UM Innovations in STEM Education

Stakeholders Meeting

January 24, 2012

11:00 a.m.

Johnson Commons Ballroom

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Agenda

- STEM Education: A National, State, and University Priority
- State K-12 Perspective
- Local K-12 Perspective
- UM STEM Programs and Activities
- UM Innovations in STEM Education

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Meeting Objective

Create the means for UM programs to connect with each other and with external partners to achieve UM goals:

- Increase the number of STEM graduates, especially among underrepresented groups.
- Ensure all UM STEM graduates have 21st century skills and a broad understanding of the role of science in society.
- Increase the number of K-12 math and science teachers who can inspire and prepare students to pursue STEM education and careers.
- Improve science literacy.
- Provide the facilities and infrastructure needed to achieve these goals.

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Significance

National

- U.S. competiveness, leadership, and security
- Societal challenges: energy, health, environment, etc.
- U.S. lagging in STEM education and workforce preparation

State

- Diversify and strengthen the economy
- Build a competitive STEM workforce
- Increase educational attainment

University

- Educate a diverse STEM workforce
- Expand innovative STEM education and research facilities

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State K-12 Perspective

Mississippi Department of Education
Trecina Green
Associate Superintendent
Office of Instructional Enhancement

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Local K-12 Perspective

Lafayette High School
Patrick Robinson
Principal

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Local K-12 Perspective

Oxford School District
Brian Harvey
Interim Superintendent

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UM STEM-Related Programs

K-12 Teacher Preparation

David Rock, Ph.D.
Dean, School of Education

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UM STEM-Related Programs

STEM Living Learning Community

Josh Gladden, Ph.D.
Residential College Faculty Fellow
Associate Professor of Physics and Astronomy

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UM STEM-Related Programs

Center for Mathematics and Science Education
Alice Steimle, Ph.D.
Associate Director

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UM STEM-Related Programs

Mississippi Space Grant Consortium
Peter Sukanek, Ph.D.
Director
Professor of Chemical Engineering

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UM STEM-Related Programs

Center for Manufacturing Excellence
Ryan Miller
Assistant Director and Programs Manager

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UM STEM-Related Programs

Minority Recruitment and Retention Programs

Don Cole, Ph.D.
Assistant Provost
Assistant to the Chancellor for Multicultural Affairs
Associate Professor of Mathematics

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UM STEM-Related Programs

The Oxford Science Cafe

Marco Cavaglia, Ph.D.
Associate Professor of Physics and Astronomy

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UM STEM-Related Programs

Informal Science Education and Broader Impacts

Kristen Swain, Ph.D.
Assistant Professor of Journalism

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UM STEM-Related Programs

UM Women in STEM

Susan Grayzel, Ph.D.
Interim Director of the Sarah Isom Center for Women and Gender Studies
Professor of History

Susan Pedigo, Ph.D.
Associate Professor of Chemistry and Biochemistry

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UM STEM-Related Programs

School of Engineering Ambassadors

Scott Kilpatrick
School of Engineering
Assistant Dean for Student Services

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UM STEM Education Initiative

Task Force:

- **Established Spring 2010**
- **Participants:**

M. Eftink, Co-Chair	W-Y. Chen	B. Hopkins	G. Parsons	K. Swain
G. Hopkins, Co-Chair	A. Cheng	C. Hussey	L. Ridgeway	M. Valiant
I. Banner	C. DeWitt	P. Lago	J. Ritchie	J. Vaughan
A. Barlow	D. Cole	L. McCook	D. Rock	J. Wiginton
A. Bouldin	L. Cremaldi	R. Miller	R. Savell	N. Wilkin
M. Cavaglia	C. Cunningham	J. Morrison	S. Spain	D. Heil, Consultant
A. Clark	J. Hale	W. Nicholas	L. Sparks	
W. Cleland	M. Harper	J. O'Haver	J. Sumrall	

- **Funding:** NASA grant for Task Force planning activities

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UM STEM Education Initiative

Task Force Process and Activities:

- Student Focus Group Sessions
  - STEM undergraduate and graduate students
  - non-STEM education majors
- Task Force Visioning Sessions, led by consultants
- Identified Best Practices, UM Strengths and Needs
- Site Visits: Colorado, Minnesota, Tennessee, Illinois, Wisconsin
- Tradeline Conference

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STEM Education Best Practices:

- Energetic STEM faculty
- Top level commitment to STEM Education
- Collaboration between STEM departments and SoE departments
- Reward system that recognizes STEM Education efforts
- Focus on K-12 teacher prep and development in STEM
- Integration of STEM research and teaching
- Innovative UG academic programs
- Portfolio of STEM Education funding
- Focus on STEM access to minority, female, 1st generation students
- Viable community outreach programs
- Use of technology to enhance teaching and learning
- Facilities that foster STEM teaching/learning/research/outreach

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UM STEM Strengths:

- Faculty enthusiasm
- Administrative support
- LD courses taught by regular faculty
- Honors College
- Effective minority programs (e.g., AMP)
- Existing CMSE
- Small campus with few silos

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UM STEM Education Initiative

Task Force Key Recommendations:

- Strengthen UG and Grad STEM education
- Expand enrollment in STEM courses and programs
- Foster innovation, research, collaboration and diversity
- Improve STEM teaching and learning in K-12 schools
- Make the case for a new STEM teaching/learning facility
- Secure public and private support for STEM education
- Provide community service/outreach in STEM fields
- Be a resource for economic development

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UM STEM Education Initiative

Task Force Key Recommendations:

- Upper administrator to lead STEM efforts
- Announce to stakeholders
- Broaden participation in the STEM Ed Initiative
- Prepare a concept paper, to generate awareness and attract investment
- Inventory of current UM STEM education assets
- Align with UM 2020 Strategic Plan and Blueprint MS
- Develop strategy for seeking public/private funding
- Develop a unified vision and business plan

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Goals:

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- Increase the number of K-12 math and science teachers who can inspire and prepare students to pursue STEM education and careers.
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- Provide the facilities and infrastructure needed to achieve these goals.

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Working Groups (Proposed):

- Innovative Teaching & Learning Working Group
- Student Recruitment, Retention, and Career Placement Working Group
- Faculty Recruitment, Retention, and Development Working Group
- Teacher Preparation and Professional Development Working Group
- Public Outreach and Engagement Working Group
- Facilities and Infrastructure Working Group

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INNOVATIVE TEACHING & LEARNING WORKING GROUP

- Interdisciplinary science courses for non-majors
- Enhance courses for majors in STEM disciplines

STUDENT RECRUITMENT, RETENTION, AND CAREER PLACEMENT WORKING GROUP

- Institutionalize minority-focused efforts
- Support for CC transfer students who enter into STEM majors

FACULTY RECRUITMENT, RETENTION, AND DEVELOPMENT WORKING GROUP

- Provide support for faculty to submit STEM Education proposals
- Recognizing these efforts in Tenure and Promotion considerations

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Teacher Preparation and Professional Development Working Group

- Recruit for the science/math education programs in the SoE
- Expand teacher support programs through the SoE and CMSE

Public Outreach and Engagement Working Group

- Use new science building for various public outreach activities
- Expand camps, field trips and tours of UM science programs

Facilities and Infrastructure Working Group

- Analyze space needs for teaching STEM at UM
- Prepare a Case Study for a new science building
- Develop metrics and assessment resources

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Working Groups

- Develop action plans for achieving specific goals
- Guiding principles:
  - Broad participation
  - Alignment with UM2020 and Blueprint MS
  - Innovation
  - Synergy

Steering Committee

- Facilitate and communicate efforts
- Develop concept paper
- Develop and maintain inventory of assets
- Identify funding opportunities and assist in proposal development

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UM STEM Education Genome

gactleadershipaactcttatttagaa
tataaaacteambuildingtgagcaa
ttagcatgtttggtgtpreparingK-12
mathteachersggtgagcatacacta
ttcatservicetdtactcaatgscience
storytellingtattattttcctagtaatc
atgcaaacainterconnectedness
gcttoutreachaaattgataccritical
thinkingtcacatgaaatctaagcattg
attgatttctcapublicengagement
acareermobilityccaactctcatctt
cggttcaaatgacommunitycgttat
cctdiversityagtcattggcatgtcact
cacaaatgacaaccountabilityttct
gttginteractingwithmediagagt
gcatctacattcglobalperspective

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Communication mechanisms:

- Wiggio: Online Collaboration and Information Sharing
- Public Web Page: www.stem.olemiss.edu

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Next Steps:

- Join Wiggio
- Respond to surveys
  - Working Group membership preferences
  - Funding opportunity interests
  - Inventory of assets
- Submit feedback, ideas, suggestions

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