

# **PLM Activities at Purdue: NSF and SME Sponsored Programs**

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## Two Major Projects Under Way

- Midwest Center for Comprehensive Design Education (MCCDE)
- Curriculum Modules in Product Lifecycle Management (PLM) for Engineering and Engineering Technology Students and Industrial Practitioners



# MCCDE Project goal

- The partner institutions on the project will work collaboratively:
  - to identify
  - develop and
  - deliver curriculum that will integrate
- comprehensive design education across
  - associate degree technician and
  - baccalaureate degree technology colleges,
- in order to increase the skill level in the manufacturing sector.

# Objectives

- 1. Validate competencies for comprehensive engineering design**
- 2. Transferability between AS and BS Programs**
- 3. Comprehensive design curriculum for academic institutions**
- 4. Comprehensive engineering design and workforce development**
- 5. Interaction with K-12 students**

# NSF ATE project will specifically target the following competency gaps/skills

- Product/process design
- Manufacturing systems
- Problem solving
- Teamwork/working effectively with others
- Business knowledge/skills
- Project management
- Oral communications
- International perspective

# Dissemination

- Dissemination will be accomplished through the integration and use of hybrid delivery models for continued professional development.
- Specific components of the competency gaps/skill set require the use of software tools and thus regular software updates.
- Collaborative professional development among the partner institutions will reinforce partner institution relationships.
- The partner institutions will then work to replicate and disseminate within their respective states.

# Future Directions

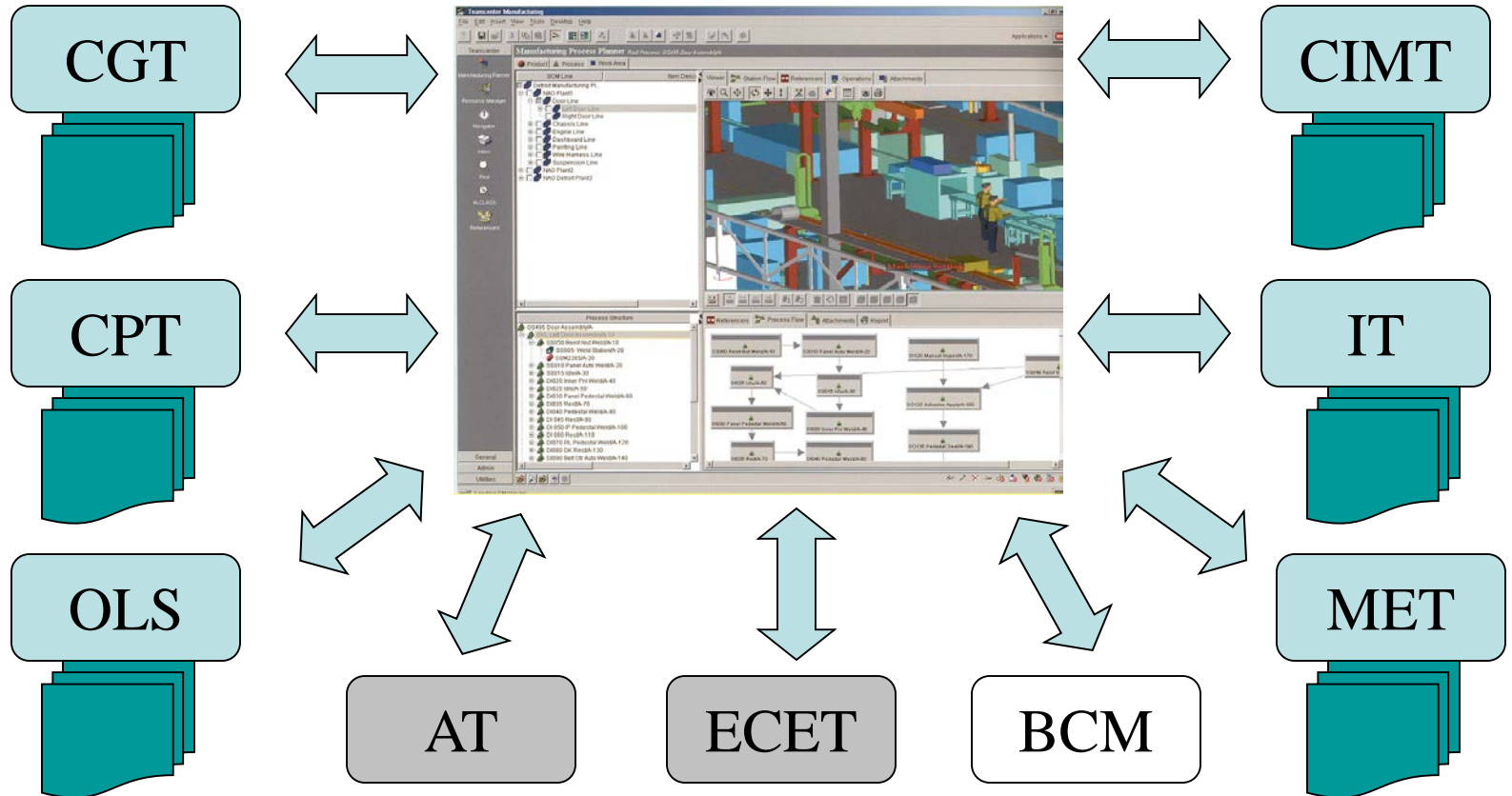
- 2008 – NSF Regional Center for Comprehensive Engineering Design Education.
- 2011 – NSF National Center for Comprehensive Engineering Design Education.
- DOL Grants

# Curriculum Modules in PLM

- Goal of the project is to develop a PLM Curriculum that is broad and transferable
- Cooperation among departments throughout the College of Technology reflects interdisciplinary nature of the topic



# SOT-PLM: Curriculum



# CGT-PLM

*Product Lifecycle Management*

- Introduction to Graphics for Manufacturing
- Introduction to Constraint Based Modeling
- Manufacturing Graphics Standards
- Manufacturing Document Production and Management
- Industrial Applications for Simulation

PLM

# CIMT-PLM

*Product Lifecycle Management*

- Manufacturing Operations and Planning
- CAD in Manufacturing
- Advanced Manufacturing Processes and Practices
- Advanced Manufacturing Operations
- Integrated Materials Handling and Facilities Planning
- Integration of Manufacturing Systems

PLM

# CPT-PLM

*Product Lifecycle Management*

- Database Fundamentals, Design and Implementation
- System Analysis
- Information Technology
- Enterprise Network Management and Application Development
- Network Security

PLM

# IT-PLM

- Problem-Solving in Manufacturing
- Introduction to Statistical Quality
- Industrial Ergonomics
- Logistics
- Production Planning
- Production Cost Analysis
- Facilities Planning and Materials Handling

# MET-PLM

- Production Design and Specifications
- Materials
- Manufacturing Processes
- Strength of Materials
- Mechanics
- Machine Elements
- Mechanical Design

# OLS-PLM

*Product Lifecycle Management*

- Innovation and Entrepreneurship
- Leadership Process
- Staffing Organizations
- Management of Change
- Human Resource Issues
- Conference Leadership

PLM

# PLM Example – Instrument Design

- Necessary to have a concrete example

- Stringed Instruments are an ongoing research topic in MET and suited to the needs of this project

- Relatively easy to make
- Geometry models have been developed
- Well-suited to multi-disciplinary analysis and optimization
- Quality definitions are both objective and subjective

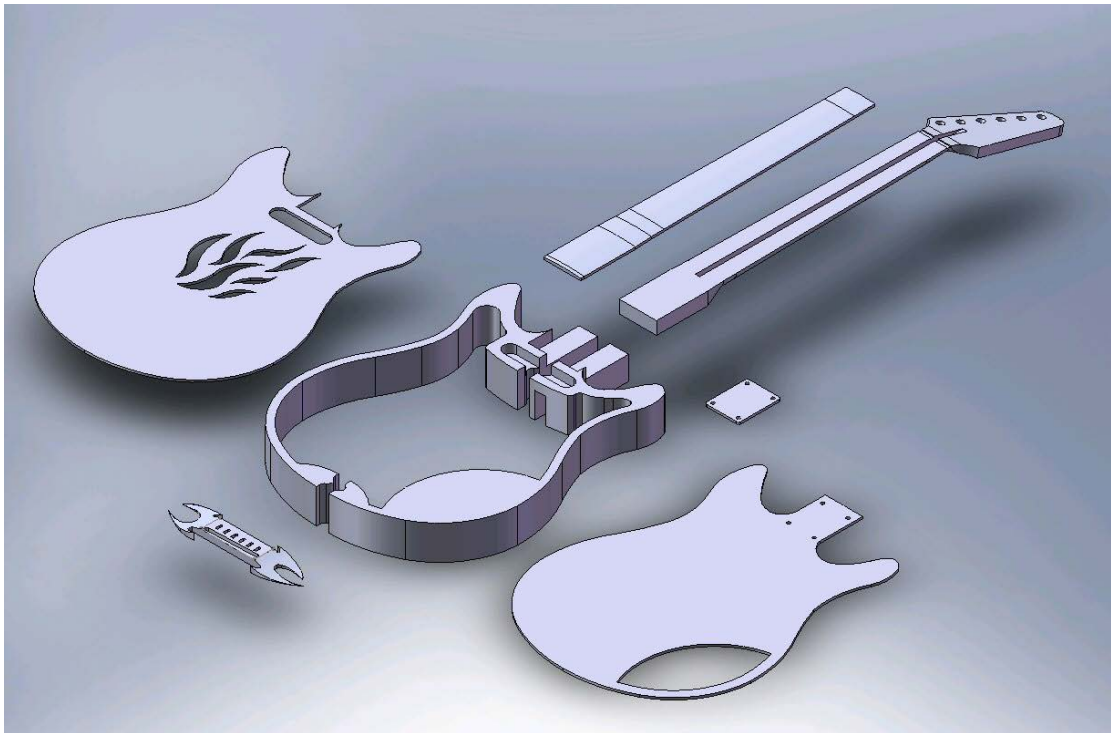
- New design developed for this project

- Acoustic Electric with on-board electronics
- Will be used for summer 2008 workshops



# Design Requirements

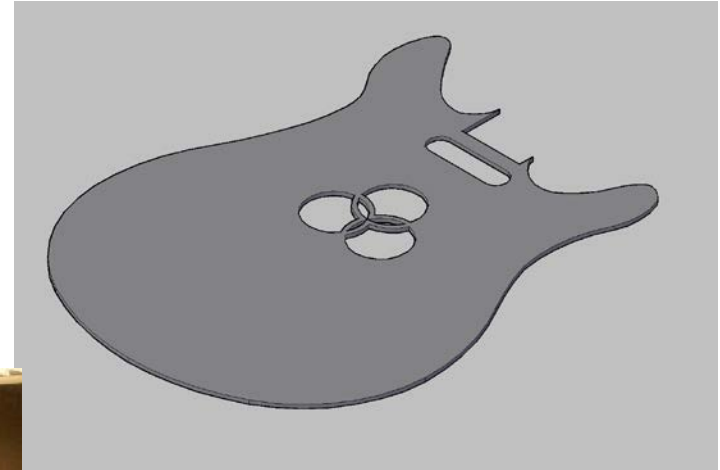
- Inexpensive
- Easy to assemble
- Attractive (cool)
- Good feel and sound quality



# Customizable Elements

■ Everyone wants their own unique design features

- Soundhole geometry
- Headstock geometry
- Pickup choices



# Design for Assembly

- Design must be produced by inexperienced builders
- Alignment and dimensional control is critical
- Design features must be included to force accurate assembly



# Distributed Design and Manufacturing

