

**CPACE**  
**Advisory Board Meeting**

**Greetings from**  
**MSU Provost Kim Wilcox**

**Continental Breakfast**

CPACE Advisory Board Meeting, April 24, 2008





*MSU College of Engineering*


CPACE Advisory Board Meeting - April 24, 2008


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**CPACE**

**Computing and Undergraduate Engineering:  
A Collaborative Process to Align Computing  
Education with Engineering Workforce Needs**


 This material is based upon work supported by the National Science Foundation under award 0722221. Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation (NSF).



## Welcome


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- Welcome: Thomas F. Wolff (CPACE PI)
  - Associate Dean for Undergraduate Studies
  - College of Engineering

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- Opening Remarks:
- Satish Udpa, Dean  
College of Engineering
- Paul Hunt, Associate Vice President  
for Research, MSU

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## Introductions: CPACE Team

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- Michigan State University (MSU)
- Lansing Community College (LCC)
- Corporation for a Skilled Workforce (CSW)
- Science and Mathematics Program Improvement (SAMPI), Western Michigan University
- Advisory Board members

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## Kickoff Activity

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- Card in your packet
- Put your name on the card
- List 2-3 outcomes you desire from computing education for undergraduate degree engineers



## **CPACE** *Overview*




## The Challenge from NSF

- Need
  - Globally competitive U.S. workforce with knowledge and understanding of critical computing concepts, methodologies, and techniques
- Problem
  - Undergraduate computing education today often looks much as it did several decades ago
- Goal
  - Transform undergraduate computing education to meet this need

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## CPACE Vision

A collaboratively-defined undergraduate computing education within the engineering and technology fields in alignment with the computational problem-solving abilities needed to transform mid-Michigan's economy and workforce

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## CPACE Innovation: NSF Review

- Recognizes that stakeholders have disjoint concerns
  - Well-conceived process is explicitly designed to address these issues
- Potential for broad application
  - Collaboration among stakeholders can produce curricular change
  - A critique of the process would be of great value to the wider computing community
  - Connection between computing principles and workplace requirements appropriate in Michigan may be applicable elsewhere
- Fundamental and transformative effects on computing education
  - Process may help align undergraduate education with workforce requirements without transforming computing into a vocational field of study
  - An excellent example of including a broad range of stakeholders in the community it encompasses
- Improving the global competitive position of Michigan
- Could lead to significant improvement in undergraduate computing education

## Goals

- Bring together academics, business and industry, professional organizations
- Create a collaborative process to redesign undergraduate computing curriculum
- Document and evaluate the process
- Prepare CPATH Transformation grant proposal to implement redesign of computing education in engineering programs




## Objectives

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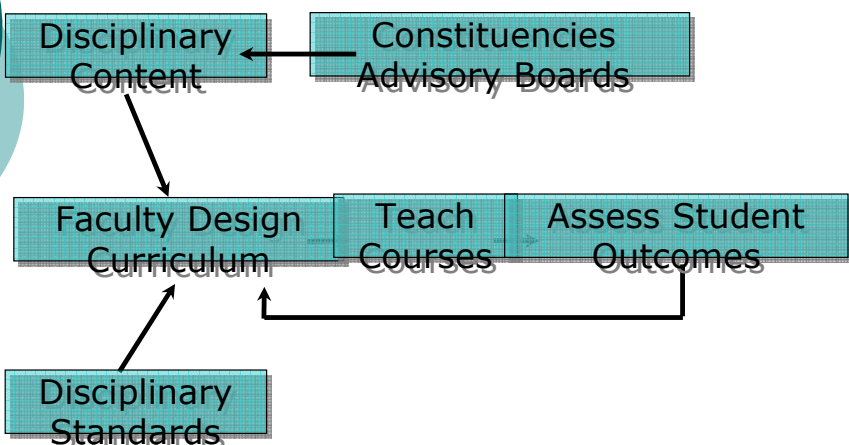
- Promote and support partnerships
- Develop and document process
- Integrate computing education in engineering curriculum
- Identify and implement new models that are replicable across programs and institutions
- Promote organizational change and sustainability
- Contribute to a diverse, agile workforce with computational problem-solving knowledge

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## Traditional Curricular Model

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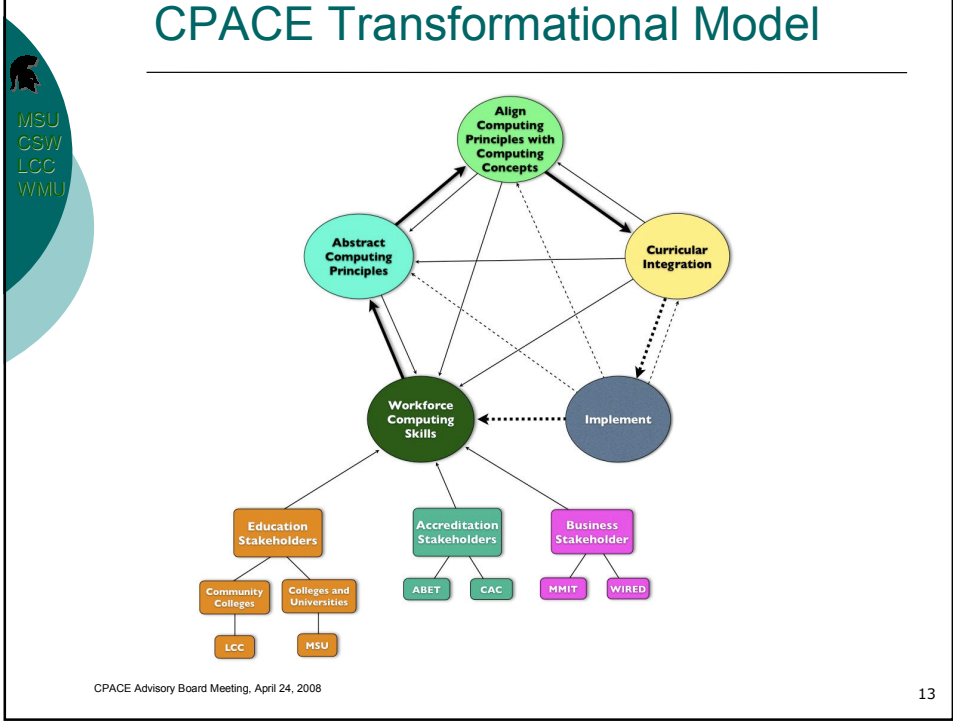


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    graph TD
      A[Constituencies Advisory Boards] --> B[Disciplinary Content]
      B --> C[Faculty Design Curriculum]
      D[Disciplinary Standards] --> C
      C --> E[Teach Courses]
      E --> F[Assess Student Outcomes]
      F --> C
  
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# CPACE Transformational Model



# Anticipated Outcomes

- Develop engagement process
  - Identify and engage stakeholders
  - Collect data about workforce computational needs
  - Identify key computational problem solving skills
  - Abstract computing principles and concepts aligned with computational problem solving skills
  - Disseminate findings
  - Evaluate the project model and prepare reports of each phase of the activity
  - Submit full implementation NSF CPATH Transformation grant
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# *Discussion Questions?*

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## Roles of the Advisory Board

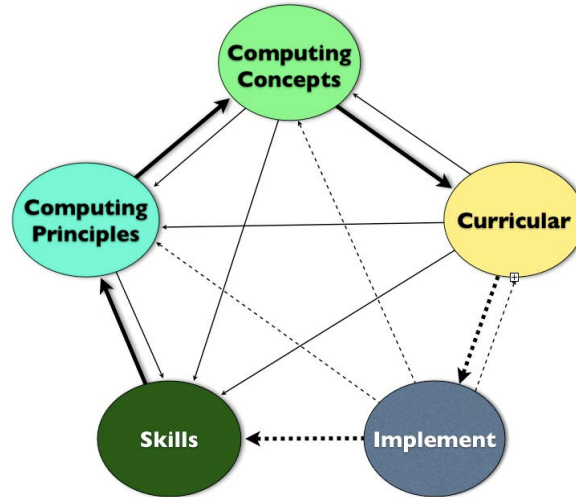
- Represent stakeholder groups
- Advice on project implementation
- Stakeholder networking & engagement
- Ongoing project communication
- Project milestone meetings

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## AB Role - Transformational Model



## Project Communication

- Maximize impact
- Minimize time demands
- Build collaborative knowledge and meaning
- Capture, document, and analyze the process



## Communication Facilities

- CPACE Wiki
  - <http://cpace.egr.msu.edu>
  - Your ID / PW in your packet
  - Support / questions:  
Claudia Vergara  
[vergara@msu.edu](mailto:vergara@msu.edu)
- CPACE Advisory Board Email Listserv
  - [cpaceab@list.msu.edu](mailto:cpaceab@list.msu.edu)

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## *Discussion Questions?*

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# ***Research/Data Collection and Engagement Strategies***



## **Data Collection Strategy: Purpose**

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Conduct employer interviews and employee surveys to better understand the computational knowledge and skill development needs of the entry-level engineering workforce



## Data Collection: Target Audience

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- Small to Large companies/  
Organizations
  
- Entry-level engineering occupations  
representing key MSU and LCC  
engineering disciplines



## Data Collection: Target Programs

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- Applied Science Engineering
- Bio Systems Engineering
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical, Electronics,  
Communications Engineering
  
- Mechanical Engineering



## Data Collection: Target Areas

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*in priority order ...*


1. Mid-Michigan
2. State of Michigan
3. Out-of-state mid-west regions



## Interviews

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- 20-25 interviews with Engineering Managers/Directors and Human Resource Managers/Directors
- Estimated timeline: June-August 2008



## Data Collection: Employee Surveys

- Web-based surveys of 200-250 employees of companies
  - Companies participated in interviews
  - Members of engineering professional societies/associations and other networks such as the MiRegional Skills Alliances
  
- Estimated timeline
  - June-August 2008

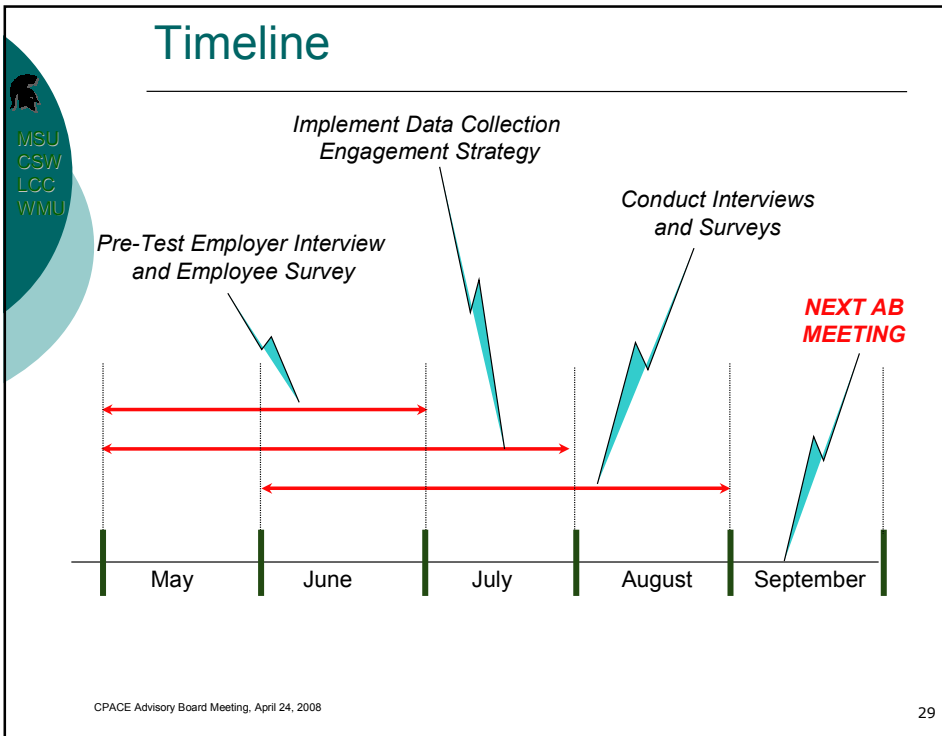
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## Data Collection: After this meeting

- Feedback from AB members
  - Content and flow of draft interview protocol and employee survey questions
  - Estimated deadline - Monday, May 5
  
- Pilot test survey and interview instruments with small sub-set of individuals
  - Estimated timeline: May/June 2008

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# *Employer Engagement Strategy*

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## Engage: Value Proposition (ROI)

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### ○ Short Term Benefits

- Networking, connecting to resources
- Bridge communication divide
- Assist in strategic planning process

### ○ Long Term Benefits

- Better prepared employee
- Reduced turnover costs
- Reduced waste/error (costs of quality)
- Increased continuous improvement
- Increased independent thinking, creativity, innovation
- Developed workforce transforms economy




## Engage: Leveraging the AB

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### ○ Leveraging your positions of influence

- Employer and association contacts to gain access to members
- Provide feedback on survey, interview, and engagement documents






## Engage

- Connecting with professional associations, societies, and groups
  - Lend names for support in connecting with professional societies
  - Create a coordinated mail campaign
  - Post information links on society websites, newsletters, and other collateral pieces
  - Presentations at upcoming association forums

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## Engage

- Engaging employers directly
  - Lend names for support in connecting with employers
  - Leverage MSU and LCC alumni and employer recruiting relationships
  - Presentations at upcoming employer forums
  - Tap into existing collaborations within the state
  - Encourage participating employers who interview to have their employees surveyed

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## Engagement



- Does the engagement strategy make sense?
- How do you view your role in engaging others to participate in research?
- Are there other ways to optimize your role?
- What do you feel is the value proposition?
- What else should be considered?

## *Recap: Advisory Board Project Engagement*




## Recap: Provide Advice/Stay Connected

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- Providing feedback and edits on data collection tools
- Providing feedback and edits on engagement strategies
- Helping engage others for participation in the data collection
- Participating in pre-test of survey and interview protocols
- Familiarizing self with the wiki and using it regularly to stay informed of other CPACE project meetings and activities
- Reading e-mail sent to the CPACE listserv group

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## What other methods should we consider to help you engage in the project between AB meetings?

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## Reflection

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- Returning to your card with 2 - 3 outcomes you desire from computing undergraduate education for engineers
- Reflecting on the CPACE project what challenges do you think the project will face addressing your desired outcomes?
- Write on the back of your card



## Next Steps for the AB

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- Next meeting
  - Mid-August to mid-September
- Feedback and testing instruments
- Connections to the engagement strategy
- ***Other items?***

