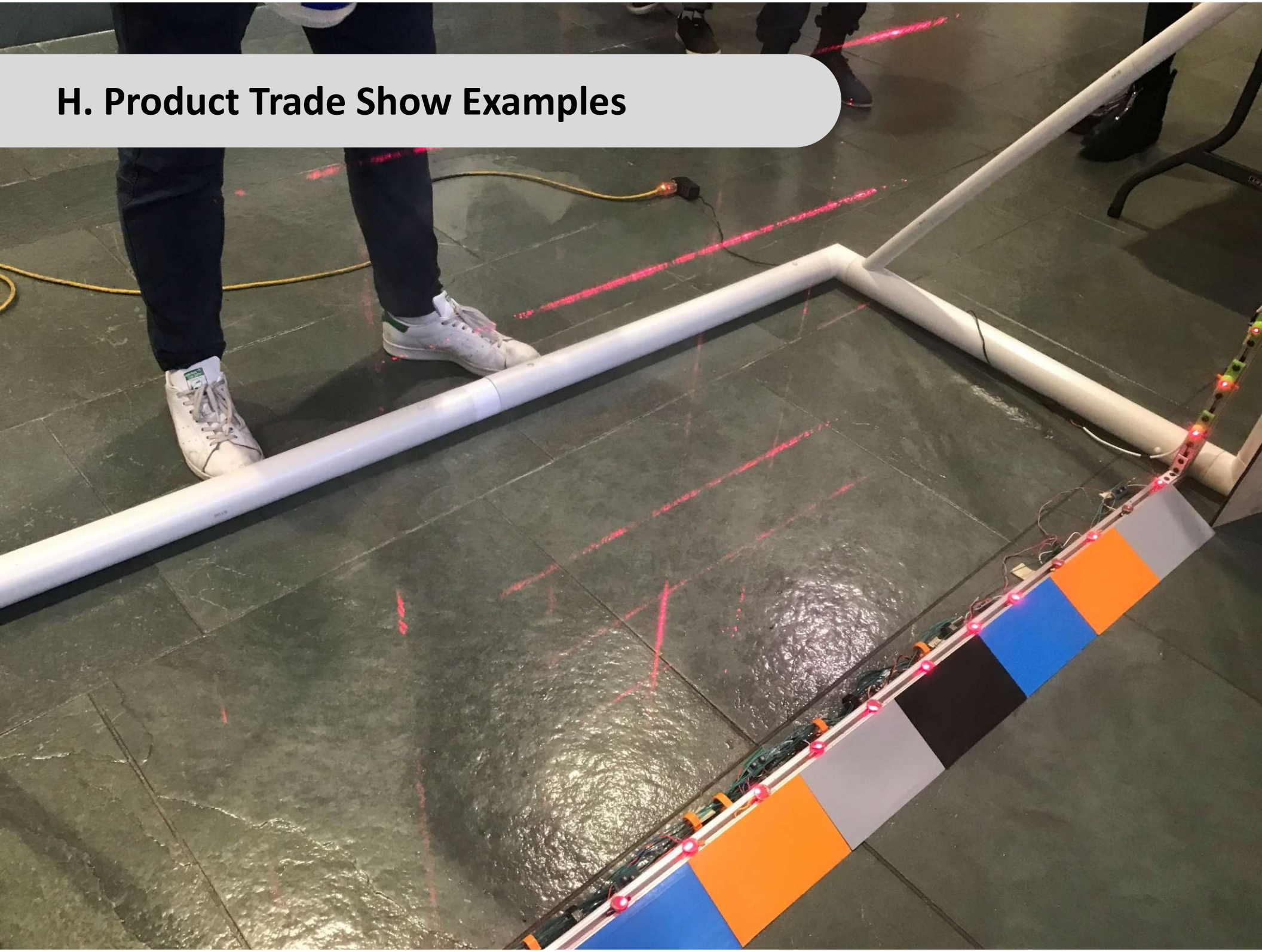

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