

# Shared Teaching Materials for Advanced Manufacturing (STAM) Workshop #2



Project Directors

Dr. Richard A. Wysk, NC State University

Dr. Gul Okudan-Kremer, Iowa State University

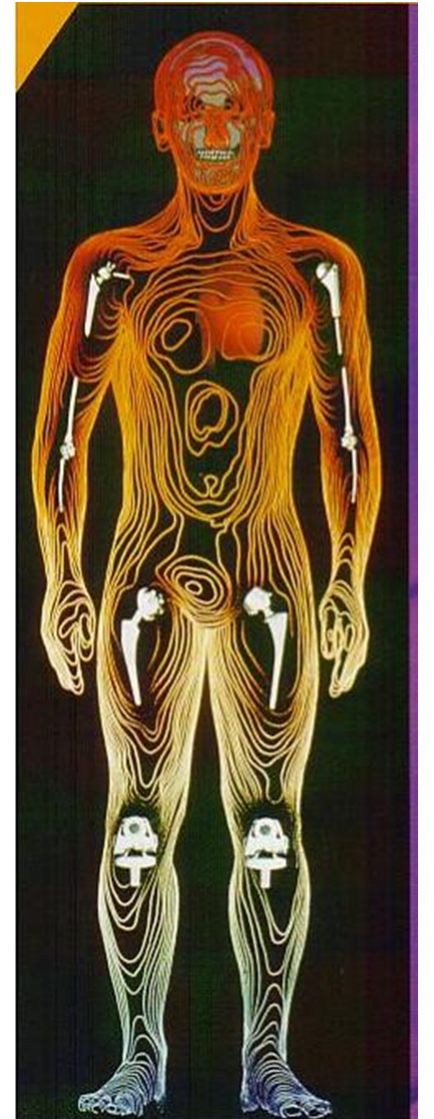
Technical Committee: All of you

# Introductions

- I will introduce myself and then Gul will introduce herself
- Provide a Summary of who is attending the Workshop
- Who are we missing?
- Why are you here?
- Is there something special you offer the community?

# A sincere welcome to all of you

- I am Rick Wysk, and I have been teaching a BROAD set of manufacturing courses for 42 years. I am not quite this bad as this picture, but I am about half way there.
- I am here to see if we can form a “manufacturing community” focused on teaching modern manufacturing while bringing excitement about making things to the next generation.
- I retired this summer and would like to leave a “footprint” in this community.



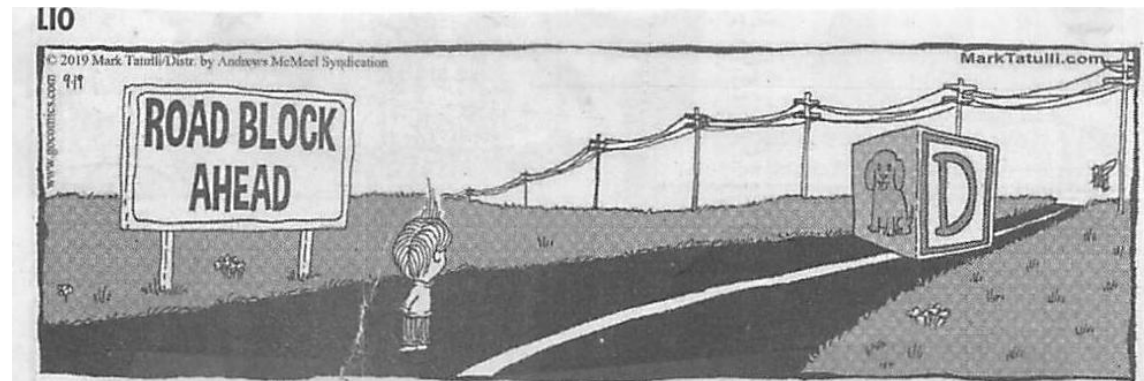
# Gul Okudan-Kremer

- Currently, Professor and C.G. “Turk” and Joyce A. Therkildsen Department Head at Iowa State University
- Served on the faculty at The Pennsylvania State University
- Served as an NSF Program Manager for the Engineering Education Division



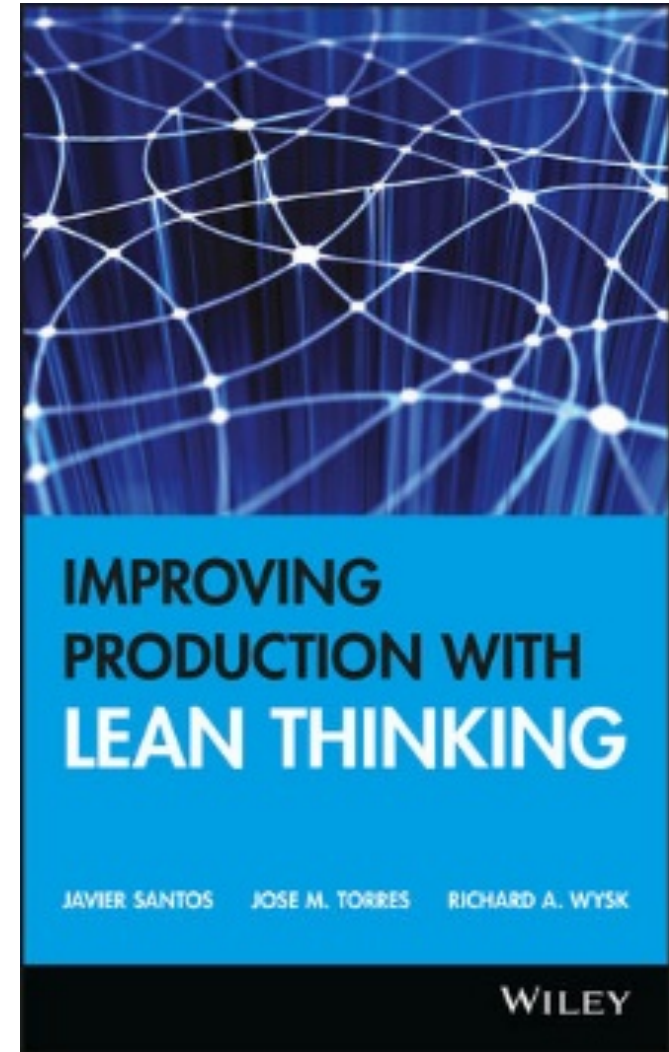
# Purpose of the Workshops

- Cultivate a community of experts teaching in advanced manufacturing
- Understand the roadblocks associated with developing a Shared Repository of teaching materials
- Develop a proposal that can be FUNDED by the NSF IUSE Program



# Our basic hypothesis

- We feel that an Advanced Manufacturing Teaching Repository will serve as the seed for an “organic set of teaching materials”, which will continue to grow over time.
- We feel that a focused technical community of college educators who share their technical experiences, course materials and teaching experiences so that a broad compilation of educational materials can be provided to participating schools that will catalyze advances in *Modern Manufacturing*.

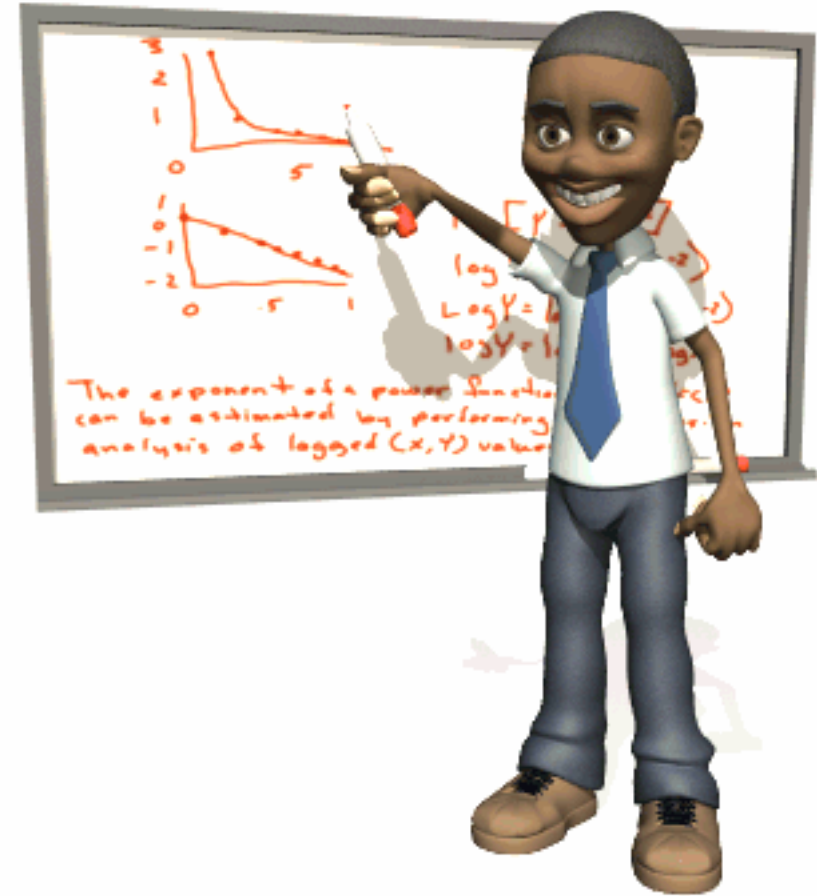


# Foundation: A test repository

- Dr. Wysk has created a Repository at NC State for teaching Advanced Manufacturing
  - Topics are organized from a collection of 40 years of teaching
    - Chapters of text materials
    - Presentations
    - Engineering product models
    - Quizzes
    - Homework
    - Tests
    - Laboratory Exercises

# Currently, at the start of Academic year 2016-7

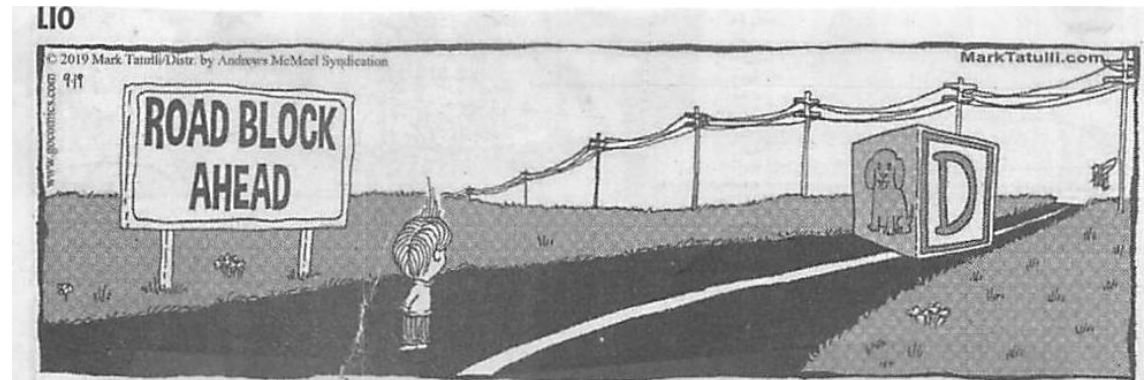
- A collection of stuff
  - Poorly organized
  - In need of editing
  - Forty plus years of work
  - Students like to idea of a free book



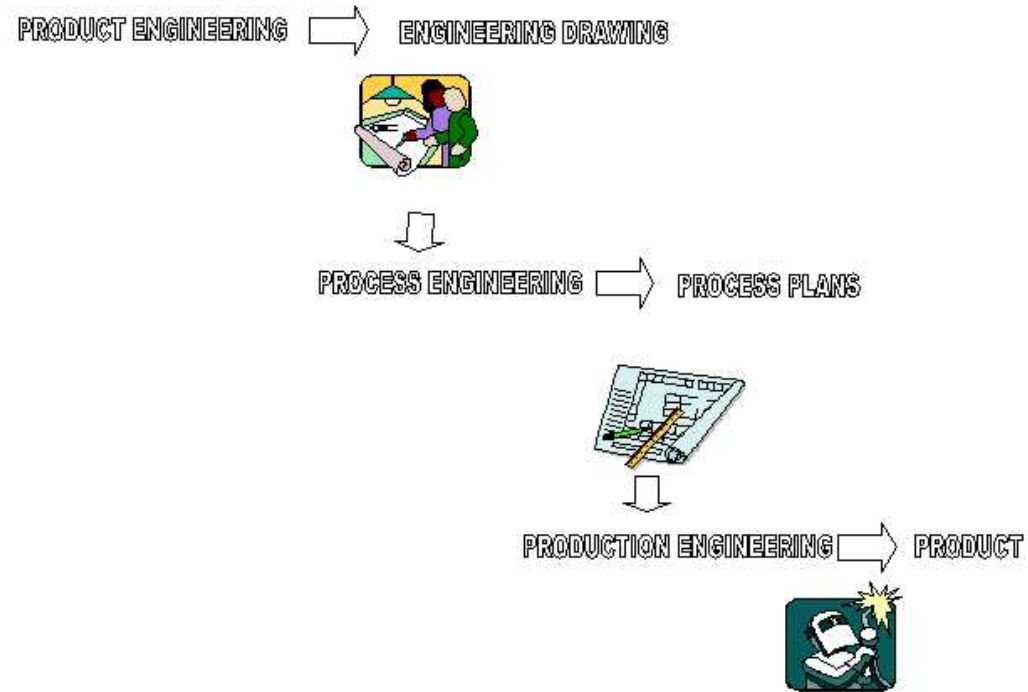


# So how do we proceed?

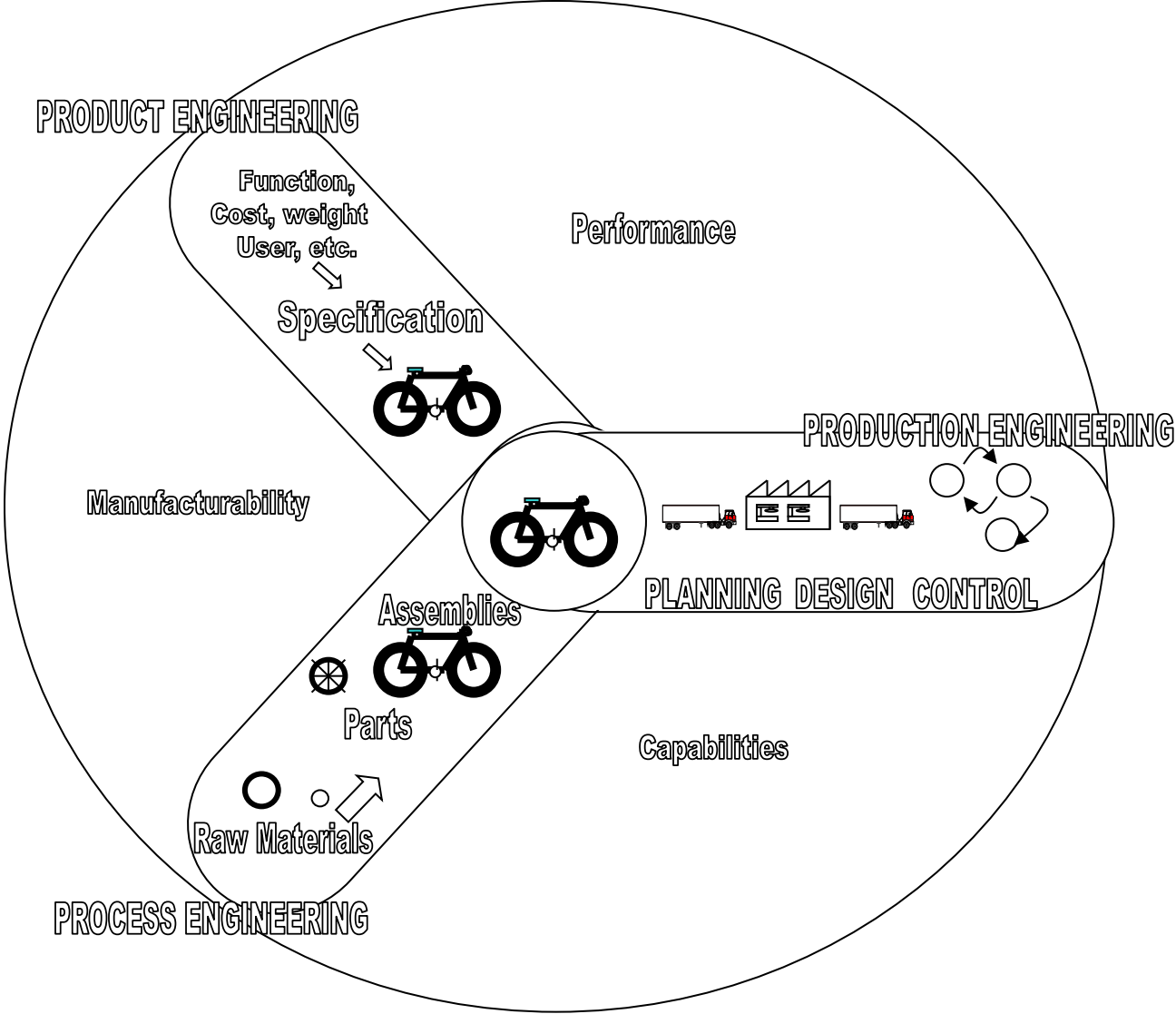
- Organize
- Foster a system that is sustainable
- Improve the materials through use
- Plan for a larger use – make up the margin by improving volume



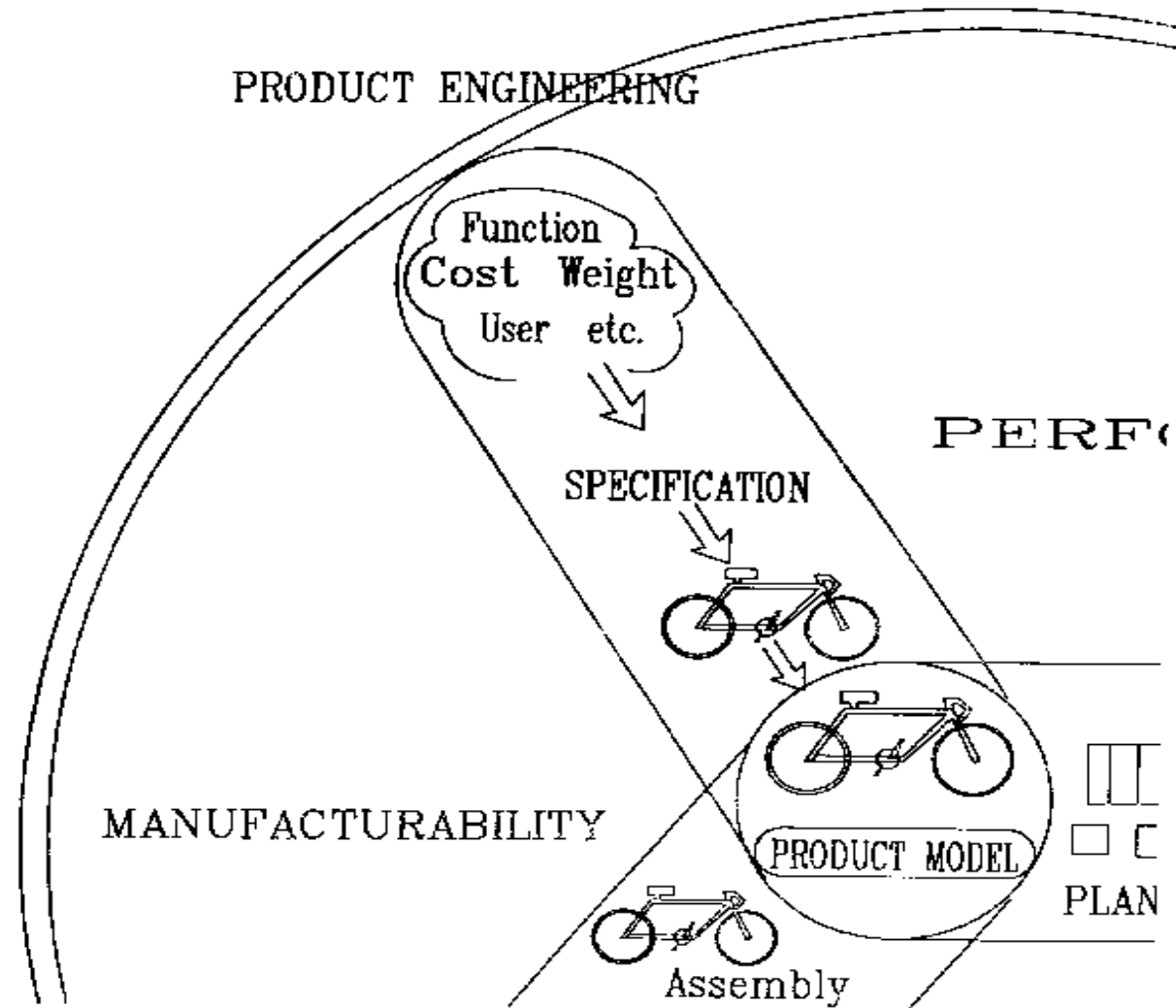
# Focus: Traditional Engineering



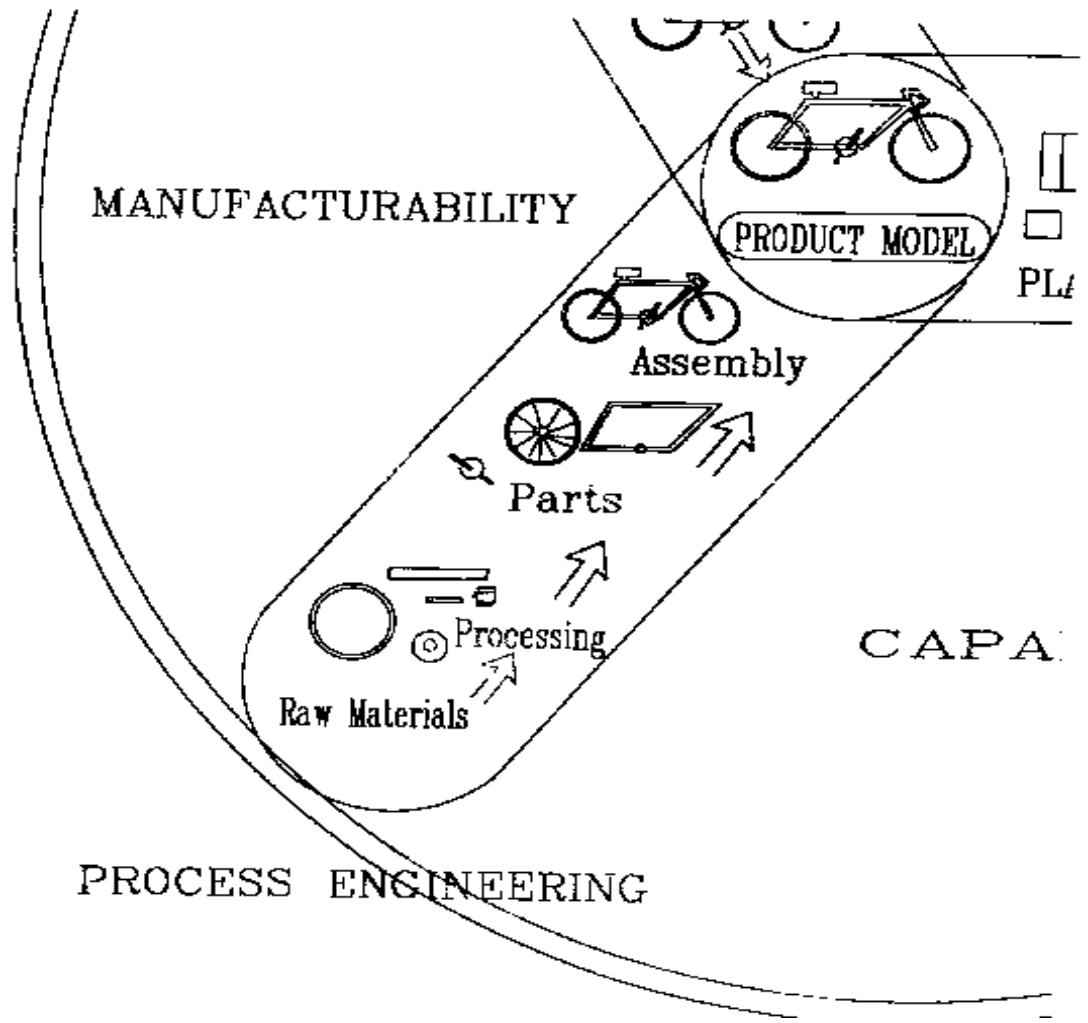
# Concurrent Engineering



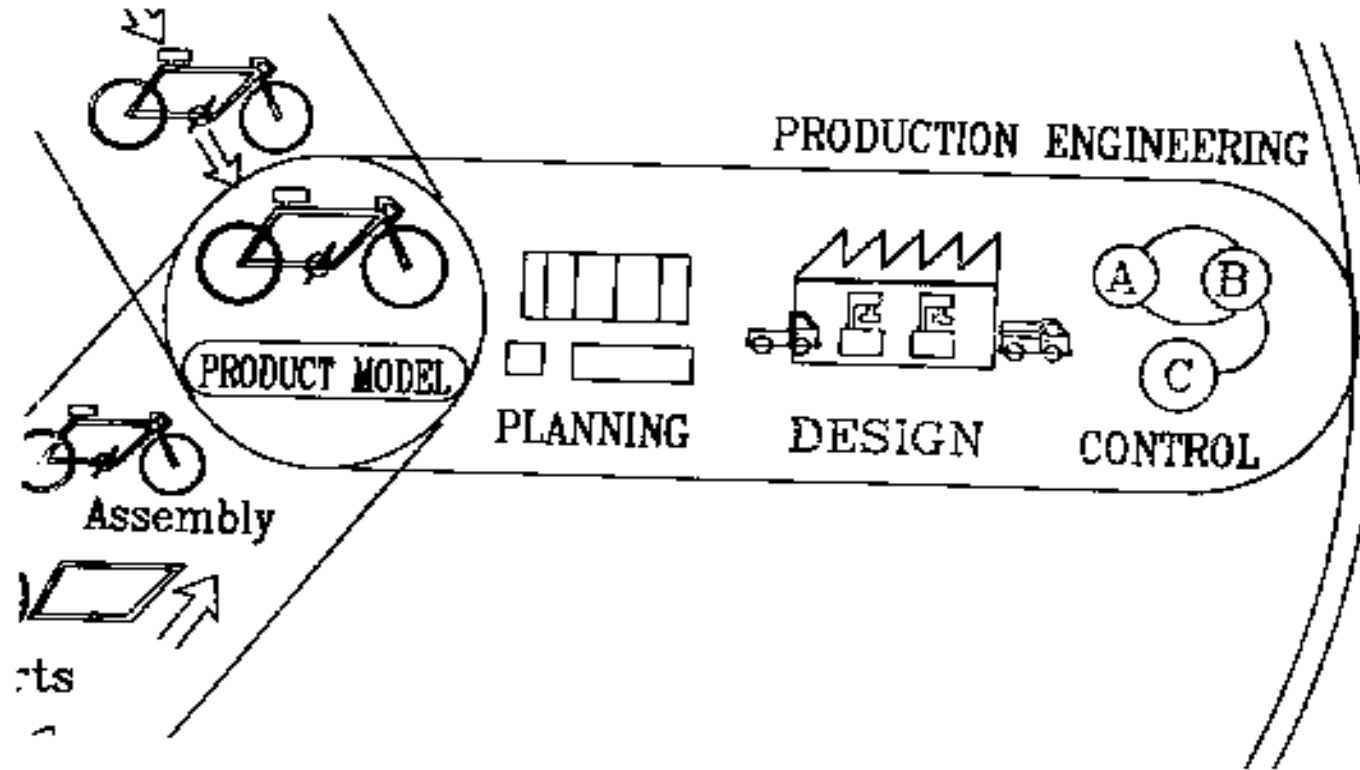
# Product Engineering



# Process Engineering



# Production Engineering



# An Engineering Technology Taxonomy (ETT)

## Product Engineering

Geometric Modeling

ASME Y14.5

Product Design

GD&T

Miniaturization

Etc.

## Process Engineering

Process planning

CAD/CAM

Fixture Design

Product Economics

Tool path planning

Etc.

## Production Engineering

Machining

Casting

Injection Molding

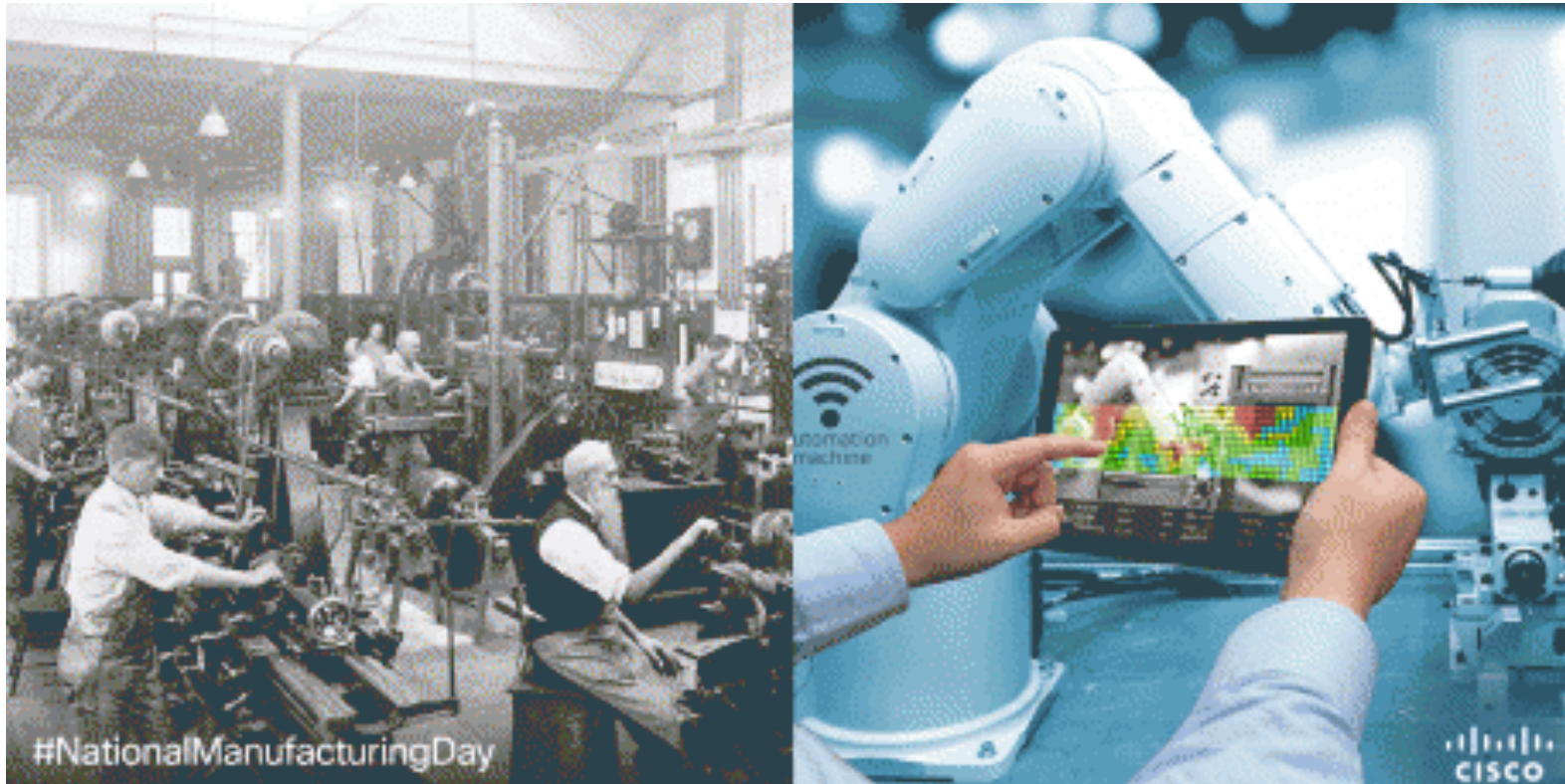
Sheet metal working

Inspection

Etc.

# Related taxonomy

- Prerequisite materials: Fundamentals of materials, Mechanics, etc.
- Introductory materials: Motivating, defining and scoping the topics





# Types of materials included in the repository

- Text chapters
- Exercises and problems
- Presentation slides
- Quizzes
- Tests
- Videos (empty, except for a few youtube urls)

# Organizations of materials

- Use ETT as the basic topical search structure
- Create a set of users and privileges
  - Administrators
  - Instructors
  - TAs
  - Lab Managers
  - Enrolled students
  - Interested instructors
  - Interested students

# An Initial site is under construction at NC State

- A very generous offer was made at the beginning of spring semester 2019 in my ISE316 course. As I was going over the ground rules for the course, a young man approached and offered to help with my concept. That individual has by now probably been “broken of the habit to volunteer”, but has still offered to attend our Workshop today to talk about our initial.
- Let’s welcome, Sam Cynamon, an NC State student to demonstrate how such a repository might work, and for those that have seen what Sam’s been doing, providing and update to the materials.

# Manufacturing Education

Technical Website Introduction and Review



# Introduction

- Senior ISE (Graduate in 2020)
- Took Manufacturing Processes under Dr. Wysk and Dr. Lee (Spring 2019)
  - Free Textbook
- Occupation: OIT Web-Tool Development Lead (ClassTech)
  - Coop: SPT (Elizabethtown) Manufacturing Plant
- Project: semi-automated academic repository and resource hub
  - Minimize Student Costs
  - Increase Professional Participation / Partners

# Manufacturing Education

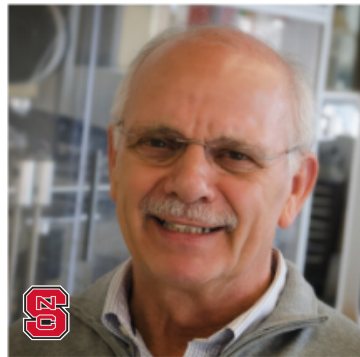
[Home](#) [Topics](#)

**Welcome to Manufacturing Education,**



## Charter Statement

“To design and develop an online service for academic institutions to expand the available resources and source materials within the next year.”



[Dr. Richard Wysk](#)



[Dr. Yuan-Shin Lee](#)



[Dr. Gül E. Kremer](#)

## Topics

- Fundamentals
- Engineering
  - Manufacturing
    - Product
    - Process
    - Production
  - Quality \*\*
  - Biomechanical \*\*
- Limitless Expansion



Materials



Mechanics



Drafting



Manufacturing Engineering



# Subject Materials

Manufacturing Education

[Home](#) [Topics](#)

## Product Engineering

Geometric Modeling, ASME Y14.5, Product Design, GD&T, Miniaturization →

## Process Engineering

Process planning, CAD/CAM, Fixture Design, Product Economics, Tool path planning

## Production Engineering

Machining, Casting, Injection Molding, Sheet Metal Working, Inspection

- Students
  - Subject Examples w/ Solutions
  - Lab Lessons
- Professors
  - Course Structure
  - Lecture Slides
  - Exams / Quizzes (Exclusive)
- Access can be independently determined



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## Vision for our Platform



openstax CNX™

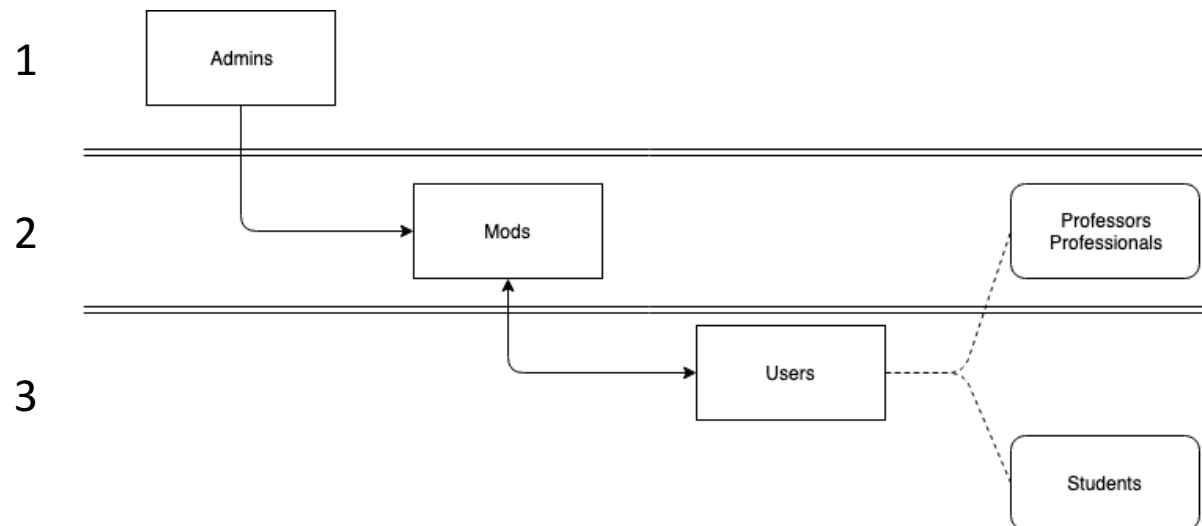
- Semi-automated – user supported
- Simple GUI for users
- Repository of supplement materials
  - Partner with third party *publisher*
- Ever expanding subject/topic base



BCcampus  OpenEd

# Technical Hierarchy

1. Admins - Site controllers, assign access
2. Mods - technical experts, volunteers to review submissions
3. Users - provide materials, and use site



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## Future Features

- ❖ Field Expert Contacts
- ❖ Expanding Academic Subjects
- ❖ Videos of Subject Review
- ❖ Integrating additional Universities



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## Summary

- ❖ Web-based repository with custom user authentication settings
  - Making resources accessible regardless
- ❖ Manufacturing has a strong initial repository of materials available
- ❖ Allows versatility in teaching styles
  - Flexibility in course construction
  - Students can access materials on their own time
- ❖ Goal: **easy to update, simple to access, and contains the desired knowledge**

**NC STATE  
UNIVERSITY**



**COLLEGE OF  
ENGINEERING**

# Current implementation for Spring 2019

The screenshot displays a Moodle course interface for 'ISE 316 (001) SPRG 2019'. The top navigation bar includes the NC State logo, the course name, and the user's name 'Richard Wysk'. The left sidebar contains a course menu with categories like 'Participants', 'Grades', and 'General', followed by a list of topics from 'Topic #0' to 'Topic 10'. The main content area is titled 'Topic #0 -- General Course Guidelines and Rules' and lists several documents: 'Course Syllabus v1.0 12-6-20'18', 'Course Schedule (v2.1, 01/8)', 'Ground Rules and Course Overview Presentation', 'Introduction to Engineering and Producing a Product', and 'Chapter 1 - Word'. Below this is 'Topic #1 -- Dimensioning and Tolerances', which includes a text description and a list of resources such as 'GD&T Chapter', 'Product specification, dimensioning and tolerancing', and several homework assignments with due dates. The right sidebar features a 'LIBRARY COURSE TOOLS' section with links to 'Library Course Tools (ISE 316)', 'E-Reserves', 'Citation Builder', and 'Article Search'. Below that is a 'PEOPLE' section with a 'Participants' link. A vertical list of recent activity is also visible on the right side of the main content area.

# Agenda for our day

- Overview of STAM
- Breakout for: What are the values for STAM?
- Breakout for: What are the Roadblocks associated with implementation?
- Breakout for: What are user and value-added issues? How can we interest you?
  - User
  - Developer
  - Reviewer

# Questions concerning the REPOSITORY

