Welcome from the Co-Chairs

On behalf of the entire Capstone Conference Organizing Committee we would like to welcome you to Boulder for the 2010 Capstone Design Conference.

We are delighted to continue the success of the 2007 inaugural conference and to keep building a community of educators, students, and industry to discuss, analyze, and improve capstone design education. In the development of the 2010 conference we chose to focus on two themes. These are the primary theme of capstone pedagogy and a forward looking “new frontier” theme of international teams.

The 2010 conference was intentionally designed to promote discussion and interaction across the capstone community. Rather than the traditional oral paper presentation format, we opted for a conference-wide poster session to encourage vibrant and extensive sharing of ideas and experiences. Based on themes that emerged from the accepted papers, we constructed panels to deliberate topics related to the conference themes. Multiple short courses have been scheduled in their own designated time slots so attendees can learn new skills and strategies pertaining to capstone education. New this year, we introduced working group sessions to initiate discussions on topics and tools that are useful for capstone educators. We envision that these working groups will continue their work between conferences to develop tools and materials that will be made available to the wider capstone community via the web.

Also new to the 2010 conference is student involvement, reflecting students’ role as important stakeholders in capstone design. We issued a request for exemplary capstone design projects and student panelists and were overwhelmed with submissions. Look for featured capstone student projects in the poster session as well as invited student participation in some of the panel sessions. We are grateful to the contributions of our conference sponsors who supported the student involvement and helped us keep the conference fees low.

During the conference planning process the organizing committee addressed the issue of sustainability. We envision holding the conference biannually on the even years, with a different theme for each conference. Currently, we are planning several activities to carry forward the momentum from the 2010 conference. This includes a special issue in the International Journal of Engineering Education following the 2010 conference and a follow-up session at ASEE on the odd years. We expect that the working group discussions started at this conference will serve as the thread that connects the biannual conferences, informing you about future conference topics, disseminating best practices, and strengthening the greater capstone community.

Take the opportunity this week to immerse yourself in this conference; expand your capstone network, exchange ideas, and empower your involvement with capstone design courses. We want to thank you for attending the conference and look forward to collaborating with you now and in the future!

—Scott Palo and Susannah Howe, co-chairs
Monday
June 7, 2010

8 a.m. - 5 p.m. ............... Registration Check-in — Engineering Lobby
9 a.m. - noon .................. Short Courses — DLC & ITLL
noon - 1 p.m. ............... Lunch (for Short Course participants only)
1 - 1:45 p.m. ............... Introduction & Icebreaker Activity — Math 100
1:45 - 3:15 p.m. .......... Keynote Speaker: William Grogan — Math 100
3:15 - 3:30 p.m. .......... Coffee Break — Engineering Lobby
3:30 - 5 p.m. ............... Panels — Engineering Center
5 - 5:30 p.m. ............... Working Group Overview — ECCR 245
5:30 - 7 p.m. ............... Reception — DLC Atrium
7 - 10 p.m. ............... Short Courses — DLC & ITLL

Tuesday
June 8, 2010

8 a.m. - 5 p.m. ............... Registration Check-in — Engineering Lobby
8:30 - 10 a.m. .......... Keynote Speaker: Alice Phinney — Math 100
10 - 10:30 a.m. .......... Coffee Break — Engineering Lobby
10:30 a.m. - noon ...... Panels — Engineering Center
noon - 1:15 p.m. ........ Lunch — Engineering Lobby
1:15 - 2:45 p.m. .......... Panels — Engineering Center
2:45 - 3:30 p.m. .......... Transition to Poster Session — Stadium Club
3:30 - 6:30 p.m. .......... Poster Session — Stadium Club
Poster Group 1, 3:30 - 4:30 p.m.
Poster Group 2, 4:30 - 5:30 p.m.
Poster Group 3, 5:30 - 6:30 p.m.
7 - 10 p.m. ............... Short Courses — DLC & ITLL

Wednesday
June 9, 2010

8 - 8:30 a.m. .................. Continental Breakfast — Engineering Lobby
8:30 - 10 a.m. .......... Keynote Panel: Alan Parkinson and David Wilson — Math 100
10 - 10:30 a.m. .......... Coffee Break — Engineering Lobby
10:30 a.m. - noon ...... Panels — Engineering Center
noon - 2:30 p.m. .......... Closing Plenary and Lunch — Math 100
Gary Pawlas ● University of Colorado ● Local Organizing Committee Chair

Tom Barber ● University of Connecticut

Steve Beyerlein ● University of Idaho

Steve Zahos ● University of Illinois

Keith Stanfill ● University of Florida

Jack Zable ● University of Colorado

Jay Goldberg ● Marquette University

Fred Looft ● Worcester Polytechnic Institute

Anthony Marchese ● Colorado State University

Junichi Kanai ● Rensselaer Polytechnic Institute

David Klappholz ● Stevens Institute of Technology

Glen Livesay ● Rose-Hulman Institute of Technology

Janis Terpenny ● Virginia Polytechnic Institute and State University

Email capstoneconf@gmail.com if you’d like to become involved in future Capstone activities.
8 a.m. - 5 p.m. Registration Check-in — Engineering Lobby

9 a.m. - noon

Short Courses

1.1 Establishing a Product-Oriented Entrepreneurial Capstone Experience

Joseph Morgan and Jay Porter, Texas A&M University
contact: porter@entc.tamu.edu

This short course will provide participants with ideas, methodologies, and resources that can be used to create a capstone design learning experience resulting in a prototype that is ready for commercialization. This process has been in place at Texas A&M for three years and has resulted in numerous successes, including three commercialized products. Another goal of the session is to explore educational methods that prepare students to incorporate entrepreneurship into their lifelong learning and career goals.

1.2 Identifying and Managing Health/Safety Issues Associated with International Projects

Natalie Mello and Fred Looft, Worcester Polytechnic Institute
contact: fjlooft@wpi.edu

Drawing on their many years of experience with off-campus projects, the facilitators will help participants:
(a) understand the difference between risk management and crisis management,
(b) appreciate reasons for implementing a risk management program for off-campus projects,
(c) identify strategies for managing risk associated with off-campus project advising, and
(d) become familiar with resources to advance risk management efforts.

1.3 Integrating Professional Skills Assessment Curricula and Assessment in Capstone Courses

Patsy Brackin, Rose-Hulman Institute of Technology
Jay McCormack, University of Idaho
Javed Khan, Tuskegee University
Phil Thompson, Seattle University
contact: brackin@rose-hulman.edu

This short course introduces curricula and assessments by the Transferable Integrated Design Engineering Education (TIDEE) consortium for cultivating design-related technical, interpersonal, and professional skills in the context of a capstone course. Facilitators will present an overview of the capstone design curricula and assessments. Then they will engage participants by allowing them to examine and score student work that probes professional development planning and growth appraisal related to personal and team needs. Participants will also review and customize lesson plans for using one or more of TIDEE’s supporting curriculum modules in conjunction with TIDEE assessments in individual courses.

1.4 LabVIEW Embedded for ARM and the Control of Dynamic “Minisystems”

Jeff Jensen and Shekhar Sharad, National Instruments
contact: shekhar.sharad@ni.com

Capstone design teams often require programming an embedded hardware device based on an ARM, FPGA or similar technology to make their system functional. While electrical engineering students have the knowledge and skills to program these devices, other majors may not have had the formal training on these skills. Graphical system design opens up embedded programming to all majors because of its intuitive, dataflow approach thus making it possible for students from to design, prototype and deploy their capstone designs in under a semester with no previous embedded design experience. In this session, attendees will experience programming a Stellaris CORTEX-M3 ARM board with LabVIEW graphical programming in a hand-on manner. Attendees will then perform a series of tasks LabVIEW, the Stellaris ARM platform, and an iRobot Create to understand how LabVIEW makes it easier to program embedded systems while still providing the powerful functionality offered by traditional embedded system approaches.
noon - 1 p.m. Lunch (for Short Course participants only) — DLC Atrium

1 p.m. Conference Begins

1 - 1:45 p.m. Introduction and Icebreaker Activity — Math 100

1:45 - 3:15 p.m. Keynote: Capstone Power

William Grogan
Dean Emeritus, Worcester Polytechnic Institute

William Grogan was named WPI’s first Dean of Undergraduate Studies in 1970 and served in that capacity until his retirement in 1990. In that role, he led the development of the WPI Plan (including the Major Qualifying Project, MQP), which combines theoretical study with project-based problem solving. He was also instrumental in implementing the WPI Global Studies Program, and helped develop multiple off-campus project centers, both nationally and internationally.

Grogan graduated from WPI in 1945 and served in the U.S. Navy as an electronics officer (both during WWII and the Korean War). He returned to WPI to earn a master’s degree in electrical engineering and began teaching in the Department of Electrical Engineering in 1946. For the next 20 years, Grogan taught at WPI, working his way up to the rank of professor by 1962, while consulting and developing patents for the U.S. Department of the Navy in Washington, D.C., and General Electric in Pittsfield, Mass., every summer. Grogan has been recognized with major awards from ASEE, the IEEE, and WPI.

Welcome to Boulder!

Boulder is located in the foothills of the Rocky Mountains, just 35 miles northwest of Denver. Home of the University of Colorado’s main campus and the National Center for Atmospheric Research, Boulder sits 5,430 feet above sea level and is surrounded by a greenbelt of city parks and open spaces. Boulder is known for its natural beauty, outdoor recreation, natural product retailers and restaurants, outstanding transportation options, diverse businesses, and technological and academic resources.

As the flagship university of the state of Colorado, CU-Boulder is a dynamic community of scholars and learners situated on one of the most spectacular college campuses in the country. As one of 34 U.S. public institutions belonging to the prestigious Association of American Universities (AAU) — and the only member in the Rocky Mountain region — we have a proud tradition of academic excellence, with four Nobel laureates and more than 50 members of prestigious academic academies.
3:15 - 3:30 p.m. Coffee Break — Engineering Lobby

3:30 - 5 p.m.

Panels

**Session A: Student Perspectives on Pedagogy**

*Scott Palo, University of Colorado Boulder (facilitator)*  
Phillip Daw, Texas A&M University  
Jordan Jalving, Colorado State University  
Shraddha Joshi, Clemson University  
Kimberly Landick, Michigan Technological University

**Session B: Nifty Ideas/Surprising Flops**

*Susannah Howe, Smith College (facilitator)*  
Kevin Caves, Duke University  
Carsten Kleiner, University of Applied Sciences & Arts (Hannover, Germany)  
Glen Livesay, Rose-Hulman Institute of Technology  
Judith Norback, Georgia Institute of Technology  
Renee Rogge, Rose-Hulman Institute of Technology  
Cameron Turner, Colorado School of Mines

**Session C: Capstone Project Management**

*Patsy Brackin, Rose-Hulman Institute of Technology (facilitator)*  
Jerry Crain, University of Oklahoma  
Dean Knudson, North Dakota State University  
Bahram Nassersharif, University of Rhode Island  
Deborah O’Bannon, University of Missouri-Kansas City

**Session D: Documenting Design Development**

*Denny Davis, Washington State University (facilitator)*  
Vikki Hazelwood, Stevens Institute of Technology  
Jean Koster, University of Colorado Boulder  
Jay McCormack, University of Idaho  
Mark Steiner, Rensselaer Polytechnic Institute

5 - 5:30 p.m.

Working Group Overview Meeting (optional)

The goal of the working group is to provide an on-going forum for engineering and applied science faculty to share experience, techniques and best practices in capstone design courses. As a first step toward the effort, we will prioritize and select topics for working group meetings during the conference. Possible topics include creating an on-line repository of course materials, integration of software tools, organizing and managing multi-disciplinary projects, and organizing and managing industry sponsored projects.

5:30 - 7 p.m. Reception — DLC Atrium
## Short Courses

**2.1 Creating a Practitioner-Centric CE Capstone with Real CE Projects**

*Deb O’Bannon, University of Missouri-Kansas City*
*Thomas Kimes, HDR*
*Erich Schmitz, TranSystems*
*contact: obannond@umkc.edu*

Short course participants will gain insight how to implement a practitioner-centric CE capstone design course which partners with clients to design right-sized projects with real-world deliverables on a schedule appropriate for college seniors. They will identify appropriate project partners, learn how to recruit other faculty, and capitalize on project benefits in preparing students for professional practice as well as in advancing local engineering programs.

**2.2 Organizing Project Teams with a Personality Questionnaire**

*Doug Wilde, Stanford University*
*contact: wilde@stanford.edu*

This short course will familiarize participants with the principles and practices described in the author's book which employs a 20-item personality questionnaire to guide the assignment of members to roles on a project team. After hearing a short outline of psychiatrist C. G. Jung’s theory of eight "cognitive modes" for solving problems, participants will complete the questionnaire, compute scores for their eight modes to find which they prefer, and then quickly form “casual” quartets based on previous acquaintanceships as well as mode information. Once formed, each team will assign each of its members to four out of the possible sixteen team roles defined for distribution of effort. Finally, the team will plan and build a model practice structure to experience the interactions between the members. This experience is intended to prepare faculty to decide to what degree teamology methods might be used in their project courses to improve student team performance and to better prepare students to work effectively on professional project teams.

**2.3 Effective Management of Student Teams Using the CATME/Team Maker System**

*Richard Layton, Rose-Hulman Institute of Technology*
*Misty Loughry, Georgia Southern University*
*Matt Ohland, Purdue University*
*Hal Pomeranz, IT consultant*
*contact: layton@rose-hulman.edu*

The goal of this workshop is to introduce participants to two tools that can help them manage teams in their classes effectively and efficiently. We review some of the factors that instructors may wish to consider when assigning students to teams and when administering peer evaluations. We review the literature and engage the participants in discussions about their own experiences and practices. We conduct interactive, hands-on, practical activities using the CATME and Team-Maker systems. However, this is not just a software demonstration—we help faculty understand how the systems support cooperative learning. Attendees with wireless-network-capable laptop computers will interact with both systems in real-time.

**2.4 myDAQ: Student-affordable Data Acquisition and Instrumentation platforms for Capstone Design**

*Mark Walters and Shekhar Sharad, National Instruments*
*contact: shekhar.sharad@ni.com*

Capstone design project teams have a budget constraint while having several needs to fulfill including instrumentation and data acquisition (DAQ) for the system they are designing. Keeping this need in mind, National Instruments has designed a new student-affordable DAQ and Virtual Instrumentation platform that caters to the needs of students in Capstone design. In this course, attendees will have the opportunity to experience the new DAQ device and LabVIEW in a hands-on manner while conducting capstone design relevant exercises that include common measurements taken in a typical capstone design course. At the conclusion of the course, all attendees will receive an evaluation copy of LabVIEW to take with them.
8 - 8:30 a.m.  Continental Breakfast — Engineering Lobby

8:30 - 10 a.m.  
**Keynote: Industry Perspective of Senior Design Projects — Real World Design 101**

Alice Phinney  
Senior Engineering Manager, Ball Aerospace

Alice Phinney is a Sr. Engineering Manager at Ball Aerospace in Boulder, Colorado. She manages the Pointing, Tracking, and Sensors Technology group which is comprised of 290 mechanical, optical, thermal, structural, and detector engineers. She is responsible for the functional management of the group, which covers: providing the right people to programs at the right time, insuring the correct skill and experience within the discipline groups, balancing manpower with program needs (hiring and force reduction), professional development, salary management, and process improvement.

Alice came to engineering relatively late in life, graduating with her BS in ME from the University of Colorado, at 28. She worked for 5 years at Boeing, in Everett, Washington, on 767s and 747s prior to coming to Ball Aerospace. At Ball for almost 19 years, Alice has worked on a variety of programs including the mechanical lead for the Impactor Spacecraft (smashed into comet Tempel 1 for a science experiment). Alice also has a BA in Biology from the University of Colorado.

10 - 10:30 a.m.  Coffee Break — Engineering Lobby

10:30 a.m. - noon  Panels

**Session A: Teaching Entrepreneurial Capstones**

Phil Weilerstein, National Collegiate Inventors and Innovators Alliance (facilitator)  
Howard Davis, Washington State University  
Joseph Morgan, Texas A&M University  
Benjamin Yu, British Columbia Institute of Technology  
Scott Zenier, Oregon State University

**Session B: Curricular Scaffolding for Capstones**

Glen Livesay, Rose-Hulman Institute of Technology (facilitator)  
Don Dekker, University of South Florida  
Renee Rogee, Rose-Hulman Institute of Technology  
Sarah Shackelford, California Polytechnic State University  
Jack Zable, University of Colorado Boulder

**Session C: Industry Partnerships**

Stephen Zahos, University of Illinois at Urbana Champaign (facilitator)  
Thomas Barber, University of Connecticut  
Mandi Falconer, ASRC Aerospace  
Glenn Pope, John Deere  
Gregg Warnick, Brigham Young University

**Session D**

Working Group — Meeting 1

The goal of the working group is to provide an on-going forum for engineering and applied science faculty to share experience, techniques and best practices in capstone design courses. As a first step toward the effort, we will prioritize and select topics for working group meetings during the conference. Possible topics include creating an on-line repository of course materials, integration of software tools, organizing and managing multidisciplinary projects, and organizing and managing industry sponsored projects.
noon - 1:15 p.m.  Lunch — Engineering Lobby

1:15 - 2:45 p.m.  Panels

**Session A: Teaming/Coaching Practices**
*Richard Layton, Rose-Hulman Institute of Technology (facilitator)*
Stephen Laguette, University of California Santa Barbara
Marie Paretti, Virginia Polytechnic Institute and State University
Greg Speegle, Baylor University

**Session B: Capstone Teaching Material**
*David Klappholz, Stevens Institute of Technology (facilitator)*
Rudy Eggert, Boise State University
Jay Goldberg, Marquette University
Fred Looft, Worcester Polytechnic Institute
Jay McCormack, University of Idaho
Matt Ohland, Purdue University

**Session C: Integration of Industry-Sponsored Capstone Projects into the Engineering, Computer Science and Technology Design Curriculum at CSULA and ASU Poly**
*Paul Jones, Corporate & University Relations Group (facilitator)*
Lou Flamm, Honeywell Aerospace
John Larson, Pratt & Whitney Rocketdyne
Keith Moo-Young, California State University Los Angeles
Chell Roberts, Arizona State University Polytechnic Campus

**Session D**
*Working Group — Meeting 2*
The goal of the working group is to provide an on-going forum for engineering and applied science faculty to share experience, techniques and best practices in capstone design courses. As a first step toward the effort, we will prioritize and select topics for working group meetings during the conference. Possible topics include creating an on-line repository of course materials, integration of software tools, organizing and managing multidisciplinary projects, and organizing and managing industry sponsored projects.

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**Capstone Overview**

The goal of the Capstone Design Conference is to provide a forum for engineering and applied science faculty to share ideas about implementing and improving design-based capstone courses.

Over the long-term, we hope that the Capstone Design Conferences foster a network of capstone design educators and associated stakeholders committed to supporting one another in implementing various capstone course models, managing teams and projects, engaging stakeholders, incorporating new technology, and collaborating to identify and disseminate effective practices in capstone design education.

Our first working group is being established at the conference this year. We expect this and future working groups will be active between the biennial conferences thus providing continuity from one conference to the next.

Join us for the next Capstone Conference in 2012. Better yet, join a working group and continue the momentum between now and then. If you have a great idea, are interested in establishing a new working group or just want to get involved, send us email at capstoneconf@gmail.com.
Short Courses

3.1 Designing and Delivering a Real Projects for Real Clients Capstone (RPRCC)
David Klappholz, Stevens Institute of Technology
contact: davidk6@gmail.com

The short course facilitator and a number of CS colleagues have developed a taxonomy of issues that must be dealt with in designing and delivering a CS RPRCC, capstone or otherwise. Virtually all of these issues are relevant to RPRCC capstones, and many of these issues are relevant to non-RPRCC courses in most engineering disciplines. The goal of the session is to broaden understanding of different ways that have been used to address the relevant issues, within their own disciplines and in others, so as to aid beginning instructors in choosing ways to address these issues and to suggest ways in which seasoned capstone instructors might improve various aspects of their courses.

3.2 Coaching Your Design Teams to Victory
Rudy Eggert, Boise State University
contact: reggert@boisestate.edu

This short course will provide participants with tools for coaching design project teams. Short presentations will introduce topics for roundtable discussions including how to: plan the course, form project teams, build teamwork skills and coach dysfunctional teams. Attendees are encouraged to send an email to reggert@boisestate.edu to have a particular problem considered for discussion.

3.3 Effective Management of Student Teams Using the CATME/Team Maker System
Richard Layton, Rose-Hulman Institute of Technology
Misty Loughry, Georgia Southern University
Matt Ohland, Purdue University
Hal Pomeranz, IT consultant
contact: layton@rose-hulman.edu

The goal of this workshop is to introduce participants to two tools that can help them manage teams in their classes effectively and efficiently. We review some of the factors that instructors may wish to consider when assigning students to teams and when administering peer evaluations. We review the literature and engage the participants in discussions about their own experiences and practices. We conduct interactive, hands-on, practical activities using the CATME and Team-Maker systems. However, this is not just a software demonstration—we help faculty understand how the systems support cooperative learning. Attendees with wireless-network-capable laptop computers will interact with both systems in real-time.
8 - 8:30 a.m.  Continental Breakfast — Engineering Lobby

8:30 - 10 a.m.  Keynote Panel: International Teams

Facilitator: R. Keith Stanfill
Director of Integrated Product and Process Design Program, University of Florida

Panelist: Alan Parkinson
Dean, Ira A. Fulton College of Engineering and Technology, Brigham Young University

Alan R. Parkinson is a professor of mechanical engineering and currently serves as dean of the Ira. A. Fulton College of Engineering and Technology at Brigham Young University. The college is home to 3300 students in 11 programs. Previous to his appointment as dean he was an associate dean from 2003 to 2005 and chair of mechanical engineering from 1995 to 2001. He received his PhD and MS degrees from the University of Illinois, Urbana, and BS and MBA degrees from Brigham Young University.

During his tenure as dean, the college has implemented numerous international programs, including technical study abroad programs, international capstone projects, international internships, and a chapter of Engineers Without Borders. He is currently conducting research on cross-cultural virtual engineering design teams. Other areas of research interest include design automation, optimization methods and robust design. In 2003, he received the Design Automation Award from the American Society of Mechanical Engineers for his work in robust design and design optimization. Prof. Parkinson was elected to Fellow status in the American Society of Mechanical Engineers in 2004.

Panelist: David Wilson
Director of Academic and University Relations, National Instruments

David Wilson has always been a proponent of hands-on project based learning in Engineering Education. In his role as Director for Academic Marketing at National Instruments, he ensures that National Instruments continually delivers technologies that enable educators to do engineering with real-world experiments. He also mentors students in his spare time with senior design/capstone projects that are innovative and representative of hands-on project based learning. Wilson has been with NI since 1991 where he has held the positions as the Michigan-area district sales manager, the director of data acquisition marketing, the international sales director for Japan, and in 2005, director of International Marketing. Wilson holds a BS degree in applied physics from the State University of New York at Geneseo.
10:00 a.m. - 10:30 a.m. Coffee Break — Engineering Lobby

10:30 a.m. - noon Panels

**Session A: Teaching Multidisciplinary Capstones**

*Thomas Barber, University of Connecticut (facilitator)*
- Eryn Ammerman, Colorado School of Mines
- Carlee Bishop, Georgia Institute of Technology
- Jay Goldberg, Marquette University
- T. Gordon Smith, Colorado State University
- Keith Stanfill, University of Florida

**Session B: International Design Projects: Expanding 40 Years of Interdisciplinary Project Experience into the Capstone Environment**

*Fred Looft, Worcester Polytechnic Institute (facilitator)*
- Fred Hart, Worcester Polytechnic Institute
- Jeanine Plummer, Worcester Polytechnic Institute
- Yiming (Kevin) Rong, Worcester Polytechnic Institute
- Alex Wyglinski, Worcester Polytechnic Institute

**Session C: Diverse Models for Incorporating Service Learning in Capstone Design**

*Angela Bielefeldt, University of Colorado Boulder (facilitator)*
- Bruce Berdanier, South Dakota State University
- Ganesh Bora, North Dakota State University
- Kurt Paterson, Michigan Technological University

**Session D**

*Working Group — Meeting 3*

The goal of the working group is to provide an on-going forum for engineering and applied science faculty to share experience, techniques and best practices in capstone design courses. As a first step toward the effort, we will prioritize and select topics for working group meetings during the conference. Possible topics include creating an on-line repository of course materials, integration of software tools, organizing and managing multidisciplinary projects, and organizing and managing industry sponsored projects.

noon - 2:30 p.m. Closing Plenary and Lunch

Lunch will be provided during the closing plenary session as we capture the highlights of the conference, weaving together the threads of this conference and laying the foundation for continued collaboration. Panel facilitators will recap main discussion points and working group organizers will report out initial actions and future plans.

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<td>Capstone Interdisciplinary Team Project for Master of Science in Sustainability</td>
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<td>Shraddha Joshi and Joshua Summers (Clemson Univ.)</td>
<td>Investigating Information Loss in Collaborative Design: A Case Study with Capstone Design Project</td>
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<td>Paul Jones (Corporate &amp; University Relations Group), Chell Roberts (Arizona State Univ. Polytechnic Campus), Keith Moo-Young (California State Univ. Los Angeles), John Larson (Pratt &amp; Whitney Rocketdyne), Lou Flamm (Honeywell Aerospace)</td>
<td>Integration of Industry-Sponsored Capstone Projects into the Engineering, Computer Science and Technology Design Curriculum at CSULA and ASU Poly</td>
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<td>Junichi Kanai (Rensselaer Polytechnic Institute)</td>
<td>Integrating Safety into Capstone Design Courses at Rensselaer</td>
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<td>Carsten Kleiner and Arne Korschel (Univ. of Applied Sciences Hannover)</td>
<td>Success Factors in Making your Capstone in Software Engineering Productive and Appealing</td>
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<td>Daniel Knight, Daria Kasys-Schwert and Gary Pawlas (Univ. of Colorado)</td>
<td>Triangulation: An Effective Assessment Tool for Capstone Design Program Evaluation</td>
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<td>Dean Knudson and Alex Radermacher (North Dakota State Univ.)</td>
<td>Project Management and Software Development Processes for Computer Science Capstone Projects</td>
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<td>Jean Koster (Univ. of Colorado)</td>
<td>Project Teams and Challenges in Fair Grading</td>
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<td>Stephen Loguette (Univ. of California Santa Barbara)</td>
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<td>Benjamin Yu and Elsie Au (British Columbia Institute of Technology)</td>
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<td>Institution</td>
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<td>Arizona State University</td>
<td>Normarie Santos, Brianna Burns, Duncan Brown, Zane Cradic, Matthew Reeg, Daniel Petrakovitz</td>
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<td>Binghamton University - State of University of New York</td>
<td>Ahna Shaffer, James Quinn</td>
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<td>Boston University</td>
<td>Alex Ng, Juan Zhong, Gledis Mezini, Kevin Yu, Nicholas Zolnierz</td>
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<td>Joseph Anderson, Sarah Shackelford</td>
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<td>Jordan Jalving, Justin Nelson, William Buchanan, Todd Zurlinden, Peter Pewron, Sky Tyler</td>
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<td>Jacqueline Boyer, Jeffrey Dowgala, Liam Hendricken, Lauren McNally</td>
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<td>Ian Gong, Jing Guo, Michael Kotecki, David Tainter</td>
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<td>Neil Shah, Brandon Fox, Rohan Trivedi</td>
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<td>Lafayette College</td>
<td>Diana Hasegan, Bryan Hendrickson, Connor McGee</td>
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- Metered parking (denoted by the gold rectangles) is available in the lots north of the Coors Events Center (14), north of the DLC (18) or south of the ITLL (52). If you use metered parking, park your car in a numbered spot and then continue to the kiosk to pay for the day. The kiosk will accept cash or credit cards.

- **If you have purchased a parking pass available for the duration of the conference:** Park your car in lot 436, on the southeast corner of Colorado Ave. and Regent Dr., entering the lot from Regent Dr., proceed to the registration table located on the first floor of the Engineering Center (24) to register and receive your parking pass. Then fill out the parking pass as required, return to your car and hang it from your rear view mirror. This pass will allow you to park in lot 436 for the duration of the conference.

- Registration and all conference sessions, excluding the plenary sessions, will be held in the Engineering Center (24) and the ITLL (52). The registration desk is located on the first floor of the Engineering Center (24) near the revolving doors and elevators. If approaching from the east (parking lots or walking from hotels) cross Regent Dr. at the marked crosswalk and enter the Engineering Center (24) between the ITLL (52) and the DLC (18). Continue to the west and enter the Engineering Center (24) through the double doors on the 1B level of the complex. Proceed up the stairs and head towards the revolving doors on the west side of the building. The registration desk will be located on your right as you head through the lobby.

- The Monday afternoon, Tuesday and Wednesday morning keynote talks will be held in the Math Building (61), the first building west of the Engineering Center.

- The reception will be held in the DLC Atrium (18).

- The poster session will be held in the Stadium Club (86).
Go to www.capstoneconf.org for future Capstone activities.