The Peter Kiewit Institute

Student Capstone Conference

in

Engineering, Information, Science & Technology

Conference Handbook
Welcome PKI Student Capstone Participants and Volunteers!

On behalf of the University of Nebraska, The Peter Kiewit Institute welcomes you to the first annual

Peter Kiewit Institute Student Capstone Conference in
Engineering, Information Science & Technology

The Peter Kiewit Institute in partnership with the University of Nebraska-Lincoln College of Engineering and the University of Nebraska-Omaha College of Information Science & Technology is proud to host a student focused conference which features presentations of research and projects from students based at PKI, across the University of Nebraska and from other universities and colleges. The tracks align with the academic programs based at the Institute that are central to engineering, information science and technology as well as other research areas with emerging national significance. Assessment of student presentations at the conference will be made by independent, outside judges. The Institute welcomes attendance by faculty, students, industry partners and government representatives.

The Institute expresses its grateful appreciation to the judges, faculty, staff and students who volunteered their time to make this conference an outstanding event. PKI is also profoundly appreciative of industry companies and government agencies that generously sponsored the presentation tracks and special events of the conference. Without the support of these individuals, companies and organizations the conference would not be possible.

This handbook is designed to give all conference attendees and supporters with an overview of all events and responsibilities. Within this handbook are descriptions of student presentations, submissions, track leader duties and criteria for judging presentations.

A full understanding and appreciation of the conference’s purpose will help all those working in collaboration make the PKI Student Capstone Conference a successful event. Thank you for joining us!

Sincerely,

Michael L. McGinnis
Executive Director
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PKI Student Capstone Conference

The Peter Kiewit Institute of the University of Nebraska, in partnership with the University of Nebraska-Lincoln College of Engineering and the University of Nebraska-Omaha College of Information Science & Technology is proud to host the Institute’s first annual Student Capstone Conference in Engineering, Information Science and Technology on April 28, 2011. The Conference will feature presentations and papers by students from the University of Nebraska, universities and colleges across the region. The Conference affords students with the opportunity to present their research and findings to a wide audience of fellow students, faculty, judges, and leaders from government and industry. For many students this will serve as the culminating event of their research and academic careers.

The conference is organized along presentation tracks which align with PKI academic programs and research clusters. Each track is assigned independent external judges who will identify the top three student presentations from among all who present. First, second, and third place student teams, and their academic institutions, will be recognized at the evening Capstone Banquet on April 28th.

If you are a faculty, student or student team interested in this exciting opportunity, we invite you to sign up. Please visit the following site, www.pki.nebraska.edu, and complete the online registration. Students must register and submit their abstracts by March 11, 2011 on this site.

The conference is open to all. If you are interested in attending the presentations in an area of interest to you, or to your academic unit, company or government agency, please visit the site. Cost per attendee is $25.00 payable by cash only upon arrival. Check, debit cards, and credit cards will not be accepted.

If you have questions or want additional information, please contact MS Leah Ellis, event coordinator, at leahellis@unomaha.edu or by telephone at 402.554.2158 or 402.554.3333.
Event Schedule

Morning

7:00-8:00  Registration
8:00-9:00  Welcome and Breakfast Reception
9:00-12:00 Presentation Tracks
12:00-1:00 Lunch

Afternoon

1:00-4:00  Presentation Tracks

Evening

5:00-6:00  Social Hour
6:00-6:45  Dinner
6:45-8:00  Keynote Speaker & Awards Ceremony

Illustrative Capstone Scheduling Matrix

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Student Presentation Tracks & Descriptions

**Track 1: Architectural Engineering**
Track Leader: Dr. Dale Tiller

Architectural Engineers support the engineering component of the building design and construction process, designing building structures, heating ventilating and air conditioning (HVAC), acoustics, electrical and lighting systems. Architectural Engineers thus play a key role in the sustainable design and operation of buildings. In addition to the links between energy consumption and sustainability, we spend most of our time indoors, where the design choices made by Architectural Engineers charged with responsibilities for providing effective lighting, HVAC and acoustical environments will affect the acceptability of spaces and occupant productivity. This track highlights the role of Architectural Engineering in designing efficient and effective buildings.

**Track 2: Computer & Electronics Engineering**
Track Leader: Professor Herb Detloff

The Computer Electronics Engineering track is focused on the applications of embedded microprocessor and communication systems. The design, development and integration of the hardware and software aspects of computer systems with communication networks has become an ever-expanding, pervasive influence on the modern world. The use of information technology has changed both the products and process of engineering. The solutions presented will include (but are not limited to) applications for: mobile computing, mobile communications, automobiles, appliances, entertainment, health care and aerospace.

**Track 3: Civil Engineering**
Track Leader: Dr. Tian Zhang

The vision of this track is to have students positioned as global leaders who strive toward building a better quality of life. This track is an important opportunity for students in civil engineering fields to convene and focus on topics of the day. This year’s technical program focuses on “Bearing Knowledge for Sustainability”. It is important that civil engineering community integrate sustainability, in dealing with today’s issues whether they be technical, economic, social, environmental or political. This track also features our traditional sub-disciplines and technical sub-tracks such as environmental engineering, geotechnical engineering, structural engineering, transportation engineering, municipal or urban engineering, water resources engineering, materials engineering, coastal engineering, surveying, and construction engineering, international issues/projects, and state-of-the-art infrastructure projects. All research projects or papers related to these sub-disciplines and technical sub-tracks are welcome.

**Track 4: Construction Engineering**
Track Leader: Dr. Terri Norton

A specialized branch of civil engineering concerned with the application of scientific, mathematical, and management principles to the planning, design, and construction of facilities and structures such as highways, bridges, airports, railroads, buildings, dams, and reservoirs. Construction engineers take on a role that is more business-like in nature: drafting and reviewing contracts, evaluating logistical operations, insuring safety and quality control, procuring materials, budgeting and estimating costs, and performing sit analysis and computer-aided design.
**Track 5: Construction Management**

Track Leader: Professor Stuart Bernstein

This track focuses on innovative solutions in construction project management. This can include, but not be limited to, the development and use of project delivery systems, utilization of building information modeling, equipment simulation, more effective use of resources, and methods and materials for sustainable construction and design.

**Track 6: Informatics**

Track Leader: Dr. Chris Augeri

Informatics is the study of enabling people to analyze, synthesize, and produce information. Medical providers tracking disease trends, travelers searching for airline flights, engineers leveraging building infrastructure sensors to conserve energy, and analyst mining chat feeds to detect news events are examples of informatics in action. Growth in these user-guided knowledge discovery systems is accelerated by emerging technologies such as mobile devices, social media and cloud computing.

**Track 7: Computer Science**

Track Leader: Qiuming Zhu

This track is to cover the broad areas of computer science. Topics are solicited from all subjects of computational theories, software engineering practices, and information system applications, including, but not limited to, automata theory, computability and complexity analysis, mathematical logic, number theory, concepts and principles in programming languages and compiler construction, data structures and algorithm design, computer architecture and operating systems, software engineering and modern software development methodologies, rewriting theory and machine translation, human-computer interaction and interfaces, database management systems and data warehouses, data mining, predictive modeling, numeric analysis and large systems of data processing, communication networks and information security, biomedical and human biology–inspired computing, artificial intelligence and knowledge intensive systems, multi-agents interactions and game theory, machine learning, computer graphics and game programming, graph theory and its applications, modeling and simulation, computational geometry, parallel processing and high-performance computing, cloud computing, cyber computing, fault-tolerant architectures and computing, pattern recognition and fuzzy logic systems, artificial neural networks, digital image processing and computer vision, hybrid dynamic systems and complex adaptive systems, stochastic processes and random optimization techniques. Secure information system management and large scale distributed systems, etc. Presentations can be an up-to-date coverage of contemporary and emerging concepts, models, techniques, and methodologies in computing and information systems, and other general and specific topics in computer science and engineering. Participants are encouraged to investigate the current state-of-art in one of the specific areas, to report the insights of the research topics, to present the results from particular research projects, and to identify the future research directions for an area of interest.

**Track 8: Management Information Systems**

Track Leader: Dr. GJ de Vreede

This track focuses on the development and management of an organization’s information resources, technology, and infrastructure. As such, it brings together related disciplines to provide a framework for technology in the context of individual and organization decision making, problem solving, and business process support.

**Track 9: Cyber Systems and Information Assurance**

Track Leader: Dr. Robin Gandhi
Cyber systems have been integrated wide and deep into the infrastructure that supports our quality of life. The ability of these systems to preserve the security expectations of the users that rely on their services is now of utmost importance. Information Assurance (IA) is the practice of managing information-related risks. IA is concerned with the protection of confidentiality, integrity, and availability of data and their delivery systems in order to mitigate risk in the global IT infrastructure. Topics of interest in this track include, but not limited to: security engineering and principles, information operations, cryptography, vulnerability discovery, network & database security, digital forensics, software development & life cycle assurance, security appliances & products, security consultancy & services, regulatory requirements assessment, computer security management, disaster recovery, physical security, law, governance & ethics, security risk assessment for enterprise, project or product.

**Track 10: IT Innovation**

Track Leader: Dr. Ken Dick

Information technology is ubiquitous. The challenge we face is to build effective systems that are both reliable and flexible, and to do so in a timely way. This track addresses that need through an in-depth practical experience. The focus is on a real-life information systems designed and developed by the students. The project will cover the project conceptualization, analysis & design of the system, prototyping, and user testing.

Students are expected to bring knowledge from other courses and disciplines and their own experience into this track. Students are expected to apply their knowledge, to practice with different tools and techniques, to examine a variety of points of view, to critique the readings and others’ views, to stretch their thinking, and ultimately to learn and demonstrate what they have gleaned.

**Track 11: Modeling and Simulation, Visualization and Analysis**

Track Leader: Dr. Mahadevan Subramania

This track focuses on cutting edge developments in modeling, simulation, visualization, and analysis technologies for understanding complex scientific, industrial, social, and information systems. Areas covered include, but are not limited to, models and algorithms, game-based planning and training, high performance computing technologies, visual analytics, and approaches for validation of simulations and models. Application disciplines include cyber security and information assurance, military and government, social networks, wireless telecommunications and policies, urban infrastructures and energy, bioinformatics, health informatics, and others. Students developing or using simulation tools are invited to participate and present original projects and papers.
Student Presentation Submissions

**General.** The Peter Kiewit Institute’s Student Capstone Conference provides a forum for students to share their research in engineering, information science, technology and related fields and disciplines. Students are invited to present their findings to members of academe, industry and government. Students from colleges or universities within the region are invited to submit abstracts to one of the tracks on topics related to the study and application of engineering and information science & technology. Students or student teams may submit abstracts to more than one track but cannot submit the same abstract or give the same presentation to multiple tracks.

**Students.** Students who wish to be scheduled for the conference are required to submit a 250 word abstract for consideration. Papers 4-6 pages in length are optional. Students must be the primary authors of the paper.

**Invited Presentations.** Students who would like to submit a paper that has been recently published and/or presented, or is being submitted for publication may request an *Invitation to Present* at the Student Capstone Conference. Please email events@pki.nebraska.edu to make your request. Be sure to specify which track your paper is aligned with.

**Track Leaders** will extend special invitations to presenters whose research complements the body of presentations in their respective Tracks. Presenters should note: invited papers will not be refereed and are ineligible for award.

**Key Dates.** Please register and submit your abstracts to The Peter Kiewit Institute website: [www.pki.nebraska.edu](http://www.pki.nebraska.edu) by **Friday, March 11, 2011**. Those selected to participate will be notified by via email by **Tuesday, March 29, 2011**. At this time, presenters will be given back their reviewed abstracts to prepare for their presentations. Those wishing to submit a paper have until **Friday, April 15, 2011** to submit their final papers to the website.
On-Line Submission.

The following student information is required from all students submitting abstracts.

<table>
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<tr>
<th>Title of Paper or Presentation</th>
<th>Contact Information (cell &amp; email)</th>
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<tr>
<td>Intended Track</td>
<td>University/College</td>
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<td>Student Name</td>
<td>Faculty Advisor</td>
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Paper format and submission guidelines conform to IEEE paper formatting guidelines and are available on the PKI website at [www.pki.nebraska.edu](http://www.pki.nebraska.edu).

Track Leaders

Track leaders are key to a well run conference and are encouraged to enlist the assistance of faculty, staff and student volunteers in accomplishing the tasks outlined below.

Responsibilities:

- Solicit the assistance of faculty to serve as paper referees;
- Receive and review papers for suitability of presentation with the track. Forward suitable papers to referees;
- Establish the presentation order of papers to be presented in the track;
- Submit the track schedule of presentation to MS Leah Ellis at leahellis@unomaha.edu by **March 29, 2011** so that (1) notification can be sent to students and faculty of acceptance; and (2) papers may be compiled into the conference proceedings.
- Administer the track during the conference by adhering to prescribed presentation duration, keeping to the presentation sequence, and maintaining orderliness of the presentation room;
- Assist judges as needed with the selection of first, second, and third place presentations.

Referees

Referees will anonymously evaluate the student papers. An Evaluation Form will be completed by each Referee with the following in consideration:

- **Organization and Suitability**
  - Is the material organized and focused
  - Is the presentation and/or argument understandable
  - Is this original research, a review of previous research, or informative
  - Does the paper cover the topic comprehensively, partially, or as an overview
  - Is the citation style clear and consistent

- **Illustrations**: Review use of charts, graphs, maps for relevance and aesthetic

- **Timeliness and Usefulness**
  - Is the information current
  - Does the research support or refute an argument
  - Is the Bibliography selective with primary sources
Track Judges:

Track Judges will participate in the conference by invitation. There will be two to three judges per track from sectors of the community such as academia, industry, and government. Judges must be able to commit the full day to hearing and observing the student presentations. Upon completion of all student presentations, the judges then decide first, second, and third place presentations. These selections should be based on content, student grasp of the information, student presentation of the information, and student’s ability to field the question and answer segment of their topic. A Presentation Evaluation Form will be completed by each Judge for each student presentation. The top three presentations will be recognized at the evening banquet. Students will receive awards to commemorate the event.

Awards of Excellence

The top three presentations in each track will receive awards and be recognized at the Capstone banquet. There will also be a best paper award from among all papers submitted.

Capstone Banquet

The day’s events will close with an evening awards banquet. Activities involve a reception, dinner, and an address by a distinguished guest speaker. The highlight of the evening will be the recognition of the students and presentation of awards for each track.

The Peter Kiewit Institute

The Peter Kiewit Institute is a University-level institute reporting through the Executive Vice President and Provost to the President of the University that resides on the University of Nebraska-Omaha campus. The institute is home to approximately 1900 undergraduate and graduate students and 110 faculty from two University of Nebraska colleges: College of Engineering (COE) at the University of Nebraska-Lincoln (UNL); and the College of Information Sciences and Technology (IS&T) at the University of Nebraska-Omaha (UNO). Other units operating out of the institute are the Holland Computing Center and the Peter Kiewit Institute Technology Development Corporation in addition to college-affiliated centers and schools such as the Charles W. Durham School of Architectural Engineering and Construction, Nebraska University Center for Information Assurance and the Institute for Collaboration Science among others.
2010 Student Capstone Conference
Paper Evaluation Form – Referees

Information about the article:

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<tr>
<td>Unsatisfactory</td>
<td>Needs Improvement</td>
<td>Satisfactory</td>
<td>Developing Excellence</td>
<td>Excellent</td>
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Please consider the following in the critique of the paper:

1) Organization and Suitability
   - Is the material organized, focused, and understandable

   ____________________________________________________________________________________

   1 2 3 4 5

   - Does the paper contribute to the Body of Knowledge

   ____________________________________________________________________________________

   1 2 3 4 5

   - Is this original research, a review of previous research or informative

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   - Does the paper cover the topic comprehensively, partially, or as an overview

   ____________________________________________________________________________________

   1 2 3 4 5
• Quality of Writing: well written with the citation style clear and consistent

2) Illustrations
  • Review use of charts, graphs, maps for relevance and aesthetic

3) Timeliness and Usefulness
  • Is the information current; does it have a breadth of interest
  • Does the research support or refute an argument
  • Is the Bibliography selective with primary sources

4) Evaluation

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2011 Student Capstone Conference
Presentation Evaluation Form – Judges

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<td>The student needs extensive clarification. The instructor has to intervene so that the information is accurate and covered in sufficient detail.</td>
<td>The instructor must provide directed questioning so that the information is accurate and covered in sufficient detail.</td>
<td>The student requires clarification on one or two minor discussion points so that information is accurate and covered in sufficient detail.</td>
<td>The student is able to clarify information with only a prompt so that information is accurate and covered in sufficient detail.</td>
<td>The student requires no prompting for clarification. Discussion points are discussed in depth and detail. The highest level of performance is achieved.</td>
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A. Innovation of Idea (40%)

The following is discussed.
- Purpose of research
- Methodology
- VVA

B. Review of Literature (20%)

- Current and related research identified and discussed
- Primary literature is correctly summarized
- Major strengths and deficiencies of these data are discussed

C. Evaluation of Research (20%)

- Strengths and weaknesses of methodology identified
- Statistical analysis is assessed and critiqued
- Conclusions are drawn and compared with current research
- Student’s own conclusions about research are correct

D. Ability to answer questions (10%)

- Answers are logically presented
- Answers are accurate
- The student can think on their feet and may theorize if unsure (but indicates such)

E. Organization and Presentation (10%)

- Well prepared (does not reread the article)
- Introduction of research effectively sets the stage for the remainder of the presentation
- Direct eye contact is made with the audience
- Professional terminology used
Confidence is apparent; absence of nervousness
Printed material of visual aids are well prepared and utilized effectively
Presentation is summarized at the conclusion

Total Score*__________________________ (will be between 5 and 25)

This score will determine the placement of the presentation. Highest scores will rank presenters in first, second, of third place. First place presentations will receive the XX Award for Excellence.

Comments:
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