



# Mechanics Division

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## *NEWSLETTER*

Spring 2005

Chair: **Scott Danielson**  
Secretary: **Paul S. Steif**

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Visit the new Mechanics Division Website <http://comp.uark.edu/~jjrencis/aseemechanics/>

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### Message From the Chair

Dear Mechanics Educators:

Greetings to all Mechanics Division members and friends! I am sure that your academic year was filled with lots of activities. I also know that the summer will be as busy, but with slightly different activities and may include personal and/or professional travel plans. Many of you have already registered for the 2005 ASEE Annual Conference and Exposition in beautiful Portland, Oregon. For others, if your schedule and situation now allow, please consider coming to the conference. The dates for the conference are June 12-15 and the advance registration (that can save you \$68) is open until May 18<sup>th</sup> (an earlier close than last year!). For more information, please visit <http://www.asee.org/conferences/annual/2005/>

Jennifer Kadlowec, our program chair, has developed an excellent program this year. I hope you can attend all or most of the sessions. Anyone who is new to the Mechanics Division or is attending the ASEE convention for the first time should look for the Mechanics Division banner at the picnic on Sunday evening. This is an excellent time to see friends and make new ones in the mechanics education community and in ASEE in general.

At the Tuesday evening awards banquet, we will have a fascinating program. Jeff Winston, the head of Nike Global Footwear Testing, will give a presentation on the engineering challenges of product testing. Also during the banquet, we will honor several of our colleagues for their contributions to mechanics education. Please make plans to attend this banquet. Even if you don't plan to eat the meal, you are still welcome to drop in after the meal to participate in the ceremonies and the presentation.

You are also invited to attend the Executive Committee meeting/lunch on Monday and the Mechanics Division business meeting/lunch on Wednesday. You do not have to purchase the meal ticket, if you do not plan to eat. We need and value your input and ideas.

I'd like to thank this year's officers and committees for all of their work in making the Mechanics Division run so smoothly this year. Special thanks are due to Joe Rencis of University of Arkansas for creating and maintaining the division's web site, <http://comp.uark.edu/~jjrencis/aseemechanics/index.htm>.

I hope to see many of you in Portland.

**Scott Danielson**

Mechanics Division Chair, 2004-2005  
sdanielson@asu.edu

## *Mechanics Division Award Recipients, 2005*

The Mechanics Division is pleased to announce the following winners of its 2005 awards. Join us in congratulating these colleagues. Plan to attend the annual Awards Banquet on Tuesday evening, June 14, at the ASEE Annual Meeting in Portland where these awards will be presented.

### **Archie Higdon Distinguished Mechanics Educator Award**

K. R. Rajagopal, Texas A&M

### **The Ferdinand P. Beer and E. Russell Johnston, Jr. Outstanding New Mechanics Educator Award**

Peter J. Joyce, U.S. Naval Academy

Steve Tung, University of Arkansas

### **The Mechanics Division Best Paper Award (2005 Annual Conference)**

*The Dynamics Concept Inventory Assessment Test: A Progress Report and Some Results*

Brian Self, U.S. Air Force Academy, Don Evans, Arizona State University, Francesco Costanzo, Pennsylvania State University, University Park, Gary Gray, Pennsylvania State University, Jill Lane, Pennsylvania State University, University Park, Phillip Cornwell, Rose-Hulman Institute of Technology

### **The Mechanics Division Best Presentation Award (2004 Annual Conference)**

*Teaching Undergraduate Kinetics using LEGO Mindstorms Race Car Competition*

Brian Self, U.S. Air Force Academy

## **Comments on the 2005 Mechanics Division Program**

This year 51 abstracts were submitted to the Mechanics Division. Of those, 31 abstracts were accepted and 27 papers were submitted and reviewed. Of these, 24 papers were accepted and will appear in the proceedings. I want to thank the numerous volunteers involved in reviewing papers for their work; I couldn't have put the program together without their help. Also thanks to those who volunteered and will serve as moderators for our sessions.

The five technical sessions span the conference with the first technical session starting at 7 am on Monday and the last session at 2:30 on Wednesday. We have strong papers in all sessions, so those attending the sessions will learn about the exciting work of our colleagues in mechanics education. As always, we ask that speakers focus their presentations on the unique features and outcomes of their work. If interested in more details, session attendees may refer to the written papers and/or request additional information directly from the authors.

Please plan to attend the Mechanics Division executive meeting at noon on Monday, the annual awards banquet on Tuesday evening, and the Division business meeting on Wednesday at noon. These meetings are open to anyone interested in the Mechanics Division activities. A meal ticket is necessary to eat lunch at the meetings, but you are welcome to come and participate without eating. I want to thank Christine Masters for her work in arranging our Tuesday night banquet speaker and giving me feedback about the program. I also want to thank Scott Danielson for such good mentoring as I took on the role of program chair.

If you have any questions or comments about the program, please don't hesitate to contact me. See you in Portland!

Best regards,

Jennifer Kadlowec (kadlowec@rowan.edu)

2004-2005 Program Chair

# **ASEE Annual Conference, Portland, 2005 – Mechanics Division Events**

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## **Sunday, June 12**

### **Session 0568**

**Title:** *Linking Mechanics, Materials and Design*

**2:30 –6:00 PM**

**Location:** Oregon Convention Center D134

**Description:** This workshop will focus primarily on the MMD Method. An outline of topics for the workshop follows: Motivation: What's the problem and who cares, Materials from the mechanics perspective, Mechanics from the materials perspective, Modern engineering design, Linking mechanics, materials, and design: the MMD Method, The MMD Method: the integrated curriculum approach, The MMD Method: web-based modules, Assessment/evaluation: ABET 2000 Disciplines and sub-disciplines covered by this workshop may include: Aerospace, civil, materials, and mechanical engineering, applied mechanics, structural engineering, materials science.

## **Monday, June 13**

### **Session 1168**

**Title:** *Improving Mechanics of Materials*

**7:00 - 8:15 AM**

**Location:** Oregon Convention Center F149

**Description:** This session focuses on efforts to improve mechanics of materials classes through the use of design projects, innovative teaching methods, hands-on activities, and computer-based tools.

#### **Titles and Authors:**

LEARNING ABOUT STRESS AND STRAIN TRANSFORMATIONS BY COMPARING THEORETICAL, EXPERIMENTAL, AND FINITE ELEMENT RESULTS

Ali Mohammadzadeh, Grand Valley State University

MECHANICS OF MATERIALS: AN INTRODUCTORY COURSE WITH INTEGRATION OF THEORY, ANALYSIS, VERIFICATION AND DESIGN

Hartley T. Grandin, Jr., Worcester Polytechnic Institute

Joseph J. Rencis, University of Arkansas

Joseph Rencis, University of Arkansas

TEACHING STUDENTS WORK AND VIRTUAL WORK METHOD IN STATICS: A GUIDING STRATEGY WITH ILLUSTRATIVE EXAMPLES

Ing-Chang Jong, University of Arkansas

ENHANCING MACHINE DESIGN COURSES THROUGH USE OF A MULTIMEDIA-BASED REVIEW OF MECHANICS OF MATERIALS

Daniel Jensen, United States Air Force Academy

John Wood, U.S. Air Force Academy

Kris Wood, University of Texas, Austin

ONLINE EXPERIMENTATION FOR STUDY OF STRESS AND DEFORMATION IN STRUCTURAL BEAMS

Alamgir Choudhury, Western Michigan University

Jorge Rodriguez, Western Michigan University

## **ASEE Annual Conference, Portland, 2005 – Mechanics Division Events**

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Mitch Keil, Western Michigan University  
Pavel Ikononov, Western Michigan University  
Sam Ramrattan, Western Michigan University

### **Session 1468**

**Title:** *Mechanics Division Executive Meeting*

**12:30 – 2:00 PM**                      **Location:** Oregon Convention Center A109

### **Session 1668**

**Title:** *Improving Statics Instruction*

**4:30 - 6:00 PM**                      **Location:** Oregon Convention Center F151

**Description:** This session focuses on efforts to improve statics and instruction, including in-class, hands-on, and technology-based activities.

**Titles and Authors:**

INCLUSION OF HANDS-ON INTERACTIVE PROGRAMS FOR TEACHING STATICS

Ganapathy Narayanan, University of Toledo

INTO, THROUGH, AND BEYOND: AN INTEGRATIVE FRAMEWORK FOR THE TEACHING OF STATICS

Jon-Michael Hardin, Virginia Military Institute

RESEARCH IN STATICS EDUCATION: DO ACTIVE, COLLABORATIVE, AND PROJECT-BASED LEARNING METHODS ENHANCE STUDENT ENGAGEMENT, UNDERSTANDING, AND PASSING RATE?

Sudhir Mehta, North Dakota State University

Zhifeng Kou, North Dakota State University

SHARPENING STATICS AS A TOOL FOR DESIGN: DEMYSTIFYING THE MODELING OF FORCES AT CONNECTIONS

Anna Dollar, Miami University

Paul S. Steif, Carnegie Mellon University

USING TECHNOLOGY FOR CONCEPTS LEARNING AND RAPID FEEDBACK IN STATICS

Dexter Whittinghill, Rowan University

Jennifer Kadlowec, Rowan University

John Chen, Rowan University

## **Tuesday, June 14**

### **Session 2568**

**Title:** *Innovative Teaching Techniques*

**2:30 - 4:15 PM**                      **Location:** Oregon Convention Center F149

**Description:** This session focuses on efforts to improve instruction in a variety of mechanics courses through the use of innovative teaching techniques.

**Titles and Authors:**

INTEGRATING FRACTURE MECHANICS INTO UNDERGRADUATE DESIGN

Madhukar Vable, Michigan Technological University

# **ASEE Annual Conference, Portland, 2005 – Mechanics Division Events**

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## JUST-IN-TIME TEACHING: POTENTIAL USES IN MECHANICS COURSES

Brian Self, U.S. Air Force Academy

Eric Hamilton, U.S. Air Force Academy

Evelyn Patterson, U.S. Air Force Academy

Gregor Novak, U.S. Air Force Academy

## TEACHING PROBLEM SOLVING BY STORYBOARD

Barry Dupen,

## T.H.I.N.K. ACRONOYM FOR "TURNING HUNCHES INTO NEW KNOWLEDGE"

Robert Martinazzi, University of Pittsburgh-Johnstown

## HOW TO ASSESS OR HOW NOT TO ASSESS ... THAT IS THE QUESTION

Christine Masters, Pennsylvania State University

Jill Lane, Pennsylvania State University, University Park

Richard Behr, Pennsylvania State University, University Park

Sarah Rzasa, Pennsylvania State University, University Park

## INNOVATIONS IN TEACHING FRACTURE MECHANICS

Hector Cervantes, Universidad de las Americas Puebla

K. V. Sudhakar, Universidad de las Americas Puebla

Tadeusz Majewski, Universidad de las Americas Puebla

### **Session 2768**

**Title:** *Mechanics Division Awards Banquet*

**6:30 – 8:00 PM**

**Location:** Oregon Convention Center B116

## **Wednesday, June 15**

### **Session 3268**

**Title:** *Improving Statics and Dynamics*

**8:30 – 10:15 PM**

**Location:** Oregon Convention Center F149

**Description:** This session focuses on efforts to improve statics and dynamics classes through the use of design projects, innovative teaching methods, hands-on activities, and computer-based tools.

#### **Titles and Authors:**

EFFECTIVE USE OF EXPERIMENTATION AND FINITE ELEMENT ANALYSIS IN A VIBRATIONS COURSE

John Baker, University of Kentucky

PROBLEM SOLVING IN STATICS AND DYNAMICS: A PROPOSAL FOR A STRUCTURED APPROACH

Francesco Costanzo, Pennsylvania State University, University Park

Gary Gray, Pennsylvania State University

Michael Plesha, University of Wisconsin, Madison

SHOULD KINETICS FOLLOW KINEMATICS? ONLY IN THE DICTIONARY!

Phillip Cornwell, Rose-Hulman Institute of Technology

# **ASEE Annual Conference, Portland, 2005 – Mechanics Division Events**

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Richard Layton, Rose-Hulman Institute of Technology

## **SIMULATING COMPLEX SYSTEMS IN INTRODUCTORY DYNAMICS**

Kurt DeGoede, Elizabethtown College

## **THE DYNAMICS CONCEPT INVENTORY ASSESSMENT TEST: A PROGRESS REPORT AND SOME RESULTS**

Brian Self, U.S. Air Force Academy

Don Evans, Arizona State University

Francesco Costanzo, Pennsylvania State University, University Park

Gary Gray, Pennsylvania State University

Jill Lane, Pennsylvania State University, University Park

Phillip Cornwell, Rose-Hulman Institute of Technology

### **Session 3468**

**Title:** *Mechanics Division Business Meeting*

**12:30 – 2:00 PM**

**Location:** Oregon Convention Center B112

**Description:** This is the annual Executive Committee meeting for the Mechanics Division. Anyone interested in Mechanics Division activities is welcome. You can purchase a ticket for lunch in advance or you are welcome to just come and participate.

### **Session 3568**

**Title:** *Labs, Demos and Software in Mechanics*

**2:30 – 4:15 PM**

**Location:** Oregon Convention Center E148

**Description:** This session focuses on innovative classroom and laboratory exercises, demonstrations, hands-on activities, and software in the broad areas of mechanics education.

#### **Titles and Authors:**

#### **ASSESSMENT OF INTERACTIVE COURSEWARE FOR SHEAR FORCE AND BENDING MOMENT DIAGRAMS**

Carla Campbell, University of Missouri, Rolla (ENG)

Nancy Hubing, University of Missouri, Rolla (ENG)

Richard Hall, University of Missouri, Rolla (ENG)

Timothy Philpot, University of Missouri - Rolla

#### **UNIFIED LECTURE SOFTWARE FOR STATICS, DYNAMICS, AND MECHANICS OF DEFORMABLE BODIES**

Don Morris, Virginia Tech

L. Glenn Kraige, VA Polytechnic Inst. & State University

Scott Hendricks, Virginia Tech

#### **PARAMETRIC TIME DOMAIN SYSTEM IDENTIFICATION OF A MASS-SPRING-DAMPER SYSTEM**

Bradley Burchett, Rose-Hulman Institute of Technology

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