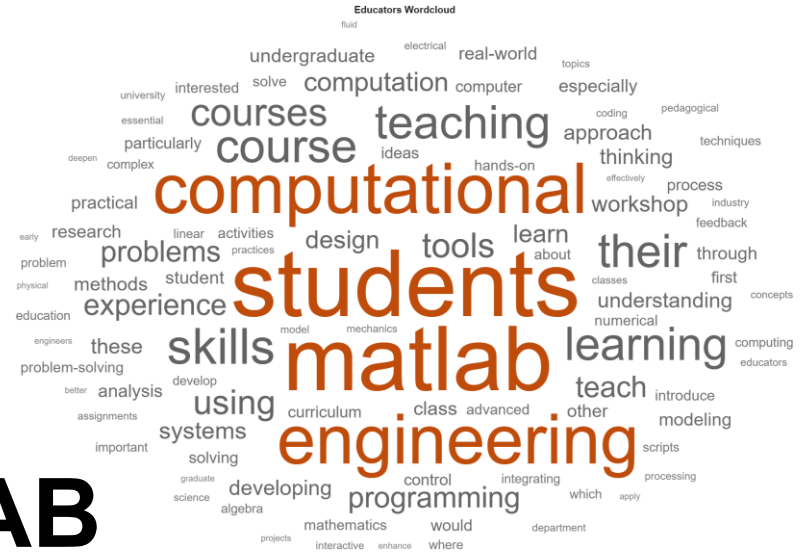
Welcome to the

12th Annual

Teaching Computation with MATLAB

Educator Workshop





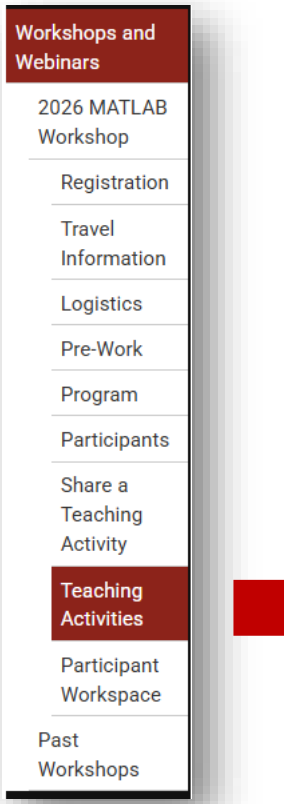
2026 School Affiliations: 50 Workshop Educators

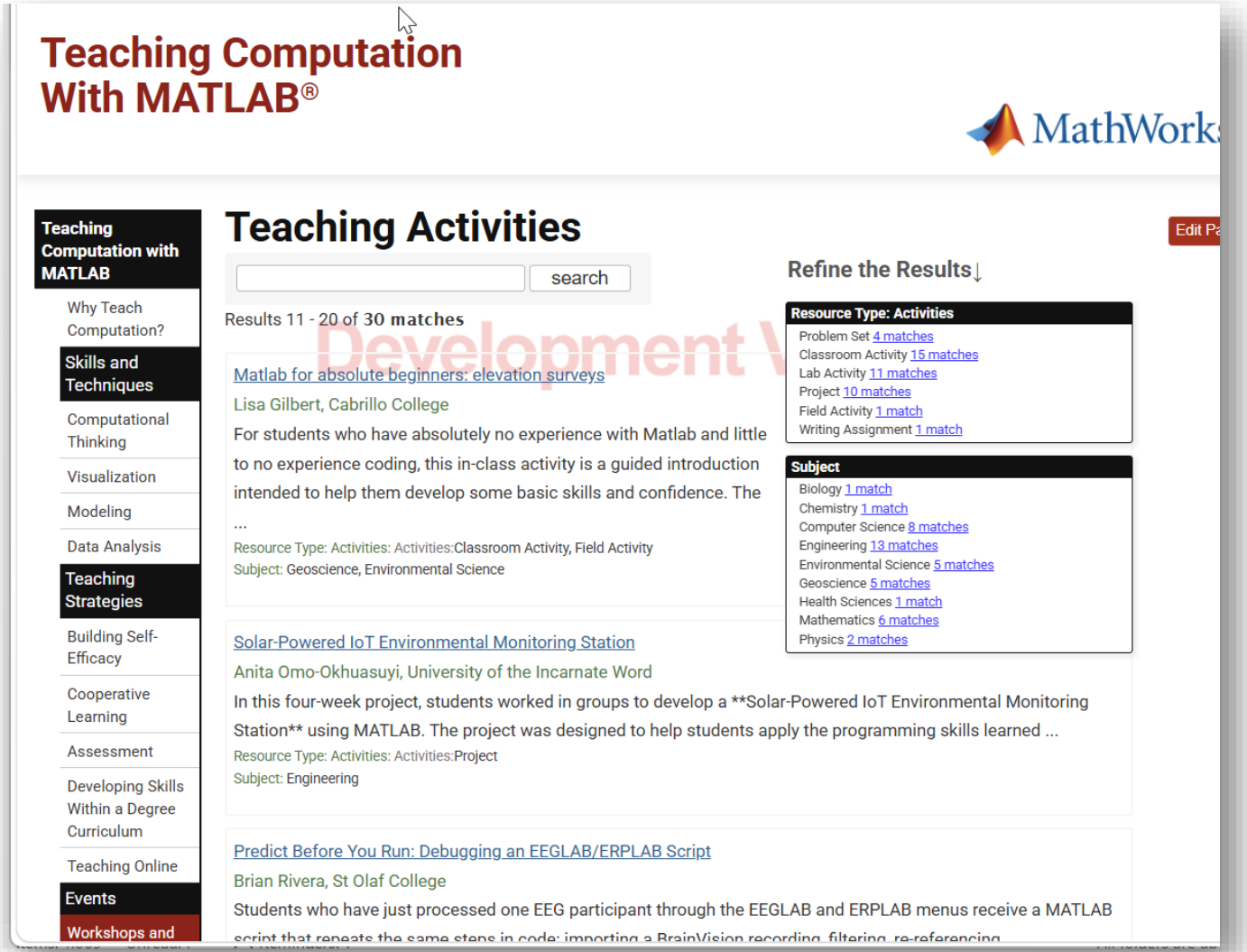
(some multiples, ~20 returning participants)

- Arizona State University East
- Bradley University (2)
- Cabrillo College
- California State University-Fullerton (2)
- California State University-Sacramento
- Cornell University
- Elon University
- Embry Riddle Aeronautical University (2)
- Howard University (2)
- Idaho State University
- Instituto Tecnologico de Costa Rica
- Lonestar college
- Louisiana State University and Agricultural & Mechanical College
- Massachusetts Institute of Technology
- Michigan Technological University
- Minnesota State University-Mankato (2)
- North Carolina A & T State University
- Rensselaer Polytechnic Institute
- San Diego State University
- San Francisco State University
- San Jose State University
- Siena University
- South Dakota State University
- St Olaf College
- Texas A&M University-San Antonio
- The University of Southern Mississippi
- The University of Tennessee-Knoxville
- The University of Texas at Dallas (3)
- University at Buffalo, State University of New York
- University of Alaska Anchorage
- University of Arizona
- University of Bridgeport
- University of Ferrara
- University of Florida (2)
- University of Hartford
- University of Maryland – College Park
- University of Nebraska-Lincoln
- University of Technology, Jamaica (2)
- University of the Incarnate Word
- University of Wisconsin-Eau Claire
- Vanderbilt University (3)
- Virginia Military Institute

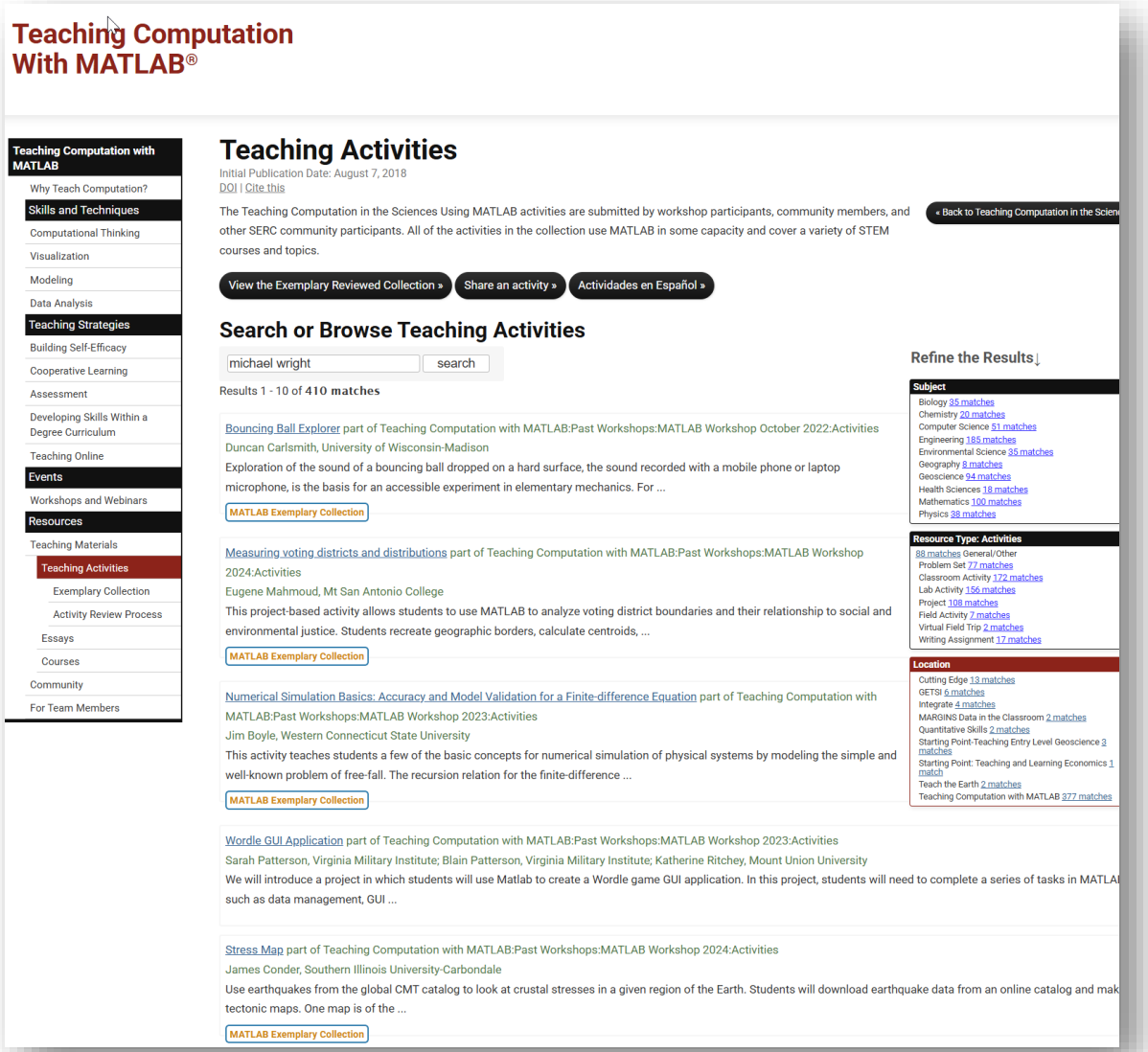
2026 Teaching Activities: You Submitted **36**

Review editors have reviewed and shared feedback on ~2/3 of activities





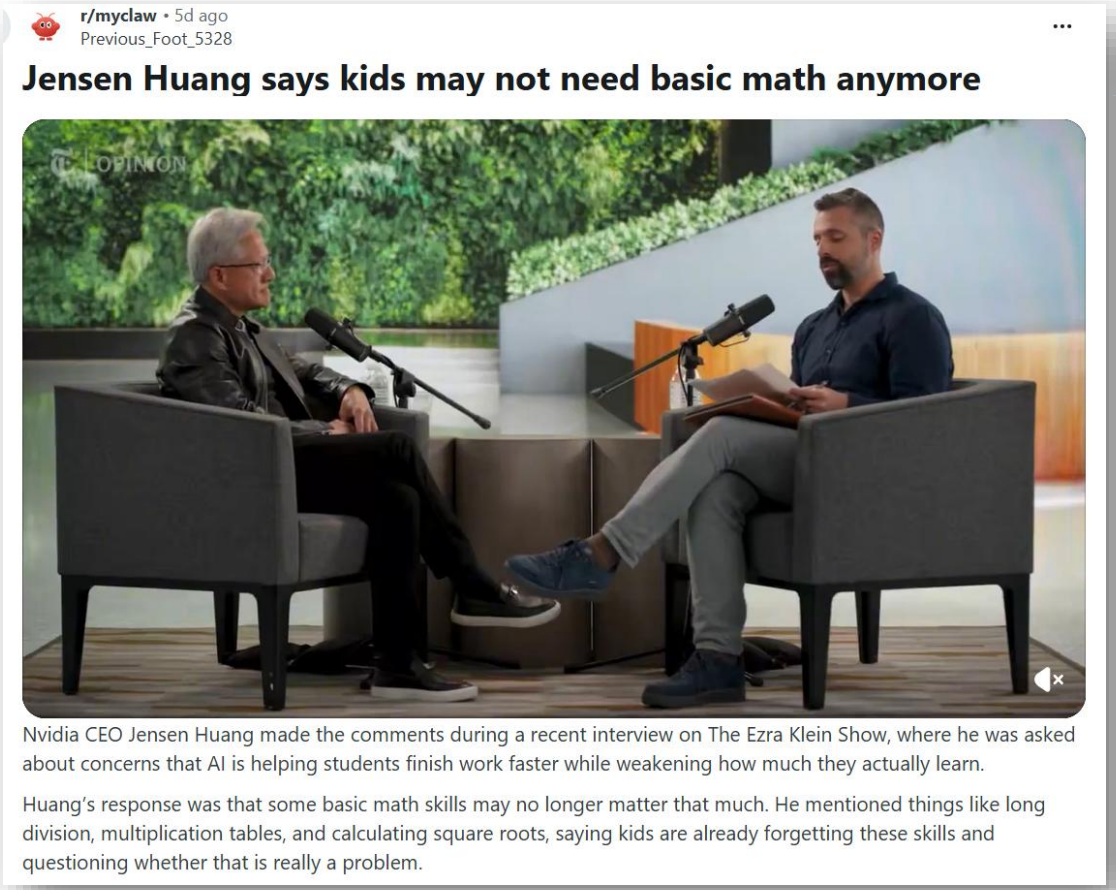
Teaching Computation with MATLAB: The Full Collection



Keynote Starting Soon . . . .

9/2026: *Maybe students don't need to learn math anymore – Jensen*

The study that triggered the question: The conversation referenced data showing that AI tools helped students raise homework scores, with lower exam scores and retention later.



Hyperbole or Our Future?

Original Source:
9/23: *The Ezra Klein Show* podcast
Jensen Huang Thinks A.I. Alarmism Has Gone Too Far

Related:
9/29: *The Ezra Klein Show* podcast
Bill Gates's Blunt Warning on A.I.

Keynote

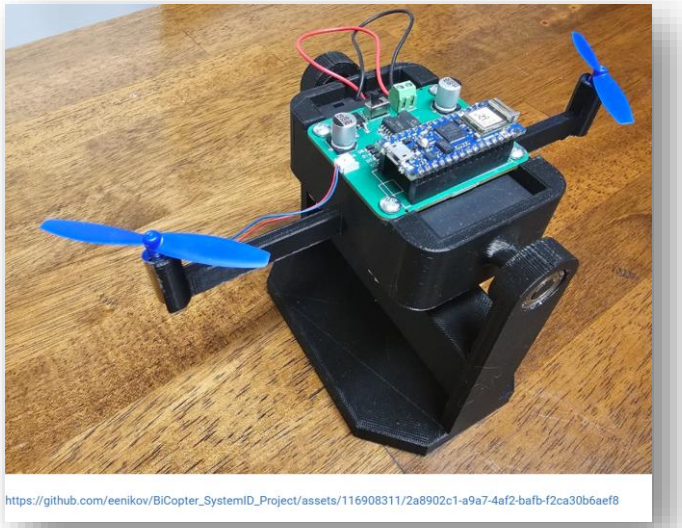
Action: 3 Things

Teaching for the Future:
What will I do next?

- Trends in Education (and you!)
- GenAI and Agentic AI
- MATLAB Teaching Tools

Lisa Kempler, Lead Convener
MathWorks
October 25, 2026
lisak@mathworks.com





Question: *What Does Industry Want?*

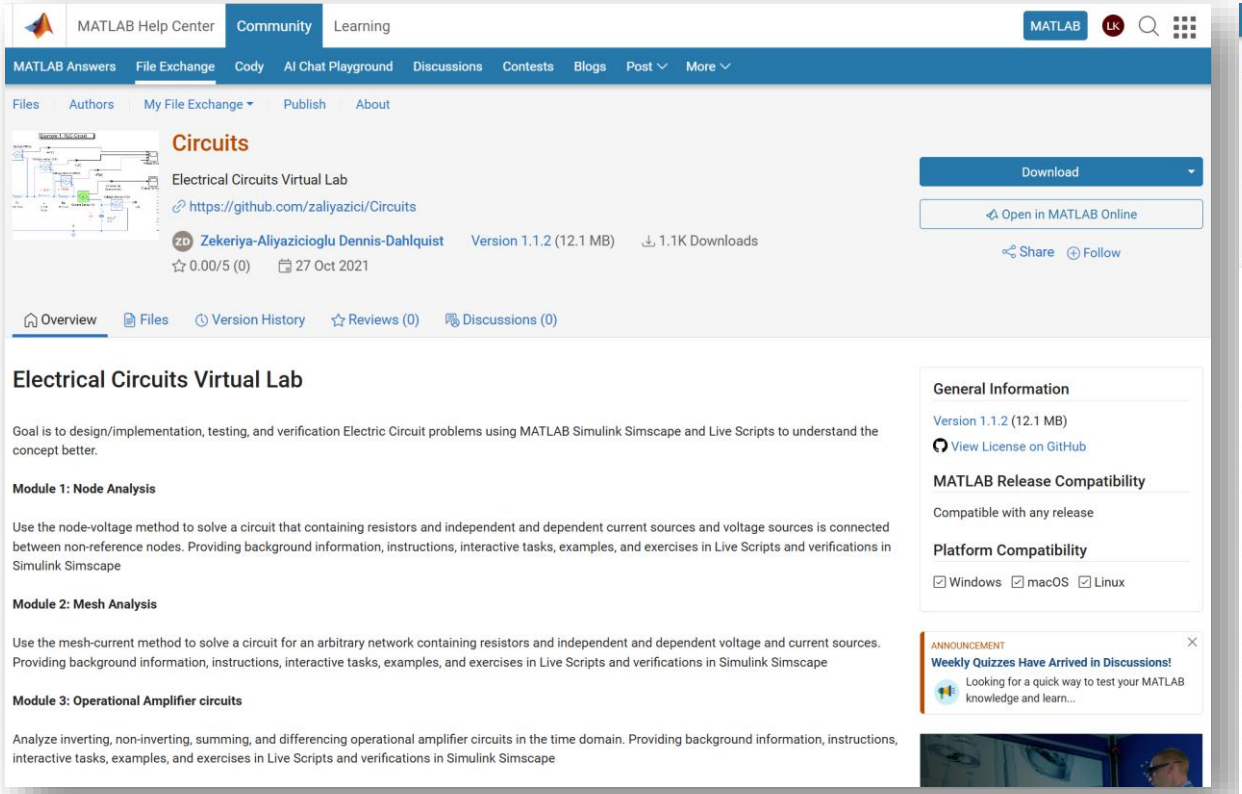
Answer: Employees who know how to think and learn.
And use AI thoughtfully.

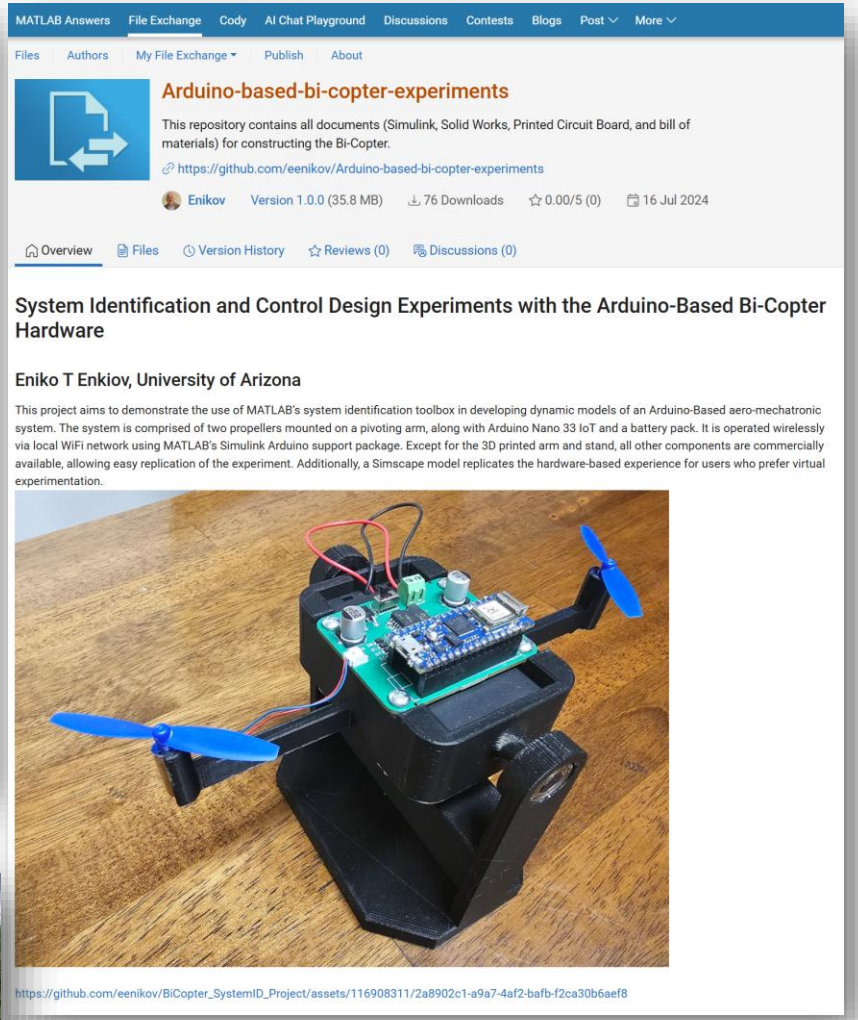
(Sorry, Jensen)

Project-Based Courses: Instruments, Robots, IoT and Data

Trend # 2







Educator: Glenn Thompson, USF

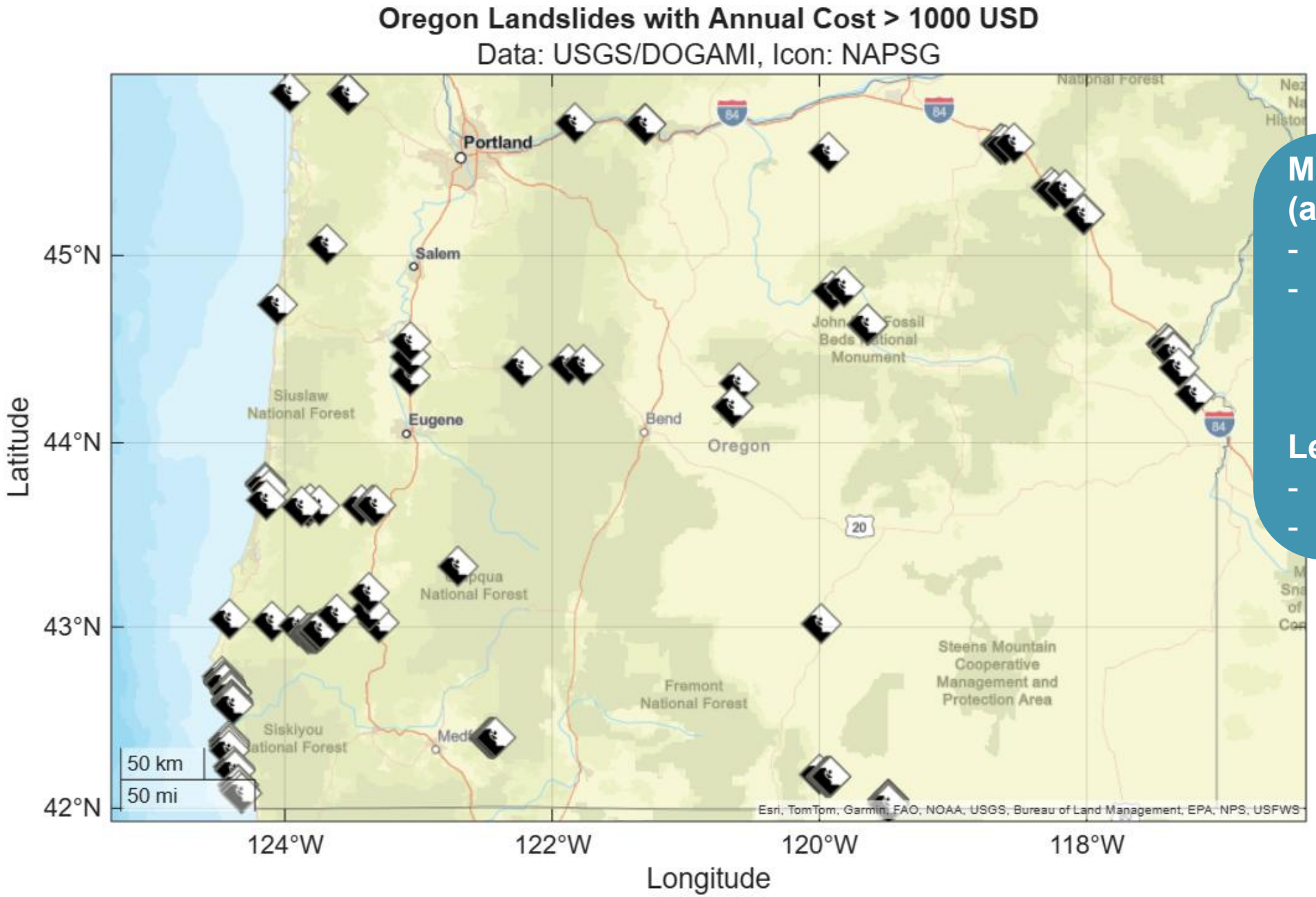
Artemis II launch reveals unique seismic activity captured by USF scientists



Activity: Students record seismic activity at NASA Kennedy Space Center

MathWorks

Trend # 2



Maps are cool (and underutilized)

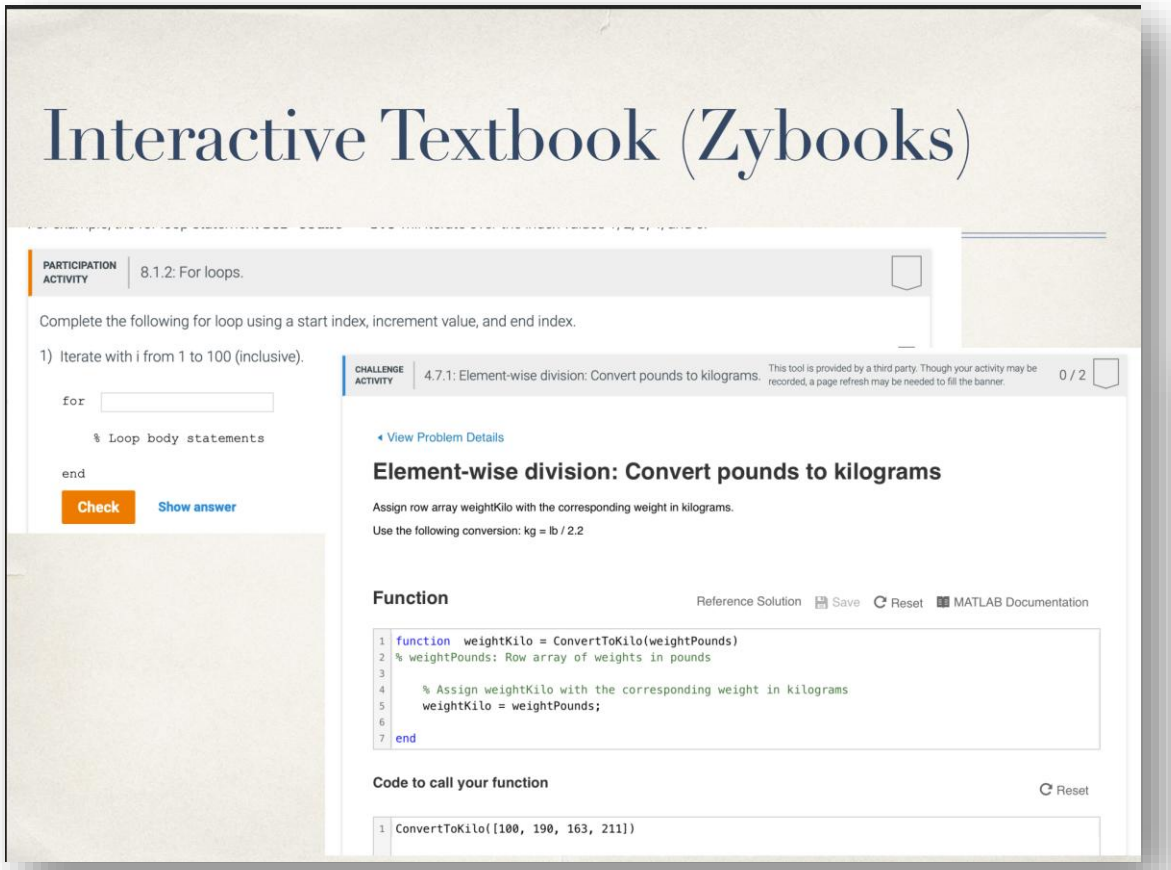
- New! Maps in R2026a
- Relevance: Auto, Aero, Geoscience, Government, etc.

Learning goals

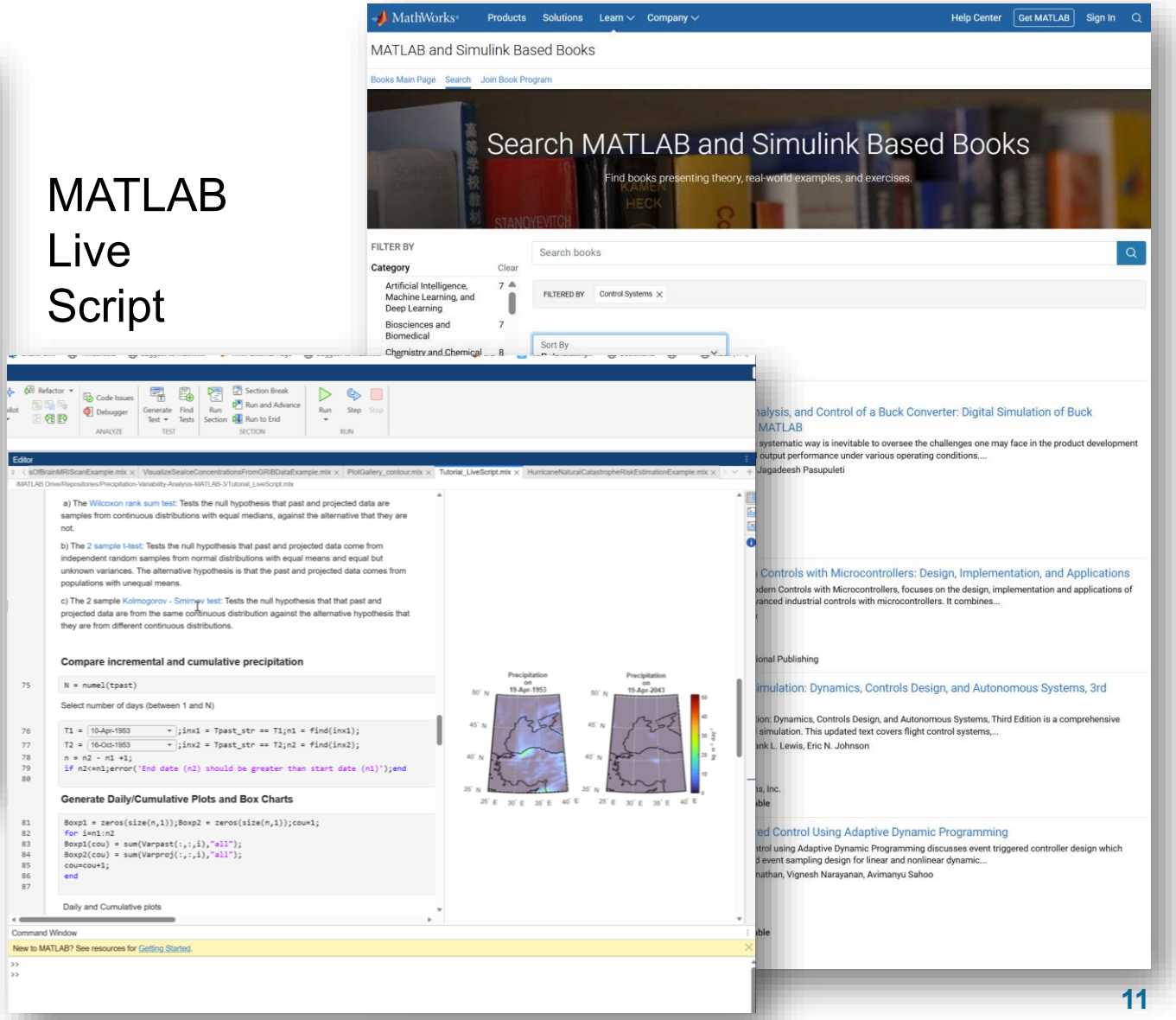
- Real data experience
- Effective visualization

Trend: Textbooks ➔ Interactive Notebooks + Apps ➔ Cloud

Trend # 3



MATLAB Live Script

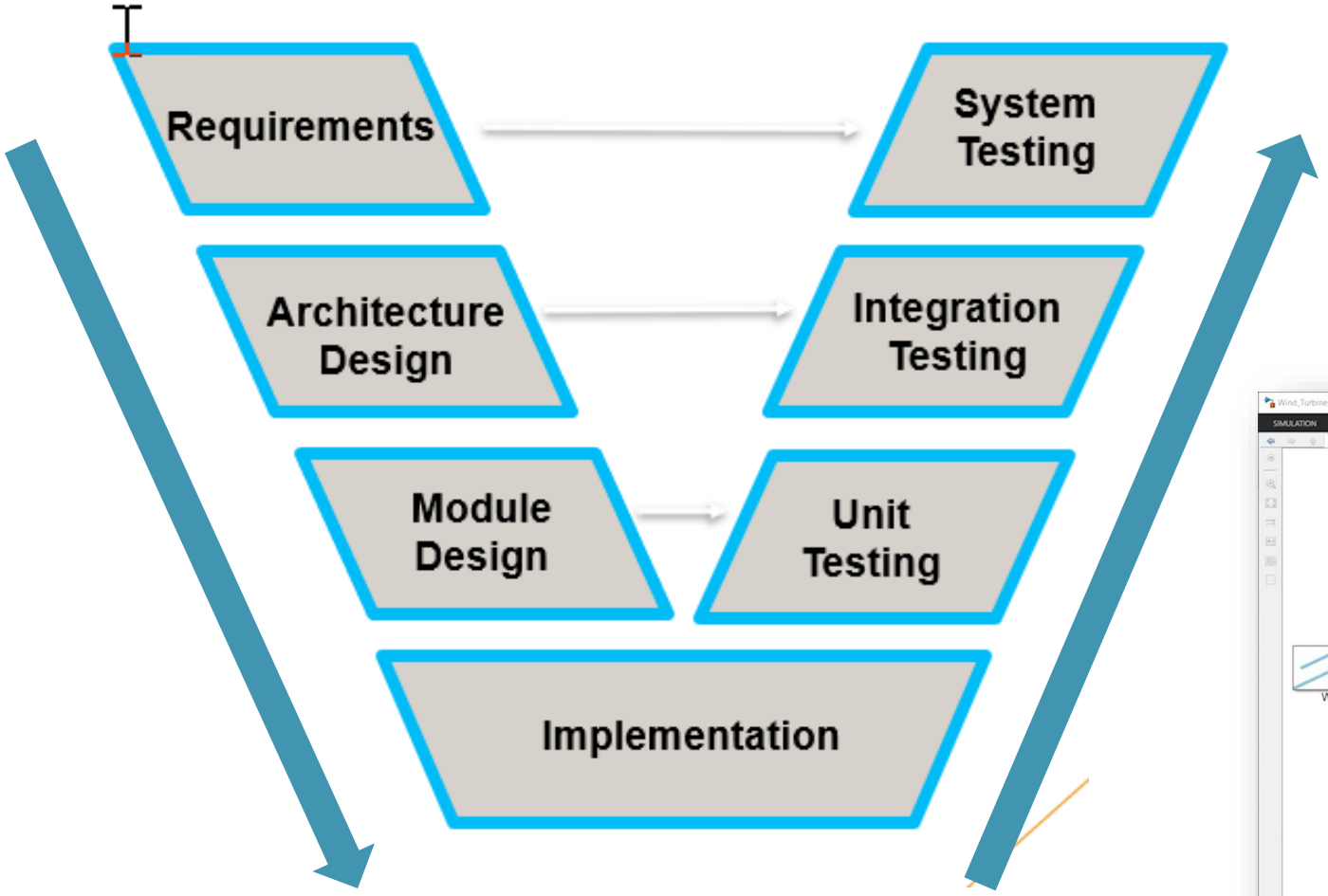


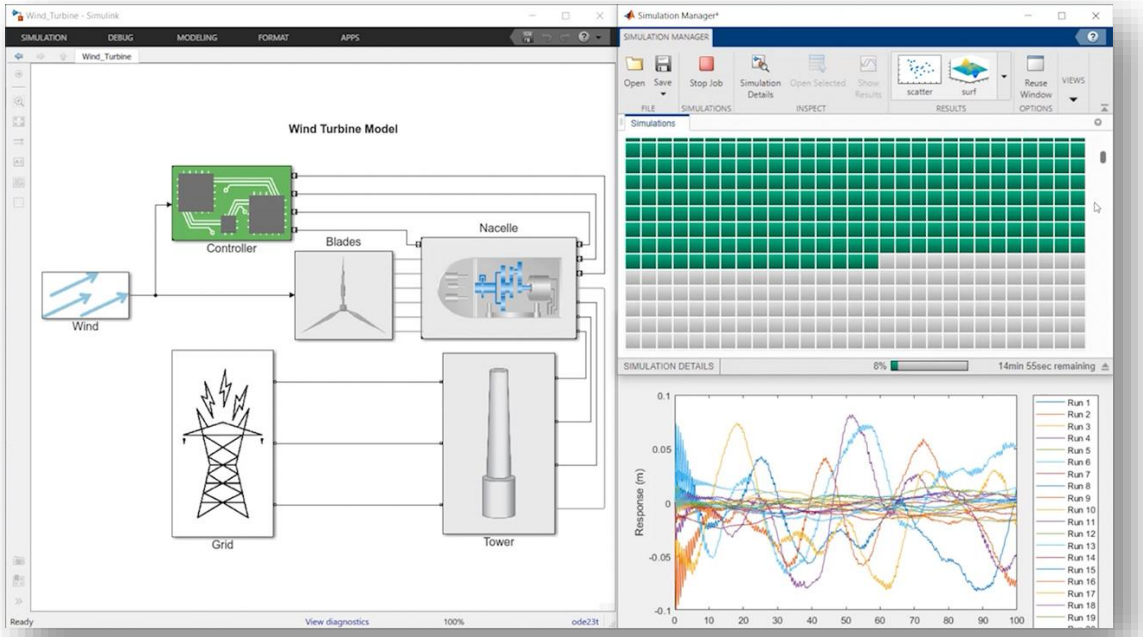
Dan Burleson's 2019 Workshop Talk

Teaching to **The Design V** — Learning that Transfers to Industry

"Model-Based Design" (for Engineering and Science)

Trend # 4





Map Learning Objectives to Engineering Workflow:
Which Development Best Practices to Teach?

Trend # 4

Category	Tools
Code Analysis	
	Code Analyzer / Profiler
	Coding Standards/Agentic Skills
Source Control/Git	
	MATLAB Projects, Dependency Analysis
Validation and Test	
	MATLAB Test/Simulink Test
	Simulink Requirements
	Hardware/Code Validation
Managed Projects and Releases	
	MATLAB Package Manager
	MATLAB Projects
Continuous Integration and Delivery	
	MATLAB Package Manager
	Integrations: Gitlab CI-CD/Jenkins/Azure Pipelines/GitHub Actions MATLAB Build Tool, MATLAB Test, Simulink Check, Docker Containers
Language Interfaces and Code Generation	
	Call Python, C, Excel from MATLAB Call MATLAB from Python, C, Excel
	MATLAB codegen: MATLAB apps, graphics C/C++ Code Gen: MATLAB Coder App Creation: MATLAB Compiler, Agentic AI

Power User → **"Reluctant" Developer**

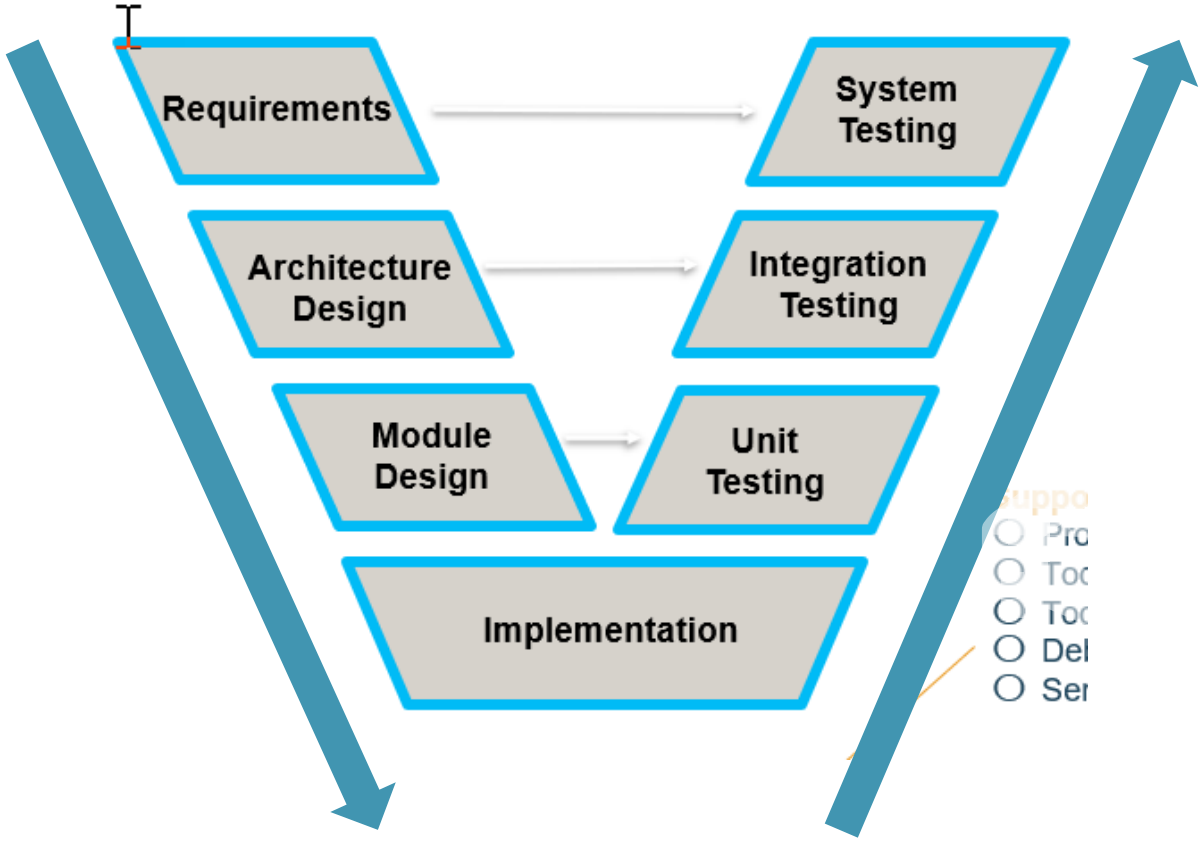
Software Development Skills

Can Course and Capstone Projects Teach Design and Development Best Practices?



Industry expects graduates to **integrate AI into the Design V**

Trend # 5



- **Develop and Enforce requirements** in AI-supported development
- **Perform simulations** of AI-developed models before deployment
- **Test, Verify, and Validate (VV&T)** AI-supported system components
- **Integrate AI with physical systems** and real-time H/W (HIL)

Your Interests

- "modeling" - 34
- "simulation" – 18
- "Simulink" – 10
- "Simscape" – 10
- "robot" – 2
- "Arduino" – 2

Cool Attracts Students!

Educators Must Balance Cool with Desired Outcomes and Reality



Learning goals



Measurable Outcomes



ABET Accreditation



Industry – Job prospects



Viability (cost, time, fit)



What else?

#1 Guiding Principle in Backwards Curriculum Design

And, thus, in this Educator Workshop

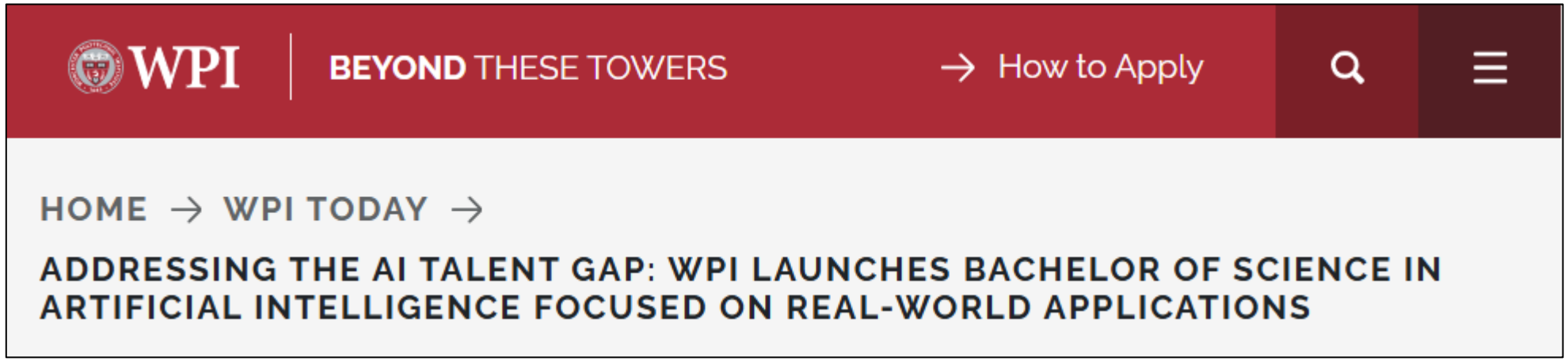
Biggest Trend:

AI – GenAI and Agentic AI

Trends

1) **Industry skills fit**
2) **Project-Based Learning**
3) **Interactive, Cloud-based Learning**
4) **Model-Based Development/Design V**
5) **AI**

News: Worcester Polytech Introduces Bachelor of Science in AI – Focus on Real-World Applications



- **Educators**

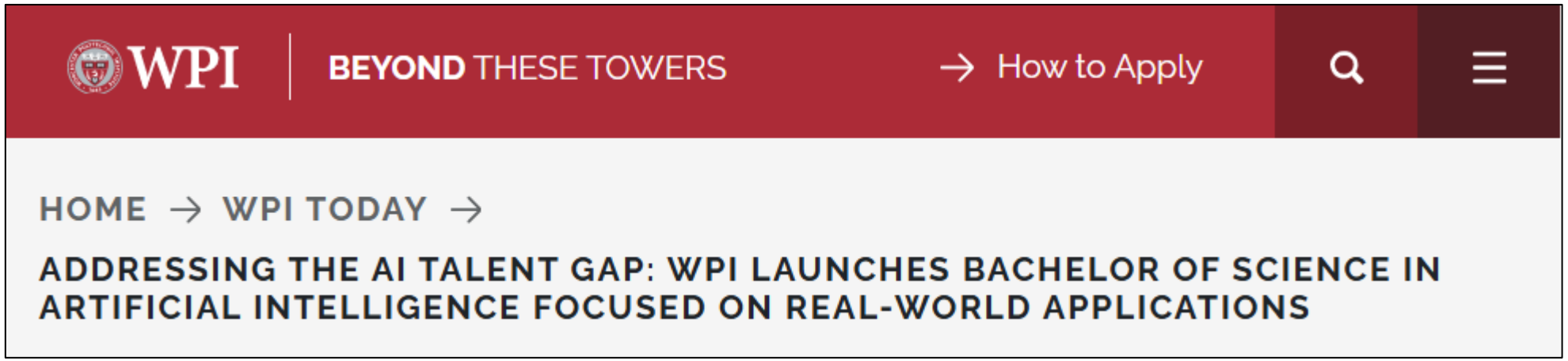


Dr.Xiao
RBE Head



Dr.Agehli
PBL Fellow and faculty lead

Problem: New WPI Robotics Lab Must Support Many More Students



- **Educator pain**



Dr.Xiao, RBE Head



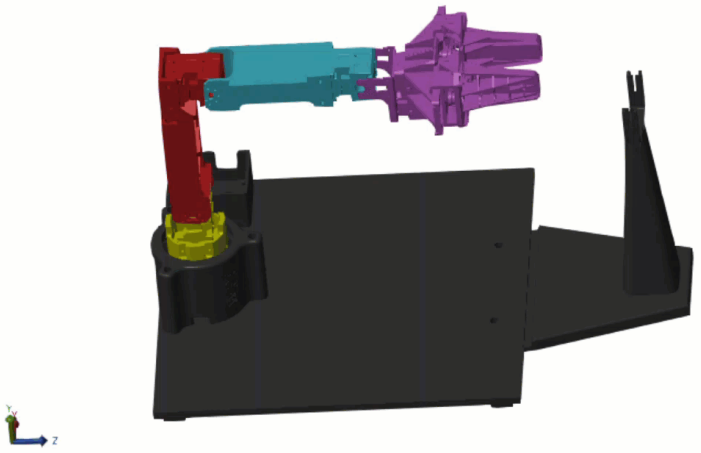
Dr.Agehli, PBL Fellow and faculty lead

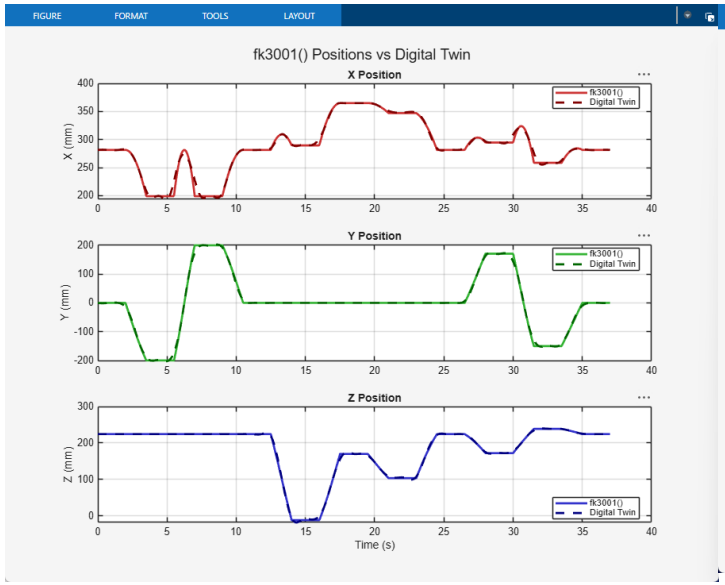
Limited lab space and hardware to go around as we anticipate significant influx of undergrads taking the robotics concentration from the AI program. **How do we efficiently manage student time?**

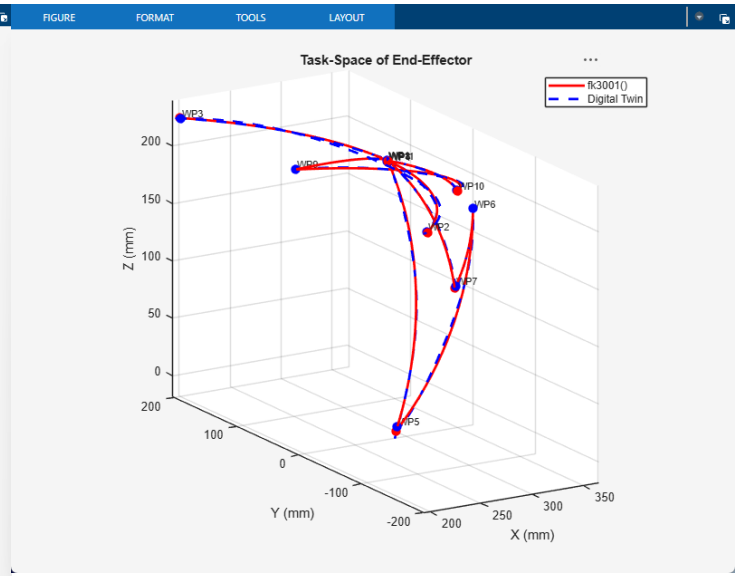
Solution: WPI Robotics Labs + **Agentic AI** Built Digital Twin Robot (with MATLAB, Simulink and Simscape)

Next:
Virtual Robotic Arm for remote students

- **Solution**
  - Students use new **digital twin of robot** to design and iterate on labs and final project
    - No waiting their turn to debug in the lab

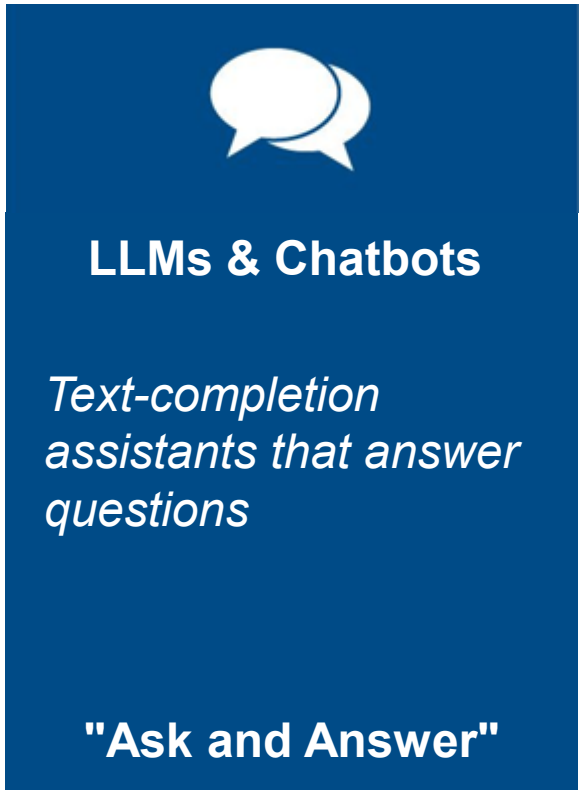


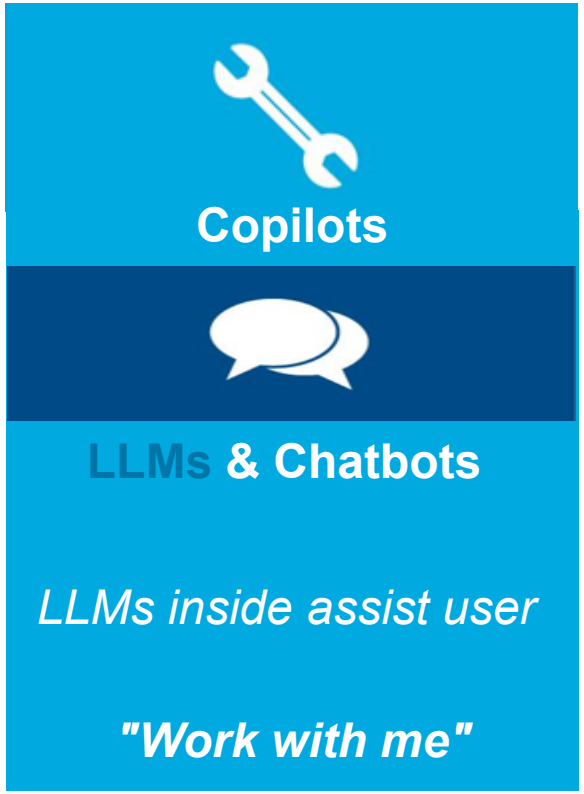




- **Tools**
  - **Simulink Agentic Toolkit** created the Simscape digital twin and lab assessments
    - From current course materials
- **Impact**
  - Time to develop curriculum reduced from 1 year to 3 months ➔ 85 students all set

Tools Framework: Power Progression of GenAI/Agentic AI Systems







ChatGPT | Claude | Google Gemini

MATLAB Copilot | Simulink Copilot | GitHub Copilot

Gemini CLI | Open AI Codex | Claude Code

Poll Break:
How are you using GenAI in your classroom?

(serial show of hands)

0) I don't allow GenAI use in my course.

1) I don't explicitly use GenAI in my course, but students can opt to use it.

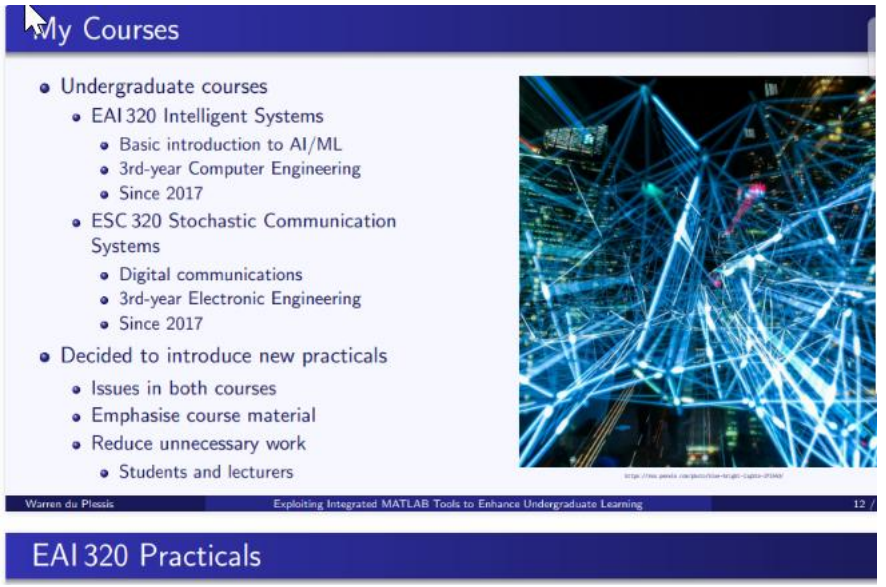
2) Course incorporates GenAI explicitly (when+how to use, or not)

Prof. Warren du Plessis, University of Pretoria

2 Courses: He wanted to fix the assignments.

- **Initially, GenAI made it worse**
  - Students used GenAI for their homework project, with 0 guidance ➔ Frustration, Time

Unintended outcomes
- *Brute forces solutions: Hack until it works*
- *Solution too trivial – simplest acceptable answer*
- *Too elaborate*
- *Increases student workload:*
  - *Actual code and coding task must match*



- **Next:** Professor provides clear GenAI guidance
  - Outcome: Faster, learn more, code → homework # 2
- **Make guidance clear!**
  - When to use it, for what, output
  - Include what **not** to do, describe pitfalls

Cheatsheet + Guidance: APMA – Programming with MATLAB, UVA

MATLAB Copilot

AI-Powered Assistance for Faster MATLAB Development

"MATLAB Copilot provides generative AI-powered capabilities specifically for the MATLAB desktop environment. It assists with MATLAB workflows and provides responses based on MATLAB specific information." - MathWorks

1. Chat with Copilot

PROS
- ✓ Documentation-grounded responses
- ✓ Reduces hallucinations vs. LLMs
- ✓ Supports iterative refinement

CONS
- ✗ May give surface-level answers
- ✗ MATLAB ecosystem only
- ✗ All responses need manual validation

BEST FOR: Exploring MATLAB concepts & getting quick answers

2. Generate / Modify Code

PROS
- ✓ Natural language → MATLAB code
- ✓ Accelerates prototyping
- ✓ Works in Editor & Live Editor

CONS
- ✗ Code must be reviewed & tested
- ✗ Limited project-level context

BEST FOR: Speeding up repetitive coding tasks

3. Get Code Explanations

PROS
- ✓ Generates high-level file summaries
- ✓ Faster onboarding to projects
- ✓ Links explanations to docs context

CONS
- ✗ No static code analysis
- ✗ May misread programmer intent

BEST FOR: Building a structured testing workflow

4. Get Error Explanations

PROS
- ✓ Translates cryptic error messages
- ✓ Reduces external doc searching
- ✓ Integrated directly into workflow

CONS
- ✗ May misdiagnose complex errors
- ✗ Reactive, not preventative
- ✗ Misses logical/algorithmic flaws

BEST FOR: Debugging & understanding error messages

From Final Project

Extra Credit #2 (optional): submit a 150-200 word reflection on how your group used MATLAB Copilot while developing your solar system simulation. Briefly discuss:

- What things Copilot helped with (code structure, debugging, fns, viz, tests)
- 1 useful Copilot suggestion and how you check that it is correct.
- One incomplete, incorrect, or unclear suggestion and how you revised

Be specific. Explain how you evaluate Copilot's output (not full Copilot history)
Submit this reflection as a separate PDF document inside your final project.

GenAI and Agentic AI Uses and Roles – *By Whom and For What?*

Junior Student

(e.g., Intro to Engineering)

GenAI

- Research
- Understand code
- Explore output
- Write comments
- Write code

Educator/ Curriculum Developer

- Syllabus
- Curriculum
- Demo Notebooks
- Assignments
- Templates
- Capstone projects

GenAI/ Agentic

Answer this research question

How do I approach this problem?

Build me an artifact

Build and execute a repeatable process

Senior Student

(Design, Teams, Capstone)

- Design, improvements
- Project components
  - Code, model, Apps, viewers
- Report?

GenAI/ Agentic

Researcher

- Methodology (GenAI)
- Develop code (AAI)
- Process data (AAI)
- Research papers
- Set up infrastructure (AAI)

GenAI/ Agentic

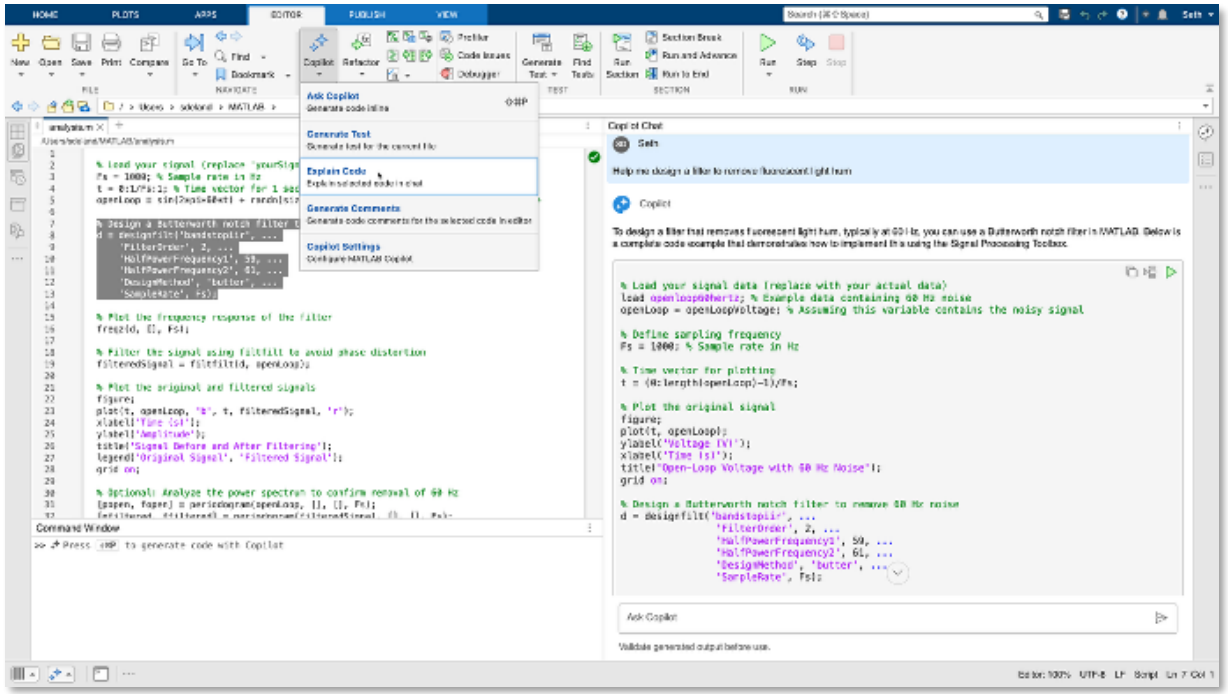
People Who Make Stuff

- Reports
- Code
- Apps
- Models
- Visuals
- Infrastructure

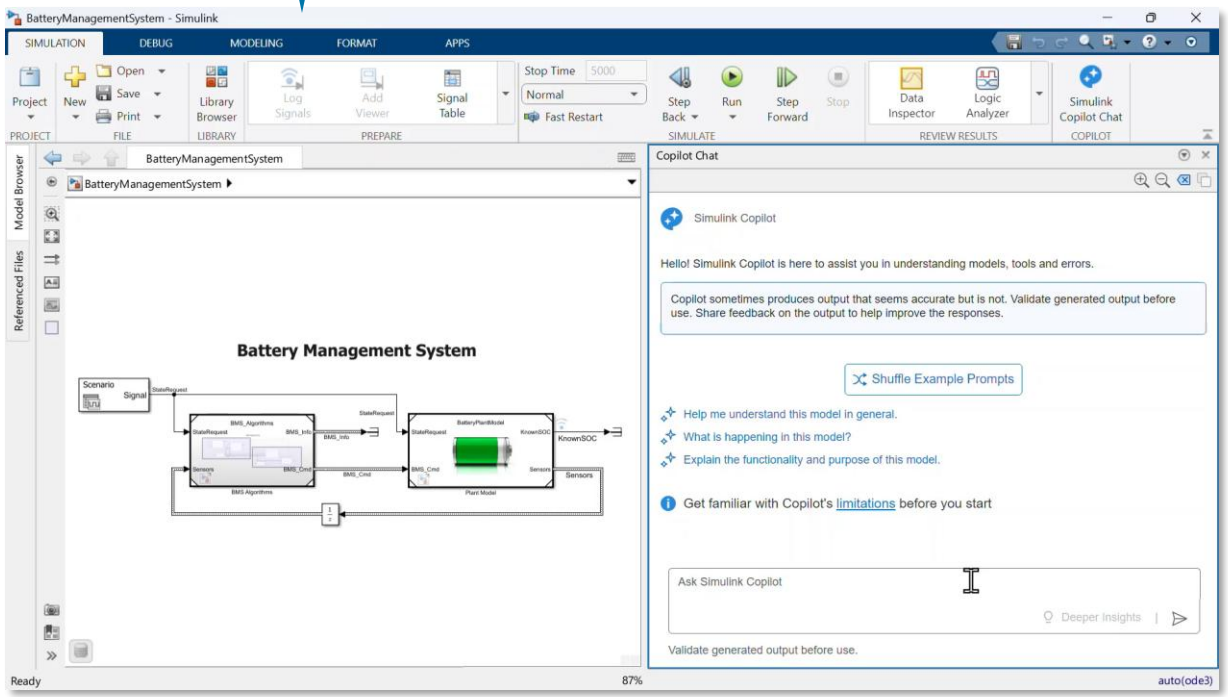
Part of Core MATLAB: MATLAB Copilot, Simulink Copilot

Released R2025a, R2026a

MATLAB Copilot

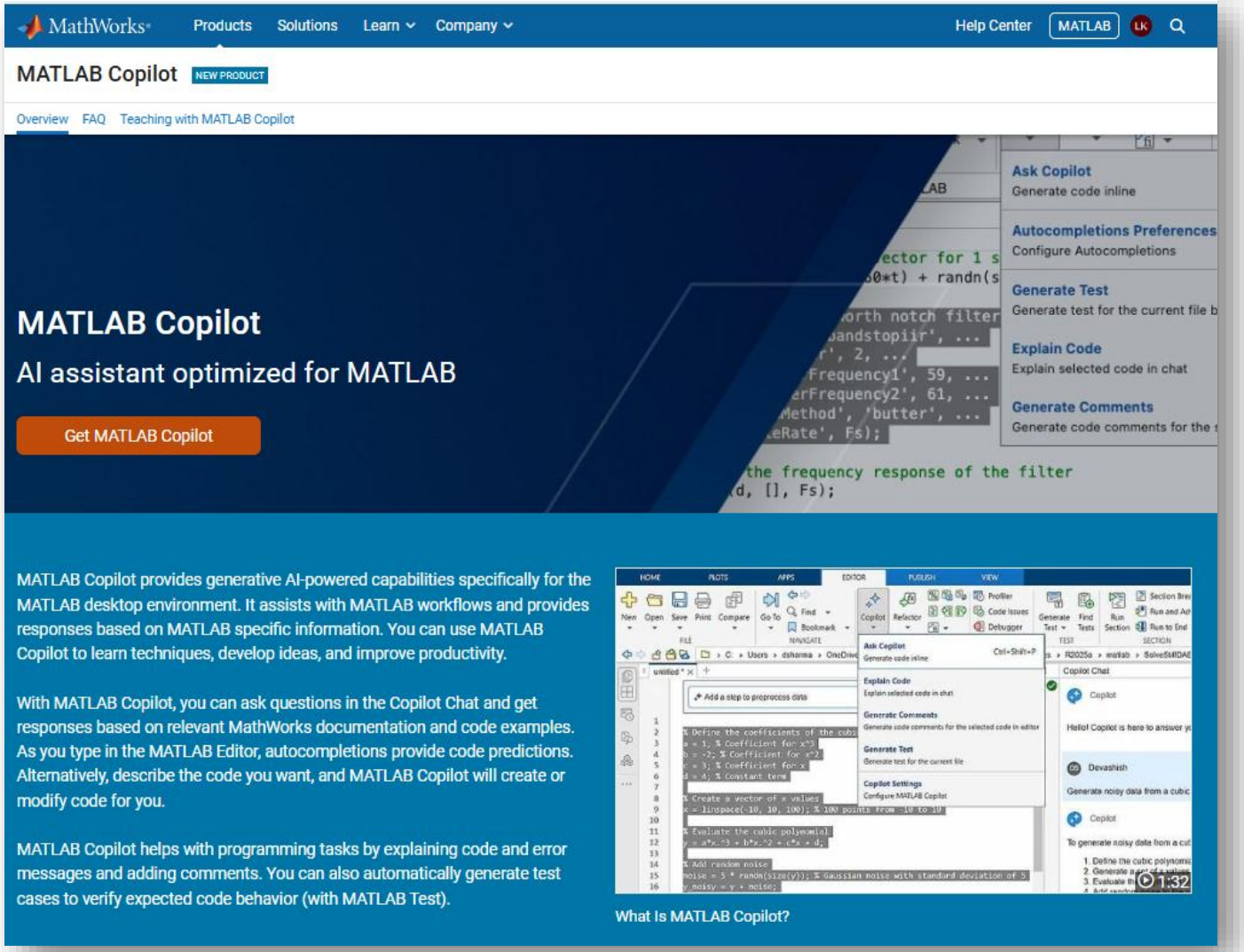


Simulink Copilot



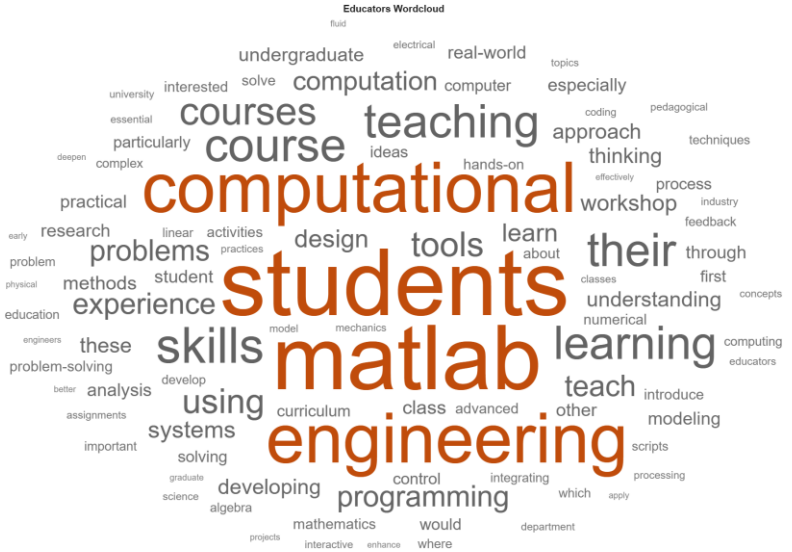
MATLAB Copilot and Simulink Copilot are included in Campus-Wide access to MATLAB and Simulink

GenAI in MATLAB: MATLAB Copilot

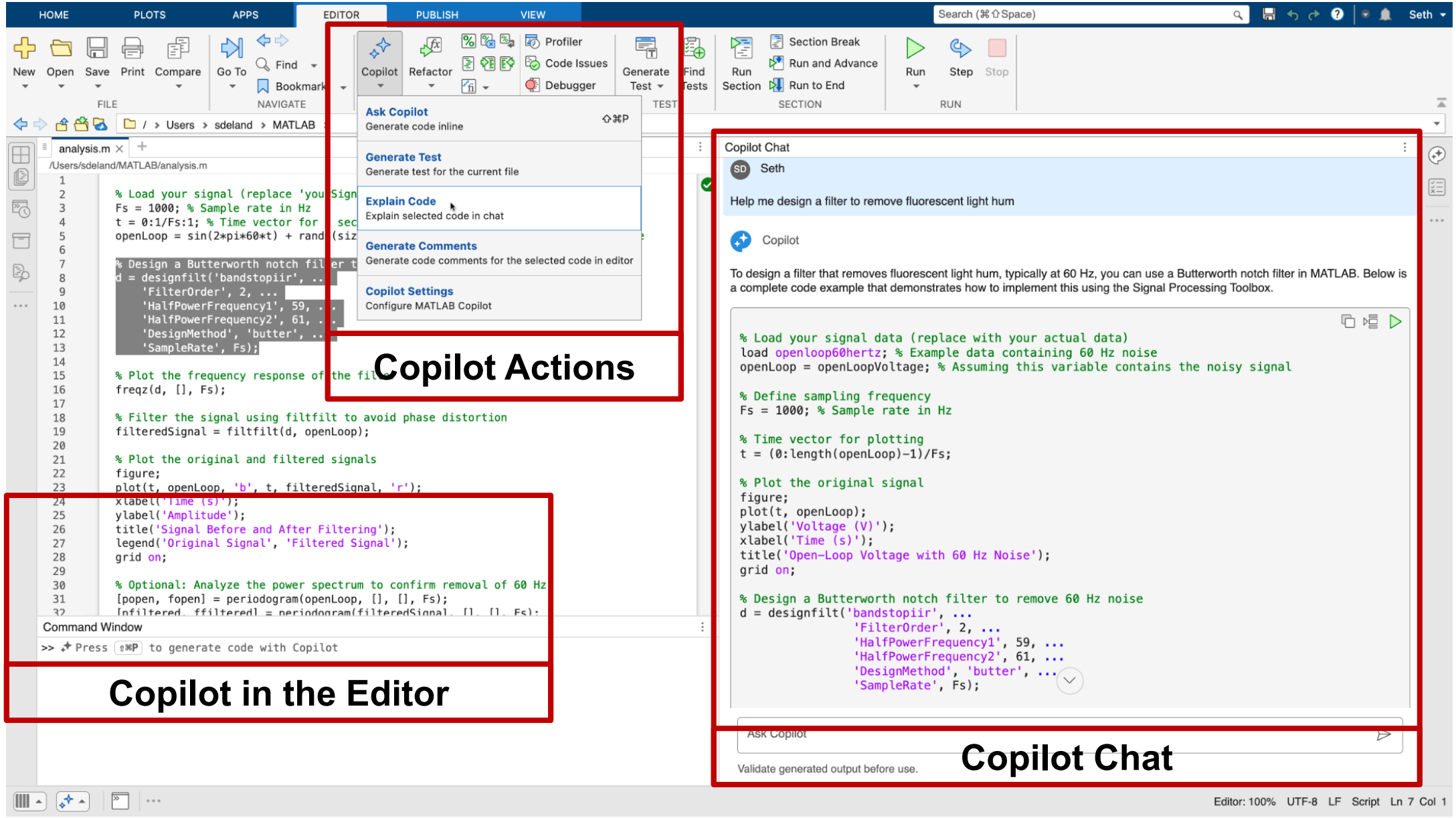


Poll Break - ???

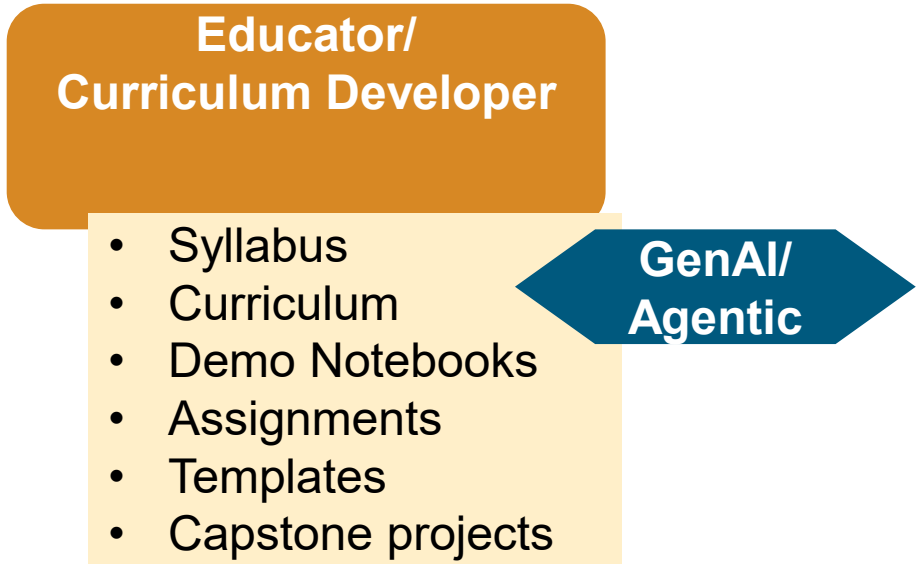
DEMO?



Summary: MATLAB Copilot integrates GenAI into MATLAB



Educator Persona and GenAI/Agentic AI



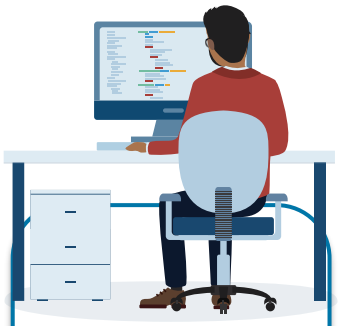
Agentic AI

Terminology:
Agent? LLM? Tool? Skill?

It's a lot.

Making the extra effort makes all the difference – productivity, usable results – a reasonable partner.

Agentic AI: Mental Model



User

Sets the goal; reviews results

AI Agent

User Interface: Harness that communicates with LLM, coordinates the task, and controls tool use

Skills
Optional reusable task guidance

Model API

context · proposal

LLM

Interprets user/agent request, decides info + actions required. It does not run tools.

MCP

tool calls · results

Tools

Perform actions and return results

MATLAB
code · tests · plots

Simulink
models · simulation

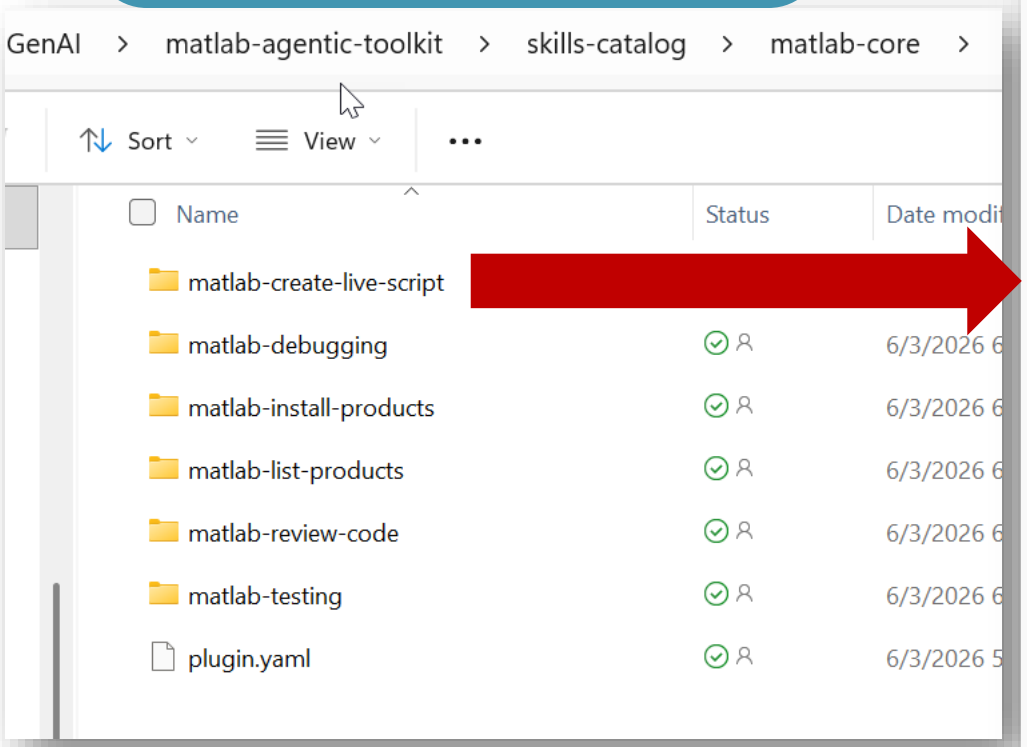
Agent coordinates · LLM proposes · Tools act · You review

[Agentic AI 101 - HTML page]

Agentic **Skills**: Sharable packages of instructions, scripts, and resources to give agents specialized capabilities + domain expertise

200 Skills (Files)

in MATLAB Agentic Toolkit!




```
# Live Scripts

Plain-text `.m` files that render as rich documents in the MATLAB Live Editor. Version-
control friendly — never use binary `.mlx`.

## When to Use

- Tutorials, reports, analysis notebooks, or documentation
- Interactive exploration with inline figures and equations
- Version-controlled content (plain-text `.m`, not binary `.mlx`)

## When NOT to Use

- Regular scripts without rich formatting
- Function files
- MATLAB older than R2025a

## Rules

- Text lines use `%[text]` — NOT bare `%`
- One paragraph = one `%[text]` line — do not hard-wrap; let the Live Editor handle
line width
- No empty `%[text]` lines — they render as unwanted blank space
- Section headers: `%%` on its own line, then `%[text] ## Title` on next line
- No blank lines anywhere in the file
- No `figure` command — implicit figure creation only
- No more than one plot per section (unless using tiled layouts)
- No `close all` or `clear`
- Double all LaTeX backslashes: `\\sin`, `\\frac`, `\\sum`
- Last bulleted list item ends with `\`
- Every file ends with the required appendix
- Avoid `fprintf` — drop the semicolon or use `disp()` for output
- Outputs should serve the reader's understanding, not verify execution — run the
script via MCP to confirm correctness

## Required Appendix
```

Agentic AI with MATLAB:

Teaching Signal Analysis via a MATLAB App

(that an agent made)

Ask of Codex: Create a Signal Analysis Simulator Live Script/App

DEMO

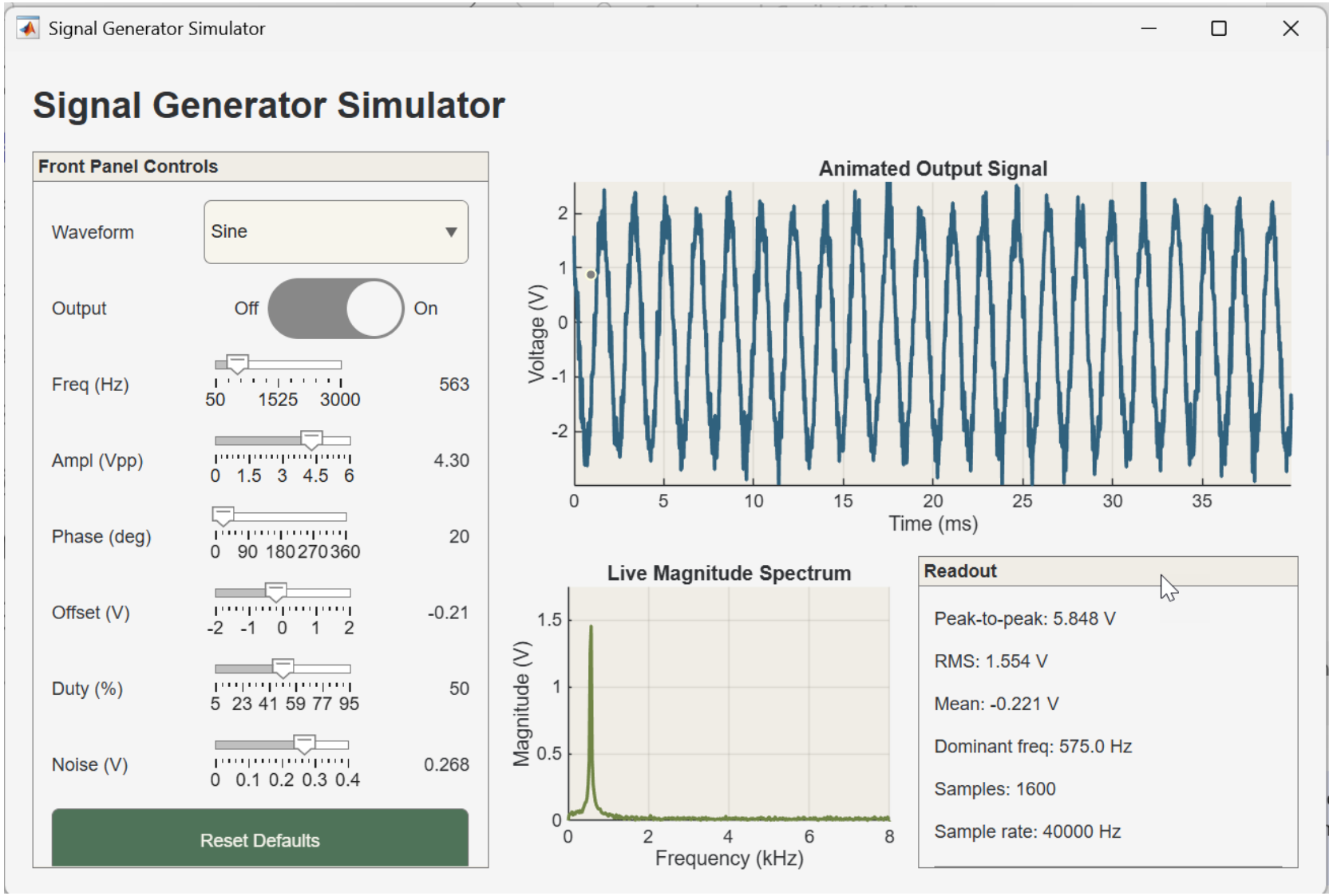
- Option # 1: Reference the MATLAB Documentation Examples
  - Signal Generation and Visualization
  - Label Signal Attributes ROI and Points (Signal Labeler App)
  - Copy and paste code from the doc example
- Option # 2: Create a Live Script with Agentic AI (Codex)
  - 1 Prompt ➔ Working MATLAB app (`SignalGenTeachingApp.m`)

Prompt # 1

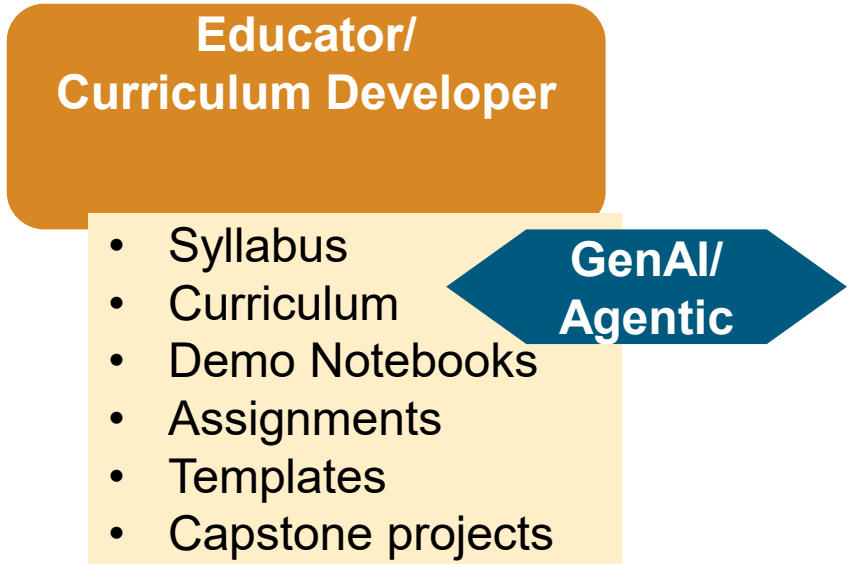
I am an educator teaching an engineering instrumentation course. I want to model for the students how to interact with and control a device.

Create a live script that interacts with a signal generator – a software simulation – using UI controls that allow the students to control the output of the signal generator. Display an animation of the signal as it updates

Teaching Signal Analysis Codex-Generated App (1 Prompt!)



Creating Course Materials



Example: Creating MATLAB Course Content with an AI Partner
for input into Course Designer or MATLAB Grader

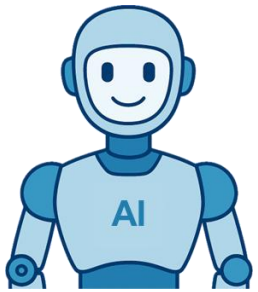
Problem

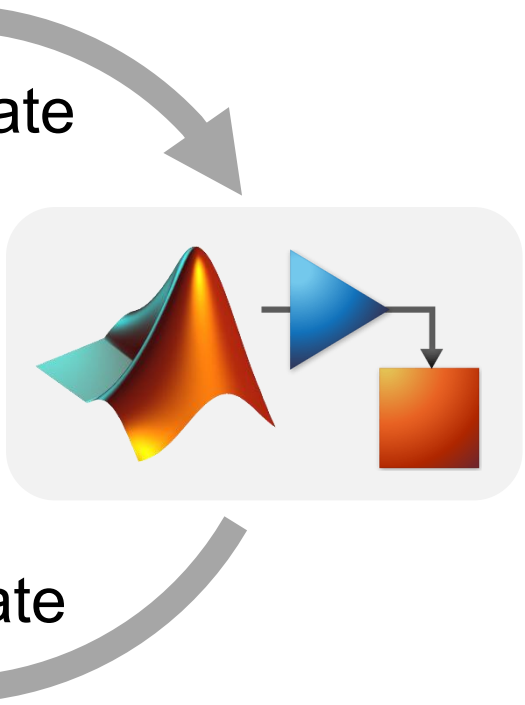
How do I align course content and assessments to learning objectives using AI?



Learning Objectives

Course Content





Solution

1) Collect and document your current materials, ideas, and learning objectives.
2) Use an Agent for creation, review, execution, and test
3) Review, then input into Course Designer

Goal

Create one lesson or entire course with learning content and assessments, packaged for import into my LMS

Example: Creating MATLAB Course Content (Agent + Course Designer)

Agent creates a compact MATLAB-only module with reading, practice, and a MATLAB Exercise – ***artifacts ready to input and implement in MATLAB Course Designer*** *(with educator review)*

```
Comple
output

Module
- Cour
- Audi
- Deli
- Acti
- Scop

Genera
- cour
- inst
- expo
- MATL
- Cour
```

Vector Orient MATLAB

Course Purpose

This compact module introd students can distinguish row transpose operations.

Audience

First-year engineering stude course.

Prerequisites

- Basic MATLAB comm
- Numeric arrays using
- Awareness that semic

Required Product

- MATLAB

Module

1. Identify and Transpos

- Reading: Vector Orientatio
- Practice: Predict Shapes B
- MATLAB Exercise: Vecto

Persistence Note

Common Cartridge export h cartridge into the target LM Exercise instructions, and in students.

Reading: Ve MATLAB

MATLAB stores vectors as vector has size `1-by-n`, suc such as `[3; 5; 8]`. The nu changes how the vector co

Use `isrow(v)` to check wh check whether `v` is a colum dimensions.

MATLAB has two transpo changes rows into columns complex signs. The conjug In this introductory module orientation.

Examples:

```
rowVec = [2 4 6];
colVec = [2; 4; 6];

isrow(rowVec)
iscolumn(colVec)

colFromRow = rowVec.';
rowFromCol = colVec.';
```

After the transpose operati `rowFromCol` is a row vecto

Practice: Running

For each line, predic Then run the code ir `isrow`, and `iscolum`

```
a = [10 20 30 40]
b = [10; 20; 30;

c = a.';
d = b.';
e = c.';
```

Record the size of ea

Variable	
a	
b	
c	
d	
e	

If a prediction is wr construction or the t

Module 01 Activity 03: Vector Orientation and Transpose

Course Designer Placement

- Module: Identify and Transpose MATLAB Vectors
- Learning activity order: 3
- Learning activity type: MATLAB Exercise

Objective Alignment

- Course objective: Students will be able to identify row and column vectors in MATLAB and use transpose operations to convert between them.
- Module objective: Distinguish row and column vector orientation and use `.'` to convert between orientations.

Learner Task

Students complete a MATLAB script that identifies row and column vectors, creates transposed copies, and applies the same operations to a second randomized data set.

MATLAB Exercise Component Source

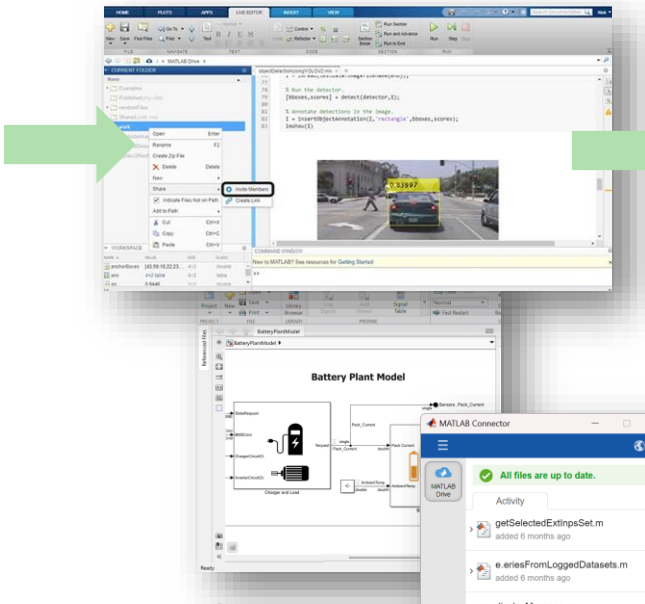
The shared MATLAB Grader-style component files are in `grader-items/module-01-activity-03-vector-orientation-and-transpose/`.

Course Designer Authoring Fields

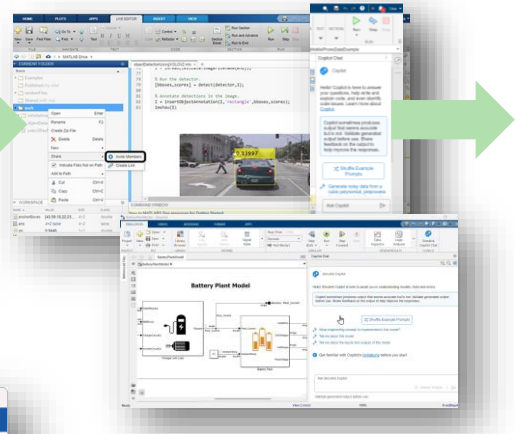
- Background file: `background.m`
- Task file: `task.m`
- Estimated time: 20 minutes
- Prerequisite context: MATLAB script editing, numeric arrays, row separators, semicolons
- Learner setup notes: MATLAB only; no additional toolboxes

MATLAB Teaching Tools: Where They Fit in the Course Flow

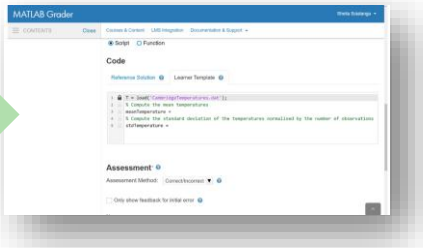
Getting Started | Application Software | In-Tool GenAI | DIY Course Guides | Auto-Grading



Live Scripts, MATLAB Drive



MATLAB and Simulink Copilot(s)

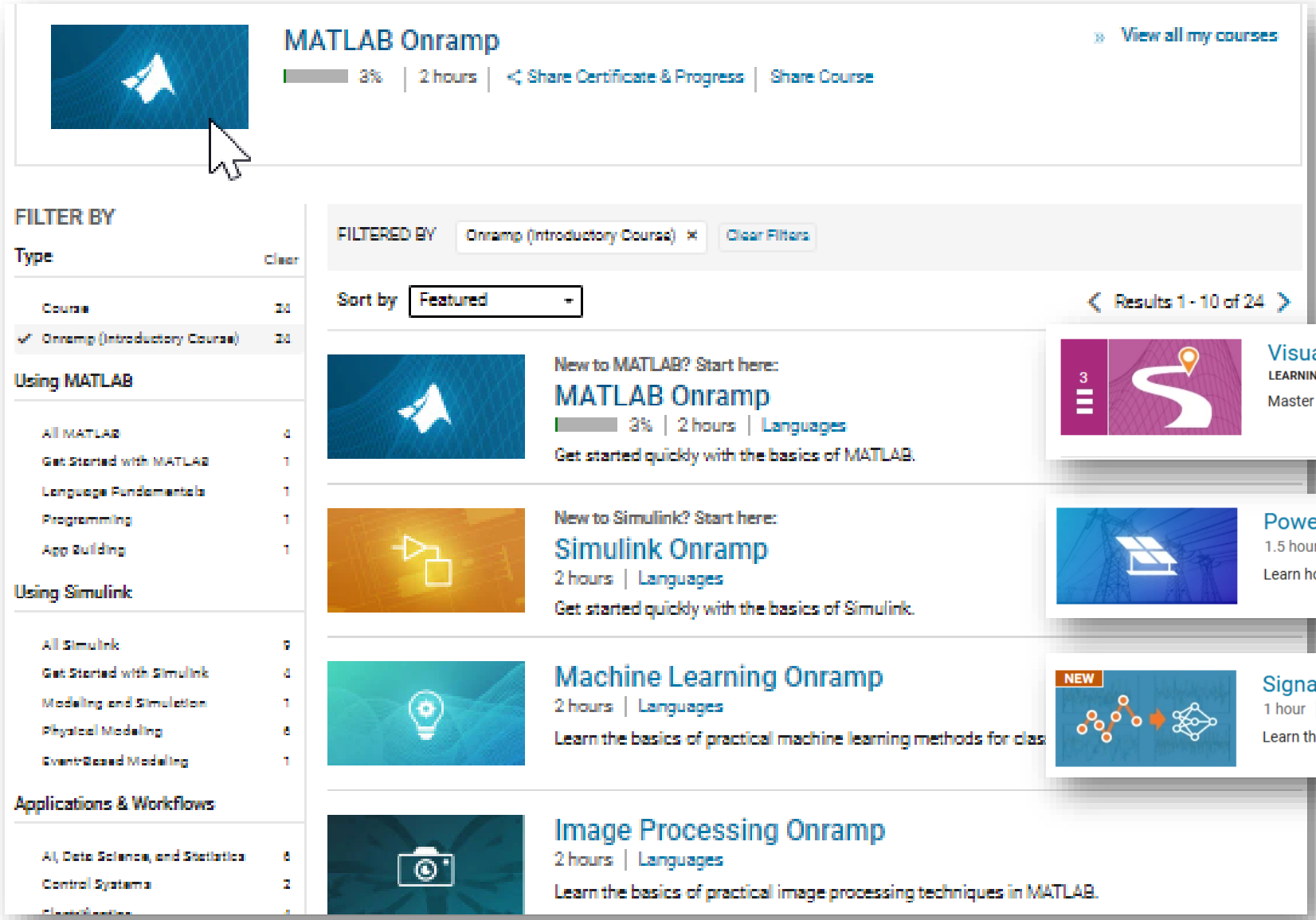


MATLAB Grader

- **Prebuilt Curriculum**
- **Code Examples, Videos**
- **Sample Models**
- **Community Code**
  - **(aka File Exchange)**

MATLAB Online + MATLAB Drive

MATLAB Onramps and Training: Learn MATLAB Capabilities (FREE)



[100+ Self-Paced Courses to Learn from]

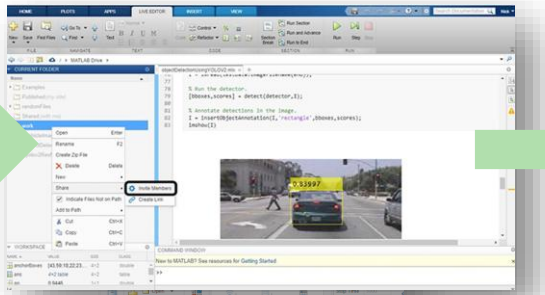
Students upload completion certificates to LMS

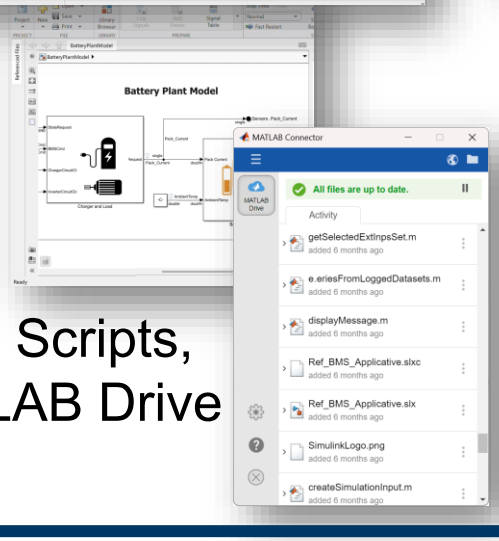
MATLAB Teaching Tools: Where They Fit in the Course Flow

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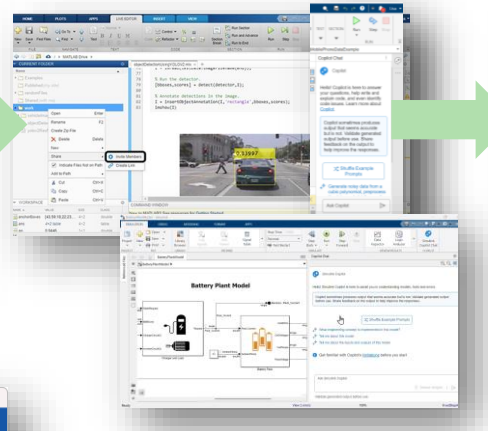


MATLAB Onramps

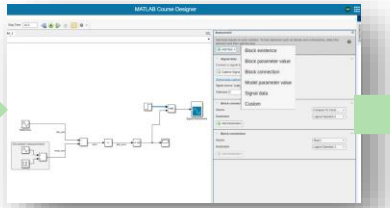




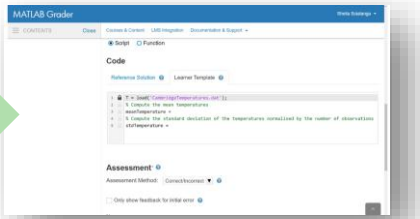
Live Scripts, MATLAB Drive



MATLAB and Simulink Copilot(s)



Course Designer



MATLAB Grader

- **Prebuilt Curriculum**
- **Code Examples, Videos**
- **Sample Models**
- **Community Code**
  - **(aka File Exchange)**

MATLAB Online + MATLAB Drive

Sunday: Settling In and Zeroing in on Goals

Teaching Activity Submission

Teaching Activity Peer Review

Prework

1-on-1 Mentoring Sessions

We Are Here

WORKSHOP BEGINS – Sunday 5-8 (CDT)

Intro and Ice Breakers

Talk: Teaching and Learning:
Which Experiments Will I Try?

Convener Panel

Networking

ACTION:
- Find the Program on the SERC site now.
- Spend a minute reviewing it.

Educator Talks + MATLAB Tools ➔ Curriculum Work

MONDAY

(Completed)
SUNDAY

Orientation and Networking

Practical Considerations for Teaching Computation

Invited Educator Talks (Kelly Roos)
Activity: Breakouts (best practices)

Learning Outcomes (Michele McColgan)
Activity: Breakouts

MATLAB Teaching Tools Demo and Practice (Nirav, Evan)

Invited Educator Talks (Kelly Roos)
Activity: Breakouts (assessing student learning)

Assessment of Learning Outcomes (Ben Bratton)
Activity: Breakouts

Worktime: Upgrading Your Curriculum (Dan Burleson)
- Attributes of an exemplary teaching activity
- Affinity working group and feedback
- Individual work time: Teaching Activity/Module Development

Roadcheck (fill out survey)

Tuesday: Upgrade Courses ➔ Share Course Plan ➔ Feedback

Sunday
Orientation and Networking

. . . .

Monday
MATLAB Tools Deep Dive
+
Curriculum Development

TUESDAY

Intro

Upgrading Your Curriculum, Part 2 (Dan Burleson)
Activity: Individual Time + Groups

Teaching Activity Sharing and Feedback
Activity: Working group activity sharing and feedback

Workshop Synthesis and Next Steps

Workshop Evaluation (fill out survey)

Teaching Activity post-review updates

Convener Panel















Help yourself to dessert and coffee and get your questions ready . . . .