Poster Session A: Monday, March 5, 11 a.m. - Noon

A1  Cooperative Human-Computer Model Updating Cognitive Systems (MUCogS) for Civil Infrastructure
Juan Caicedo*, University of South Carolina

A2  International REU Program in Smart Structures
Richard Christenson*, University of Connecticut; Juan Caicedo, University of South Carolina; GunJin Yun, University of Akron

A3  CAREER: Does Motivation Matter for Conceptual Change?
Holly Matusovich*, Virginia Tech

A4  Lifting the Barriers: Understanding and Enhancing Approaches to Teaching Communication and Teamwork Among Engineering Faculty
Holly Matusovich*, Virginia Tech; Marie Paretti, Virginia Tech

A5  A Model for Faculty, Student, and Practitioner Development in Sustainability Engineering through an Integrated Design Experience
Shane Brown*, Washington State University; Karl Olsen, Washington State University; Nadia Lustig, Washington State University; Mike Wolcott, Washington State University

A6  What is Engineering Knowledge: A Longitudinal Study of Conceptual Change and Epistemology of Engineering Students and Practitioners
Shane Brown*, Washington State University; Devlin Montfort, Washington State University; Nadia Lustig, Washington State University

A7  Intentional serendipity, cognitive flexibility, and fluid identities: Cross-disciplinary ways of thinking, acting, and being in engineering
Robin Adams*, Purdue University

A8  CAREER: Implementing K-12 Engineering Standards through STEM Integration
Tamara Moore*, University of Minnesota

A9  A Holistic Assessment of the Ethical Development of Engineering Undergraduates
Cynthia Finelli*, University of Michigan; Donald Carpenter, Lawrence Technological University; Trevor Harding, California Polytechnic State University

A10 From Defense to Degree: Accelerating Engineering Degree Opportunities for Military Veterans
David Soldan*, Kansas State University; Noel Schulz, Kansas State University; Don Gruenhacher, Blythe Vogt, Kansas State University; Rekha Natarajan, Kansas State University

A11 Multifunctional Nanostructures for Integrated Electrical, Chemical, Mechanical and Biological Applications: an Interdisciplinary Certificate Program
Priscilla Hill*, Mississippi State University; Oliver Myers, Yaroslav Kosbka, Giselle Thibaudeau, Carlen Henington,
A12  Improving Undergraduate Research Program Diversity: Recruitment Strategies, Program Integration, and Education  
Shane Rogers*, Clarkson University; Michelle Crimi, Clarkson University

A13  Promoting Diverse Thinking Through a Graduate Seminar Series  
Devdas Pai*, NCAT; Dhananjay Kumar, NCAT; Jagannathan Sankar, NC A&T State University; Courtney Lambeth, NC A&T State University; Robin Liles, NC A&T State University

A14  IMPACTING UNDERGRADUATE NANOSCIENCE AND NANOENGINEERING EDUCATION AT NORTH CAROLINA A & T STATE UNIVERSITY  
Dhananjay Kumar*, NCAT; Devdas Pai, NCAT

A15  Informal Pathways to Engineering  
Marisa Wolsky, WGBH; Monica Cardella*, Purdue University

A16  Formative Feedback: Impacting the Quality of First-Year Engineering Student Work on Modeling Activities  
Heidi Diefes-Dux*, Purdue University; Monica Cardella, Purdue University

A17  A Comparative Study of Engineering Matriculation Practices  
Matthew Ohland*, Purdue University; Catherine Branner, Research Triangle Educational Consultants; Marisa Orr, Purdue University; Russell Long, Purdue University

A18  Socioeconomic Factors in Engineering Pathways  
Matthew Ohland*, Purdue University; Valerie Lundy-Wagner, New York University; Marisa Orr, Purdue University; Russell Long, Purdue University; Cindy Veenstra, Veenstra and Associates; Nichole Ramirez, Purdue University; Xingyu Chen, Purdue University

A19  Using a Sensor Technology REU to promote multidisciplinary approaches to undergraduate research and graduate school aspirations  
Jan Van der Spiegel, University of Pennsylvania; April Yee, University of Pennsylvania; Valerie Lundy-Wagner*, New York University

A20  “Transforming and Integrating: Evolving Construction Materials & Methods to the Next Level”  
Chung-Suk Cho*, U of North Carolina Charlotte; David Cottrell, Univeristy of North Carolina at Charlotte; Candace Mazze, University of North Carolina at Charlotte

A21  A Content-Driven, Reflective Model to Support Teaching in Engineering  
Jill Nelson*, George Mason University; Margre Hjalmarson, George Mason University

A22  Implementation, Dissemination, Barrier Identification And Faculty Training For Project-Enhanced Learning in Gateway Engineering Courses  
Razi Nalim*, Indiana University Purdue Univ; Robert Helfenbein, IUPUI

A23  Meeting the NAE Grand Challenge: Personalized Learning for Engineering Students through Instruction on Metacognition and Motivation Strategies
A24  A Preliminary Look at Faculty Adopters and Non-Adopters of Engineering Education Innovations
Kirsten Davis*, Boise State University; Sondra Miller, Boise State University; Ross Perkins, Boise State University

A25  Building bridges between the engineering classroom and the research laboratory: nanoscience at Union College
Palma Catravas*, Union College; Samuel Amanuel, Union College; Brian Cohen, Union College; Rebecca Cortez, Union College; Michael Hagerman, Union College

A26  How to Create a Nanoscience and Nanotechnology Minor
JAMES BRENNER*, FLORIDA TECH CHEM. ENGINEERING; KURT WINKELMANN, FLORIDA TECH; Joel Olson, FLORIDA TECH; XU SHAO HUA, FLORIDA TECH; Yekaterina Lin, Florida Tech; Lisa COLE, FLORIDA TECH; KAVITHA HARI, FLORIDA TECH; Kyan Ali, FLORIDA TECH; Jack Kindred, FLO

A27  Incorporating Ethical Decisions into Nanomanufacturing Research
Carol Barry*, U Massachusetts Lowell; Jacqueline Isaacs, Northeastern University; Ronald Sandler, Northeastern University

A28  NUE: Interdisciplinary Course - Nanoscale Transport Phenomena for Manufacturing Nanodevices
Zhiyong Gu*, Univ of Massachusetts Lowell; Bridgette Budhlall, University of Massachusetts Lowell; Hongwei Sun, University of Massachusetts Lowell; Carol Barry, U Massachusetts Lowell; Alfred Donatelli, University of Massachusetts Lowell

A29  NUE: Nanoengineering Education in an Under-represented Minority University
Syed Omar*, Texas A&M University-Kingsville; Amit Verma, Texas A&M University-Kingsville; Reza Nekouei, Texas A&M University-Kingsville; David Stollberg, GA Tech Research Corporation - GA Institute of Technology

A30  An Integrated Multidisciplinary Nanotechnology Undergraduate Education Program at the University of New Mexico
Mani Hossein-Zadeh*, University of New Mexico; Zayd Leseman, University of New Mexico, Mechanical Engineering; Matthias Pleil, University of New Mexico, Mechanical Engineering; Claudia Luhrs, Naval Post Graduate School, Mechanical Engineering

A31  An Interdisciplinary Modular Approach To Nanodevices And Nanotechnology Objectives Through Engineering via Cyberlearning
Srinivas Palanki*, University of South Alabama; Kuang Hsiao, University of South Alabama; Mark Adams, University of South Alabama

A32  S-STEM at Ira A. Fulton Schools of Engineering, Arizona State University
Mary Anderson-Rowland*, Arizona State University; Tony Rodriguez, Arizona State University
A33 Using a Virtual Gaming Environment in Strength of Materials Laboratory
Jon Preston, Wasim Barham*, Southern Polytechnic State Uni; James Werner,

A34 Research Initiation Grant: Investigating the use of Simulation and Gaming in Sustainable Energy Education (funded Summer 2011)
John Bean*, University of Virginia; Aaron Bloomfield, University of Virginia; Stephanie Moore, University of Virginia

A35 REU Site: Texas Center for Undergraduate Research in Energy and Combustion
Eric Petersen*, Texas A&M University

A36 REU Site: Research Experiences in Microscale Sensing, Actuation and Imaging (MosAIc)
Sriram Sundararajan*, Iowa State University

A37 Multi-Year Research Experience for Teachers (RET): The Impact of Long Term Research in Rocket Science and Teaching
Thomas Sammet*, Texas A&M University

A38 RET Site: Enrichment Experiences in Engineering (E3)
Cheryl Page*, Texas Engineering Experiment S; Robin Autenrieth, Karen Butler-Purry,

A39 Translating Research Experiences into Classroom Practice: An RET Project
Kwabena Narh*, New Jersey Institute of Techno; Howard Kimmel, New Jersey Institute of Technology; Rajesh Dave, New Jersey Institute of Technology; John Carpinelli, New Jersey Institute of Technology; Levelle Burr-Alexander, New Jersey Institute of Technol

A40 Engineering Innovation and Design for STEM Teachers
Margaret Pinnell*, University of Dayton; Rebecca Blust, University of Dayton; Sandi Preiss, Dayton Regional STEM Center; Suzanne Franco, Wright State University; Renee Beach, University of Dayton

A41 Teachers’ Research in BioPhotonics – Sensors and Systems (TRIPSS)
Cynthia Brossman*, Boston University; Michael Ruane, Boston University; Helen Fawcett, Boston University

A42 2011 Research Experiences for Undergraduates – Nanotechnology and Materials Systems
Dimitris Lagoudas, Texas A&M University; Jacques Richard, Texas A&M University; Kristi Shryock*, Texas A&M University

A43 REU Site for Increasing Diversity In Engineering at the Pratt School of Engineering of Duke University
Martha Absher*, Duke University School of Engi

A44 REU Site: Bioengineering at Saint Louis University (BE@SLU)
David Barnett*, Saint Louis University

A45 Undergraduate Research and Real World Sensor Applications
Caroline Schauer*, Drexel University; Jin Wen, Drexel University; Keiko Nakazawa, Drexel University; Dorilona Rose, Drexel University

A46 Exploring Nanotechnology with Electrospinning: Design, Experiment, and Discover!
Caroline Schauer, Drexel University; Jennifer Atchison, ; Danielle Tadros*, Drexel University

A47 Enhancing Undergraduate Research in Sustainable Transportation Systems: Hybrid Electric and Plug-In Hybrid Electric Vehicles
Alireza Khaligh*, University of Maryland

A48 Impact of Software Applications for Integrating Plug-In Hybrid Electric Vehicles within the Smart Grid
Alireza Khaligh*, University of Maryland; Shruti Ramaswamy, University of Maryland; Seshadri Raghavan, University of Maryland

A49 Transitioning Engineering Research to Middle Schools (TERMS)
Karen High*, Oklahoma State University

A50 Preparing for Graduate School through Interdisciplinary Summer Research
Kathleen Rubin*, University of Massachusetts

A51 NSF REU- Educating a Culturally Sensitive Industrial Engineer: A complex interdisciplinary systems perspective to global IE issues
Viviana Cesani*, Univ. Puerto Rico- Mayaguez; Saylisse Davila, University of Puerto Rico

A52 Research Experiences for Undergraduates in Electrical & Computer Engineering at the University of Kentucky
Regina Hannemann*, University of Kentucky; Ingrid St. Omer, University of Kentucky

A53 REU Site: Back to the Future – Engineering Research in a Historic Context
Michael West*, South Dakota School of Mines; William Cross, South Dakota School of Mines and Technology; Alfred Boysen, South Dakota School of Mines and Technology; Stuart Kellogg, South Dakota School of Mines and Technology

A54 Biology-on-a-Chip Internship Program (BioChIP): Hands-on technology development and biological discovery at UC Berkeley
Frankie Myers*, UC Berkeley; Luke Lee, UC Berkeley; Megan Dueck, UC Berkeley

A55 REU Program in Computational Sensing and Medical Robotics
Ralph Etienne-Cummings*, The Johns Hopkins University; Jerry Prince, The Johns Hopkins University; Anita Sampath, The Johns Hopkins University

A56 Teacher Training and Student Inquiry and Science Literacy: Linking Teacher Intervention to Students’ Outcomes in STEM Courses in Middle and High School Classes
Gisele Ragusa*, University of Southern California
Poster Session B: Monday, March 5, 1:30 p.m. – 2:30 p.m.

B1 CAREER: An Exploration of Expert Teaching and Student Learning in Capstone Experiences
Marie Paretti*, Virginia Tech; Cory Hixson, Virginia Tech; James Pembridge, Embry-Riddle University

B2 Using Writing-to-Learn Methods to Improve Conceptual Understanding in Statics
Lisa McNair*, Virginia Tech; Marie Paretti, Virginia Tech; Chris Venters, Virginia Tech

B3 CAREER: Reflective practice for graduate engineering students
Lisa McNair*, Virginia Tech; Wende Garrison, Virginia Tech

B4 CAREER: Cognitive and Metacognitive Activities in Engineering Design Education
Oenardi Lawanto*, Utah State University

B5 Theory to Practice: Developing conceptual change theory to inform engineering education instruction
Ruth Streveler*, Purdue University; Shane Brown, Washington State University; Holly Matusovich, Virginia Tech

B6 CAREER: Characterization of Cognitive Models of Conceptual Understanding in Practicing Civil Engineers and Development of Situated Curricular Materials
Shane Brown*, Washington State University; Robby Borden, Washington State University

B7 CAREER: Mathematics as a Gatekeeper to Engineering: The interplay between mathematical thinking and design thinking
Monica Cardella*, Purdue University

B8 Students' Understanding of Human-Centered Design and the Impact of Service Learning
Monica Cardella*, Purdue University; William Oakes, Purdue University; Carla Zoltowski, Purdue University

B9 Assessing Motivation of Engineering Students using Expectancy-Value and Future Time Perspective Theoretical Frameworks
Lisa Benson*, Clemson University; Beshoy Morkos, Clemson University

B10 Engineering Student Problem Solving Strategies that Contribute to Successful Solutions
Lisa Benson*, Clemson University; Sarah Grigg, Clemson University

B11 University Education – SMART LIGHTING ERC: Educating the 21st Century Illumineer
Kenneth Connor*, Smart Lighting ERC; Elizabeth Herkenham, Smart Lighting ERC; Dianna Newman, University at Albany, Evaluation Consortium; Meghan Morris Deyoe, University at Albany, Evaluation Consortium; Christopher Valle, University at Albany, Evaluatio

B12 Smart Lighting ERC Outreach Programs: Community Outreach and Research Experiences
Kenneth Connor, Smart Lighting ERC; Elizabeth Herkenham*, Smart Lighting ERC; Gretchen Fougere, Boston University; Thomas Little, Smart Lighting ERC; Charles Joenathan, Smart Lighting ERC; Robert Bunch, Smart Lighting ERC; Dianna Newman, University at Al
B13  Two Plus Three Community College to University Programs Project (T-CUP): A Pilot Program to Broader Community College Pathways into Engineering Careers
Patricia Mead*, Norfolk State University

B14  Can gaming provide enough context to improve knowledge integration and retention in engineering freshmen?
Agustin Rullan*, University of Puerto Rico; William Hernandez, University of Puerto Rico at Mayagüez; Cristina Pomales, University of Puerto Rico at Mayagüez; Bienvenido Velez, University of Puerto Rico at Mayagüez; Felix Zapata, University of Puerto Rico

B15  Entrepreneurship in undergraduate engineering: An examination of curricula, faculty, and students
Angela Shartrand*, NCIIA; Phil Weilerstein, NCIIA; Teri Reed-Rhoads, Purdue University; Nathalie Duval-Couetil, Purdue University; Sarah Zappe, Penn State University; Elizabeth Kisenwether, Penn State University

B16  Engaging Students in STEM Education through a Virtual Learning Lab
Stephanie August*, Loyola Marymount University; Michele Hammers, Loyola Marymount University; Allison Neyer, Loyola Marymount University; Don Murphy, Loyola Marymount University; Robert Thames, Loyola Marymount University; Daryoush Shokrgozar, Loyola Marymount University

B17  Understanding Diverse Pathways: Disciplinary Trajectories of Engineering Students
Susan Lord, University of San Diego; Matthew Ohland*, Purdue University; Richard Layton, Rose-Hulman Institute of Technology; Russell Long, Purdue University

B18  Examining the Migratory Patterns of Engineering Students Using Social Psychological Theories
Demetra Evangelou, Purdue University; Matthew Ohland*, Purdue University; Russell Long, Purdue University; Ida Ngambeki, Purdue University; George Ricco, Purdue University; Marisa Orr, Purdue University

B19  Developmental engineering: An examination of early learning experiences as antecedents of engineering education
Diana Bairaktarova, Purdue University; Demetra Evangelou*, Purdue University

B20  Use of Haptics in a Virtual Reality Environment for Learning of Nanotechnology
Curtis Taylor*, University of Florida; Dianne Pawluk, Virginia Commonwealth University; James Oliverio, University of Florida

B21  Collaborative Research: Use and Knowledge of Research-Based Instructional Strategies (RBIS) in Engineering Science Courses
Stephanie Cutler*, Virginia Tech; Maura Borrego, ; Jeff Froyd, Texas A&M University; Michael Prince, Bucknell University; Charles Henderson, Western Michigan University

B22  Transforming Military Veterans Experiences in Engineering at Texas A&M University (AggiE-VETS)
Jeff Froyd*, Texas A&M University; Cesar Malate, ; Michael Yeater, Blinn College
B23 Investigation of Hands-On Ability for Mechanical and Electrical Engineers
*Michele Miller*, Michigan Technological University; Leonard Bobmann, Michigan Technological University; Chris Van Arsdale, Michigan Technological University; Natasha Hagadone, Michigan Technological University; Edward Cokely, Michigan Technological University

B24 Weaving Threads of Sustainability into the Fabric of the Mechanical Engineering Curriculum: Impacting the Fundamental Manner in which Students Solve Problems
*Michele Miller*, Michigan Technological University; John Gershenson, Michigan Technological University; Chuck Margraves, Michigan Technological University; Ibrahim Miskioglu, Michigan Technological University; Gordon Parker, Michigan Technological University

B25 NUE: Bottom-Up Meets Top-Down – An Integrated Undergraduate Nanotechnology Laboratory at NC State
*Yong Zhu*, NC State University; Joe Tracy, NC State University; Jingyan Dong, NC State University; Xiaoning Jiang, NC State University; Gail Jones, NC State University

B26 Impact of Themed Learning Community (TLC) Program in Freshmen Engineering on Nanotechnology Track in Undergraduate Degree Program
*Maher Rizkalla*, IUPUI; Mngilal Agarawal, IUPUI; Hazim El-Mounayri, IUPUI; Janet Meyer, IUPUI; Kody Varahramyan, IUPUI

B27 Fluidics Fabrication Engineering Workshop in Secondary Education (FFEWSE)
*Elijah Shelton*, UCSB Nanolab; Sumita Pennathur, UC Santa Barbara

B28 NUE: Interdisciplinary Research-Based Education in Mechanical Engineering
*Erik Thostenson*, University of Delaware

B29 NUE: Nano Science And Laboratory Experience (ScALE) at UMaine
*Rosemary Smith*, University of Maine

B30 NUE: Integrating Nanotechnology into Undergraduate Engineering Education at the University of Arkansas
*Min Zou*, University of Arkansas; Gregory Salamo, University of Arkansas; Steve Tung, University of Arkansas; Keith Roper, University of Arkansas; Jin-Woo Kim, University of Arkansas; Jingyi Chen, University of Arkansas; Adam Huang, University of Arkansas

B31 Enhanced Engineering Education & Engagement in a Technology Rich Learning Environment
*Rob Garrick*, Rochester Institute of Tech.

B32 Research Initiation Grant: Developing strategies to improve women's active participation in engineering student group project teams
*Lorelle Meadows*, University of Michigan; Denise Sekaquaptewa, University of Michigan

B33 ADEPT: Assessing Design Engineering Project Classes with Multi-Disciplinary Teams
Agent-Monitored Tutorials to Enable On-Line Collaborative Learning in Computer-Aided Design and Analysis
Jack Beuth*, Carnegie Mellon University; Carolyn Rose, Carnegie Mellon University; Rohit Kumar, Carnegie Mellon University; David Adamson, Carnegie Mellon University

The Progressive Learning Platform
Sohum Sohoni*, Oklahoma State University; Kerri Kearney, Rebecca Damron, YoonJung Cho,

The Learning Bridge
Emin Aktan*, Drexel University; Franklin Moon, Drexel University; Thomas Hewett, Drexel University; Franco Montalto, Drexel University

RET SITE: SUSTAINABLE ENERGY, WATER AND MANUFACTURING
Kimberly Ogden*, University of Arizona

Partnering Researchers and Educators to Create Problem Based instruction that Adapts Research in Engineering for Students (PREPARES)
Valerie Schild, Kenan Fellows Program; Ruben Carbonell*, Kenan Institute for Engineering, Technology, & Science

UT Arlington RET Site on Hazard Mitigation
Yvette Pearson Weatherton*, UT Arlington; Nur Yazdani, UT Arlington; Stephanie Daza, UT Arlington

UTA REU Site on Hazard Mitigation
Yvette Pearson Weatherton*, UT Arlington; Nur Yazdani, UT Arlington; Stephanie Daza, UT Arlington

The TeachEngineering digital library: What’s on it, Who’s using it and How to use it
Kaarin Goncz*, EUV ERC

An Interdisciplinary Research Experience for Undergraduates in Ecosystem Restoration
Alan Rabideau*, University at Buffalo; Amy Bartlett, University at Buffalo; H. Copeland, Educational assessment consultant

Phase Behavior of Polymers and Block Copolymers
Charlie Chirino*, CBEN; Carolyn Nichol, Rice University

Rice University Nanotechnology Research Experience for Teachers
Carolyn Nichol*, Rice University; Vicki Colvin, Rice University; John Hutchinson, Rice University

The Joule Fellows: Teachers in Sustainable Energies Research Laboratories
Aida Ghiaei*, University of Connecticut; Kazem Kazerounian, University of Connecticut

Rutgers University Research Experience for Teachers in Engineering (RU RET-E) - Focused on Green Technology
Kimberly Cook-Chennault*, Rutgers, the State University
B47  REU Project Outcomes: A Computational Study of Transient Couette Flow Over an Embedded Cavity Surface  
*Michael Thompson*, Arizona State University; Amy Lang, University of Alabama; Will Schreiber, University of Alabama; Chase Leibenguth, University of Alabama; John Palmore, University of Alabama

B48  REU site in Fluid Mechanics: Educational Goals and Outcomes  
*Amy Lang*, University of Alabama; James Hubner, University of Alabama; Tom Zeiler, University of Alabama

B49  Virginia Tech’s REU Site on Interdisciplinary Water Sciences and Engineering: 2007-09, 2011-14  
Vinod Lobani*, Virginia Tech

B50  Design and Application of a Real-Time Water Quality Monitoring Lab in Sustainability Education  
*Parhum Delgoshaei*, Virginia Tech; Dustin Greer, Wichita State University; Vinod Lobani, Virginia Tech

B51  American Student Placement in Rehabilitation Engineering REU Program  
*Maria Milleville*, University of Pittsburgh; Mary Goldberg, University of Pittsburgh; Alicia Koontz, University of Pittsburgh; Rory Cooper, University of Pittsburgh

B52  Experiential Learning for Veterans in Assistive Technology and Engineering (ELeVATE) Program  
*Maria Milleville*, University of Pittsburgh; Mary Goldberg, University of Pittsburgh; Rory Cooper, University of Pittsburgh

B53  REU Site: National Academy of Engineering Grand Challenges  
*Susan Burkett*, U Alabama; Pauline Johnson, U Alabama

B54  Relative Effectiveness of Different Modes of Education Abroad  
*Jan Helge Bøhn*, Virginia Tech

B55  An Imaging Focused Interdisciplinary REU incorporating Innovation and Entrepreneurship Training  
*Stefi Baum*, RIT; Jake Noel-Storr, RIT; Carl Salvaggio, RIT

B56  REU Site: Research Opportunities in Miniature Robotics  
*Sarah Bergbreiter*, University Of Maryland, College; Satyandra Gupta, University of Maryland, College Park

B57  Education Activities at the Engineering Research Center for Mid-InfraRed Technologies for Health and the Environment (MIRTHE)  
*Roxanne Zellin*, MIRTHE Center
Poster Session C: Monday, March 5, 4:30 p.m. – 5:30 p.m.

C1  Publicizing Research
Joshua Chamot

C2  STAR Metrics and the Assessment of Engineering Education and Centers Grants
Lisa D. McNair and Marie C. Paretti

C3  Building new engineering education theory and practice for interdisciplinary pervasive computing design
Lisa McNair*, Virginia Tech; Tom Martin, Virginia Tech; Ed Dorsa, Virginia Tech; Eloise Conpey, Virginia Tech; Kahyun Kim, Virginia Tech; Jason Forsyth, Virginia Tech

C4  CAREER: Influence of Social Capital on Under-Represented Engineering Students’ Academic and Career Decisions
Julie Martin*, Clemson University

C5  On Complex Problem Solving: From Engineering Practice to the Classroom
Olga Pierrakos*, James Madison University; Anna Zilberberg, James Madison University; Robin Anderson, James Madison University; Sean McVay, James Madison University; Jacquelyn Nagel, James Madison University; Jesse Pappas, University of Virginia

C6  The Engineer Identity: Identifying with Engineering and Becoming an Engineer
Olga Pierrakos*, James Madison University; Kathleen Casto, James Madison University; Robin Anderson, James Madison University; Heather Watson, James Madison University; Kyle Gipson, James Madison University

C7  Integrating Developmental Instruction in Sustainability Contexts into an Undergraduate Engineering Design Curriculum
Robert Nagel*, James Madison University; Eric Pappas, James Madison University; Olga Pierrakos, James Madison University

C8  Do goals matter in engineering education? An exploration of how goals influence outcomes for FIRST robotics participants
Jeanine Skorinko*, WPI; Jim Doyle, WPI; Gretar Tryggvason, University of Notre Dame; Michael Gennert, WPI

C9  Empirically-based Instructional Tools for Fostering Engineering Problem Solving and Cognitive Flexibility in Pre-college Students
Martin Reisslein*, Arizona State University; Roxana Moreno, University of New Mexico; Gamze Ozogul, Arizona State University; Amy Johnson, Arizona State University; Kirsten Butcher, University of Utah

C10 Instructional Sequences in Pre-College Engineering Education
Martin Reisslein*, Arizona State University; Amy Johnson, Arizona State University; Gamze Ozogul, Arizona State University
C11  Education and Outreach Programs – Synthetic Biology Engineering Research Center (SynBERC)
Kate Spohr*, SynBERC

C12  Berkeley Engineering Research Experiences for In-Service and Pre-Service Teacher Teams
George Johnson*, University of California; Jay Keasling, SynBERC; Elisa Stone, Berkeley Science & Math Initiative; Kate Spohr, SynBERC

C13  Preparing Global Engineers for the 21st Century
Aditya Johri*, Virginia Tech

C14  CAREER: Advancing engineering education through learner-centric, adaptive cyber-tools and cyber-environments
Krishna Madhavan*, Purdue University; Gerhard Klimeck, Purdue University

C15  Preparedness Portfolios and Portfolio Studios
Jennifer Turns*, University of Washington; Brook Sattler, ; Kate Mobrand, University of Washington

C16  One Day’s Pay: Educating K-16 Engineers to Design Affordable Innovations
Lauren Cooper*, CU Boulder; Malinda Zarske, CU Boulder; Derek Reamon, CU Boulder; Daria Kotys-Schwartz, CU Boulder

C17  CO-INSTRUCTION MODEL FOR MULTIDISCIPLINARY SENIOR PROJECTS IN SUSTAINABILITY
Jinny Rhee*, San Jose State University; David Parent, San Jose State University; Leslie Speer, San Jose State University; Anuradha Basu, San Jose State University; Larry Gerston, San Jose State University

C18  Platform Independent Interface for Remote Laboratory Experiments
Bo Cao, Univers; Xuemin Chen*, Texas Southern University; Gangbing Song, University of Houston

C19  Pilot Intervention to Improve "Sense of Belonging" of Minorities in Engineering
Kari Jordan*, The Ohio State University; Sheryl Sorby, The Ohio State University; Susan Amato, Michigan Technological University; Tammy Haut Donahue, Michigan Technological University

C20  Programming Standing Up
Matthew Berland*, University of Texas at San Ant; Taylor Martin, University of Texas at Austin

C21  Improving Learning in Engineering Classrooms by Coupling Interactive Simulations and Real-Time Formative Assessment via Pen-Enabled Mobile Technology
Frank Kowalski*, Colorado School of Mines; Susan Kowalski, Colorado School of Mines; Tracy Gardner, Colorado School of Mines

C22  Strengthening the Community College Engineering Pipeline Using Tablet PCs and Online Instruction
Amelito Enriquez*, Cañada College

C23  REU Site: Engineering Cities and Drexel University
Mira Olson*, Drexel University; Patrick Gurian, Drexel University; Sabrina Spatari, Drexel University; Sarah Collins, Drexel University

C24 NUE: Integrated Approach to Environmentally Responsible Nanotechnology Education
Mira Olson*, Drexel University; Patrick Gurian, Drexel University; Alisa Morss Clyne, Drexel University; Wan Shih, Drexel University

C25 iREU: Interdisciplinary Research Experience for Undergraduates in Medicine, Energy, and Advanced Manufacturing
Alisa Clyne*, Drexel University; Surya Kalidindi, Drexel University; David Urias,

C26 Integrating Nanotechnology into Undergraduate Engineering Curricula at Bucknell University: Enhancing a Biomimetic Materials Course
Donna Ebenstein*, Bucknell University; Erin Jablonski, Bucknell University

C27 Interdisciplinary Undergraduate Option Network in Nanoscience and Molecular Engineering Education
Rene Overney*, University of Washington; Lakshmi S. Kocherlakota, University of Washington

C28 NanoSTEP: NANO-SCIENCE, TECHNOLOGY, ETHICS, AND POLICY (NanoSTEP)
Introducing Societal, Ethical, Economic, and Environmental Issues Relevant to Nanotechnology Into Liberal Education for Engineers
Cortney Holles*, Colorado School of Mines

C29 National Nanotechnology Infrastructure Network's International Research Experience for Undergraduates Program
Nancy Healy*, Georgia Institute of Technology; Lynn Rathbun, Cornell University/NNIN

C30 National Nanotechnology Infrastructure Network's RET program: Six Years of Success
Nancy Healy*, Georgia Institute of Technology; Angela Berenstein, Harvard University; Kathryn Hollar, Harvard University; Gary Harris, Howard University; Kathy Geboski, Pennsylvania State University

C31 BRIGE: Testing the efficacy of concept inventories with bilingual students: The application of CATS at UPRM
Aidsa Santiago*, UPRM

C32 Leveraging Simulation Tools to Deliver Ill-Structured Problems in Statics and Mechanics of Materials
Christopher Papadopoulos, UPRM; Aidsa Santiago*, UPRM; Genock Portela, UPRM

C33 An Experiential Pedagogy for Sustainability Ethics
Thomas Seager*, ASU; Evan Selinger, RIT; Jathan Sadowski, RIT; Susan Clark (Spierre), ASU

C34 San Diego State University's Troops to Engineers SERVICE Program
Patricia Reily*, San Diego State University

C35 Collaborative Research: Development and Testing of 4-P Model to Assess the Effectiveness of Case Study Methodology in Achieving Learning Outcomes
C36 A Participatory Investigation of Learning in International Service Projects: Early Findings about Learning Outcomes
Russell Korte*, University of Illinois; Laura Hahn, University of Illinois; Valeri Werpetinski, University of Illinois; Bruce Elliot-Litchfield, University of Illinois

C37 Research Experience for Teachers in the Manufacturing for Competitiveness in the United States (RETainUS)
Mohamed Abdelrahman*, Texas A&M University-Kingsville

C38 RET in Engineering and Computer Science Site on Engineering a More Sustainable Energy Future
Joan Brennecke*, University of Notre Dame; Jay Brockman, University of Notre Dame

C39 Research to Inspire Students in Engineering (RISE) through Inquiry
Stephen Hale*, University of New Hampshire; Dawn Korade, NH Academy of Science and Design; Brad Kinsey, University of New Hampshire

C40 Science and Mechatronics-Aided Research for Teachers (SMART): An RET Site Project
Vikram Kapila*, Polytechnic Institute of NYU

C41 RET Site on Bio-Inspired Technology and Systems (BITS)
Xiaobo Tan*, Michigan State University; Drew Kim, Michigan State University

C42 Strengthening a K12 Learning Community through Engineering Research
Chen Ling*, University of Oklahoma; Randa Shehab, University of Oklahoma; Mark Nanny, University of Oklahoma; Hazem Refai, University of Oklahoma; Matthias Nollert, University of Oklahoma; Christopher Ramseyer, University of Oklahoma; Patricia Hardre, University of Oklahoma

C43 Experiences in Sensor Networks--University of North Texas (UNT)
Dr. Murali Varanasi*, University of North Texas, RET

C44 NSF Retaining Engineers through Research Entrepreneurship and Advanced–Materials Training (RETREAT) 2011
Okenwa Okoli*, Florida State University

C45 REU Site: Particle-Based Functional Materials for Energy, Biomedicine, and Sustainability
Joseph McCarthy*, University of Pittsburgh

C46 REU Site: Summer Research Experiences in Wireless Sensor Networks – Design and Applications
Scott Smith*, University of Arkansas; Jingxian Wu, University of Arkansas

C47 Injury Science REU
Flaura Winston, MD, PhD, Children's Hospital of Philadelphia, Center for Injury Research and Prevention; Meghan Marsac, PhD, ; Carol Murray, MSS, MLS*, Children's Hospital of Phila.
Advances in Additive Manufacturing and Bio/Nano Applications
Subha Kumpaty*, Milwaukee School of Engineering

Engineering Solutions for Clean Energy Generation, Storage and Consumption:
Undergraduate Research with Computational and Experimental Synergy
Scott Danielson, University of Pennsylvania; Jason Tedstone, Clemson University; Alex Cooper, University of Virginia; Christoffer Turner*, The University of Alabama; Jason Bara, The University of Alabama

INSET: Internships in Nanosystems Science, Engineering, and Technology
Megan Valentine*, UCSB; Nicholas Arnold, Santa Barbara City College; Jens-Uwe Kuhn, Santa Barbara City College; Maria teresa Napoli, UC Santa Barbara

Research in Advanced Propulsion and Fuel Technology for Sustainable Transportation
Bo Chen*, Michigan Tech; Jeffrey Naber, Michigan Tech

Quality of Life Technology Engineering Research Center (QoLT ERC) REU Internship Program
Maria Milleville*, University of Pittsburgh; Mary Goldberg, University of Pittsburgh; Dan Ding, University of Pittsburgh; Reid Simmons, Carnegie Mellon University

Wind Energy Science, Engineering and Policy (WESEP) REU
Eugene Takle, Iowa State University; James McCalley*, Iowa State University

Novel Advanced Materials and Processing with Applications in Engineering
Christos Takoudis*, University of Illinois-Chicago; Gregory Jursich, University of Illinois-Chicago

First Year Accomplishments of a New REU Site at Stony Brook University on Nanotechnology for Health, Energy and the Environment
Gary Halada*, Stony Brook University

Highlights of the 2011 Electrical Engineering Research Experience for Undergraduates (EEREU) at The Pennsylvania State University, University Park
William Jenkins*, Pennsylvania State University; Sven Bilen, The Pennsylvania State University

Interdisciplinary Undergraduate Research Experiences in Electrical and Computer Engineering at Oakland University
Osamah Rawashdeh*, Oakland University; Daniel Aloi, Oakland University

Development of an Online Application System Available to all REU Programs
Justin Grevich, UC San Diego; Robert Sab, UC San Diego; Melissa Micou*, UC San Diego

Research Experience for Undergraduate Site in Additive Manufacturing
Robert Landers*, Missouri S&T; Hong Sheng, Missouri S&T; Ming Lei, Missouri S&T; Frank Linn, Missouri S&T; Greg Hilmas, Missouri S&T; Joseph Newkirk, Missouri S&T; Doug Bristow, Missouri S&T
Poster Session D: Tuesday, March 6, 10:45 a.m. – 11:45 a.m.

D1 NSF Engineering Research Center for Biorenewable Chemicals (CBiRC): University Education Program
D. Raj Raman*, Iowa State University; Karri Haen, Iowa State University; Mari Kemis, Iowa State University; Mary Ann Moore, Iowa State University

D2 Sustainable Biomass Production and Processing Systems (SBPP) Research Experience for Undergraduates
D. Raj Raman*, Iowa State University; Michelle Soupir, Iowa State University; Karri Haen, Iowa State University; Mari Kemis, Iowa State University; Mary Ann Moore, Iowa State University

D3 Center for Biorenewable Chemicals (CBiRC) Pre-College Education Programs
Adah Leshem*, Iowa State University; Karri Haen, Iowa State University

D4 REU Site: Tackling Environmentally-Related Grand Challenges for Engineering
Inez Hua*, Purdue University; Michael Harris, Purdue University; Stephen Hoffmann, Purdue University

D5 Learning from Small Numbers: Methodological revisions
Alice Pawley*, Purdue University

D6 Assessing Sustainability Knowledge: Gateway Concepts to Drive Sustainability Content Exploration
Alice Pawley*, Purdue University; Stephen Hoffmann, Purdue University; Matthew Ohland, Purdue University; Monica Cardella, Purdue University; Ranjani Rao, Purdue University

D7 Recommendations for Promoting Desirable Characteristics in Engineering Ph.D.s: Perspectives from Industry and Academia
Monica Cox*, Purdue University; Jiabin Zhu; Benjamin Ahn; Jeremi London

D8 Exploring the Relationship Between Self-Efficacy and Project-Based Learning Among Engineering Students
Debbie Chachra*, Olin College

D9 CAREER: A Study of How Engineering Students Approach Innovation
Senay Purzer*, Purdue University

D10 Culture of Connectivity in STEM
Joseph Cocozza*, USC

D11 Preparing for a Workforce Environment: Bridging Education and Industry for ERC Students
Dr. Penny Jeffrey*, FREEDM Systems Center; Dr. Mesut Baran, North Carolina State University; Dr. Petru Andrei, Florida State University; Dr. George Karady, Arizona State University; Dr. Mehdi Ferdowsi, Missouri Science & Technology; Dr. Mark Weatherspoon

D12 NUE: NanoCORE II (Nanotechnology Concepts, Opportunities, Research and Education) at the FAMU-FSU College of Engineering
Amy Chan-Hilton*, Florida State University; Rufina Alamo, Florida State University; Dr. Petru Andrei, Florida State University; Mei Zhang, Florida State University; Oni Englander,

D13 Engineering the Common Good
Linda Barrington*, U of Massachusetts Lowell; Emmanuelle Reynaud, University of Massachusetts Lowell; Julianne Rhoads, University of Massachusetts Lowell

D14 E-book Dissemination of Curricular and Pedagogical Innovations in Engineering Thermodynamics
Donna Riley*, Smith College

D15 Emphasizing mathematical sense-making in introductory physics courses helps students succeed in later engineering courses
Andrew Elby*, University of Maryland; Ayush Gupta, University of Maryland; Eric Kuo, University of Maryland; Mike Hull, University of Maryland; Brian Danielak, University of Maryland

D16 Building Design Apps for Early Engineering Education
Scott Ferguson*, North Carolina State Univ.; Larry Silverberg, North Carolina State University; William DeLuca, North Carolina State University

D17 The Role of Student Engagement and Motivation on Student Conceptual Change Trajectory in Core Materials Classes
Stephen Krause*, Arizona State University; Jacquelyn Kelly, Arizona State University

D18 The Use of Differentiated Learning Activities to Enhance Engineering Students Learning
Michelene Chi*, Arizona State University; Stephen Krause, Arizona State University

D19 Mechanix: A Sketch Recognition Truss Tutoring System
Julie Linsey*, Texas A&M University; Tracy Hammond; Erin McTigue, Texas A&M; Olufunmilola Atilola, Texas A&M University

D20 Learning to Innovate Through Biosinspired Design (EEC 1025155)
Daniel McAdams*, Texas A&M University; Julie Linsey, Texas A&M University

D21 Developing and Implementing a Plan for Transitioning America's Veterans to Science, Technology, Engineering and Mathematics (STEM) Academic Programs
Robert Green*, Mississippi State University; Rayford Vaughn, Mississippi State University; Sarah Rajala, Mississippi State University

D22 A New Protocol for Problem Framing in Engineering Problem Solving
John Jackman*, Iowa State University; Gloria Starus, Iowa State University; Matthew Hagge, Iowa State University; Stephen Gilbert, Iowa State University; Gregory Aist, Iowa State University; LeAnn Faidley, Wartburg College

D23 Computational Nanoscience: Education and Evaluation in Computational Nanotechnology Course
Yongsheung Leng*, George Washington University; Huachuan Wang, George Washington University
Teaching bio-nanotechnology to engineering students with varied backgrounds
Jonathan Silver*, George Washington University

Using Digital Pens to Automatically Predict Student Performance in Engineering Statics
Tom Stabovich*, UC Riverside

NUE: Nanomanufacturing for Energy and Biomedical Engineering
Ying Sun*, Drexel University; Jason Baxter; Christopher Li; Frank Ji,

The Minor in Nanoscale Science and Engineering at Georgia Institute of Technology
Dong Qin*, Georgia Institute of Technolog

Nanocomposites for Damping in Snow Skis: A Laboratory Module and Capstone Design Project for Integrating Nanotechnology into the ME Curriculum
Kam Leang*, University of Nevada Reno; Brandon Hurd, University of Nevada Reno; Jonghwan Subr, University of Delaware; John Cannon, University of Nevada Reno

How much do engineering students consider the context of design problems?
Ken Yasuhara*, University of Washington; Cynthia Atman, University of Washington; Deborah Kilgore, University of Washington; Anukrati Agrawal, University of Washington; Ryan Campbell, University of Washington

Engineering design in context: Breadth of concerns
Ryan Campbell, University of Washington; Ken Yasuhara*, University of Washington; Helen Chen, Stanford University; Sanne Haase, Aarhus University; Micah Lande, Arizona State University; Cynthia Atman, University of Washington; Sheri Sheppard, Stanford Un

National Center for Engineering Pathways to Innovation (Epicenter)
Sheri Sheppard*, Stanford University; Tom Byers, Stanford University; Tina Seelig, Stanford University; Kathy Eisendhardt, Stanford University

Stanford Research Experiences for Teachers (SERET) Program: Catalyst for Student Motivation?
Kaye Storm*, Stanford University; Sheri Sheppard, Stanford University; Beth Pruitt, Stanford University

Societal Dimensions of Nanotechnology: A course connecting communities
Michael Gorman*, UVA; Nathan Swami, UVA; Joanne Cohoon, UVA

Research Initiation Grant: Can Makerspaces Develop Undergraduates’ Research Creativity and Innovation?
Cindy Harnett*, University of Louisville; Thomas Tretter, University of Louisville; Stephanie Philipp, University of Louisville

Research Initiation Grant: Increasing Student Engagement in Homework
Richard Bennett*, The University of Tennessee; Taimi Olsen, University of Tennessee; Will Schleter, The University of Tennessee; Stanley Guffey, The University of Tennessee

RET Site: Milwaukee Regional Energy Education Initiative (MREEI)
Research Experiences of Teachers in Engineering at The University of Texas-Pan American: Building Partnerships for Learning and Teaching in the Rio Grande Valley
Mounir Ben Ghalia*, Univ. Texas-Pan American

Computing Research Experiences for STEM Teachers (CREST)
Harry Cheng*, University of California, Davis

Research Experience for Teachers (RET) site at the University of Houston (UH)
“Innovations in Nanotechnology”
Fritz Claydon*, University of Houston; Stuart Long, University of Houston; Debra Rodrigues, University of Houston

Nanopatterning Surfaces with Cylinder-Forming Block Copolymers
Alona Bozhchenko, Rice University; Gila Stein, University of Houston; Fritz Claydon*, University of Houston

Research Experiences for Teachers, Site RET in Engineering: Connecting with Community Colleges – Year 1
Isabel Lloyd*, University of Maryland

REU in Infrastructure Materials
Elliot Douglas*, University of Florida

Rutgers-NSF REU in Cellular Bioengineering
Charles Roth*, Rutgers University

An Engineering REU Program Focused on Diabetes

REU Site in Nanoscale Science and Engineering, Northwestern University
Margaret Connolly*, Northwestern University

SURF NIST Boulder Builds Bridges to Ph.D. Programs
Joseph Magee*, NIST; Annemiek Kamphuis, NIST; Ron Goldfarb, NIST

REU Site: Integrated Bioengineering Research, Education, and Outreach Experiences for Females and Underrepresented Minorities at WPI (EEC0754996)
Marsha Rolle*, WPI; Jonathan Grasman, WPI; Jeanne Hubelbank, Evaluation Consultants; Kristen Billiar, Worcester Polytechnic Institute

RET Site: Inquiry-based Bioengineering Research and Design Experiences for Middle-School Teachers (EEC 1132628)
Terri Camesano*, Worcester Polytechnic Institut; Jeanne Hubelbank, Evaluation Consultants; Thomas Oliva, Forest Grove Middle School; Kristen Billiar, Worcester Polytechnic Institute
Tailoring Activated Carbon for Improved Removal of Dissolved Organic Matter for Water Reuse
Margaret Kupferle*, University of Cincinnati; George Sorial, University of Cincinnati; Jacob Lalley, University of Cincinnati; Valerie Deeter, California State Polytechnic University Pomona; Oscar Medellin, Illinois Institute of Technology; Liang Yan, University of Kansas

The Bioengineering Education Research REU Program
Robert Linsenmeier*, Northwestern University; Stacy Klein-Gardner, Vanderbilt University; Mark Bourgeois, Northwestern University; Penny Hirsch, Northwestern University; Jean Alley, Vanderbilt University

REU Site: Summer Undergraduate Research in Engineering/Science Program at the Georgia Institute of Technology
Leyla Conrad*, Georgia Institute of Technology; Gary May, Vanderbilt University; Jill Auerbach

Exploring the Role of Computational Adaptive Expertise in Design and Innovation
Ann McKenna*, Arizona State University; Robert Linsenmeier, Northwestern University; Adam Carberry, ASU; Jennifer Cole, Northwestern University

REU Site: Biofuels Development - Feedstock to Tailpipe
Russell Ostermann*, University of Kansas; Susan Williams

RET: ‘Shaping Inquiry from Feedstock to Tailpipe’ to Promote a SHIFT in Science Instruction
Claudia Bode*, University of Kansas; Susan Williams; Lisa Blair, Southeast Kansas Education Service Center-Greenbush

Optical Imaging for the Elementary School Classroom
Lisa Blair, Southeast Kansas Education Service Center-Greenbush; Janggun Jo, University of Kansas; Xinmsi Yang, University of Kansas; Pat Zimmerman, USD 343; Lisa Friis*, University of Kansas

Elementary School Lesson Plans on the Response of the Body to Sensory Input
Alicia Thomas, Baldwin Intermediate School; Timothy Craig, University of Kansas; Sara Wilson, University of Kansas; Lisa Blair, Southeast Kansas Education Service Center-Greenbush; Lisa Friis*, University of Kansas

Toolkits for 4th and 5th Grade Teachers (BET 4 Teachers) RET Site
Lisa Friis*, University of Kansas; Erin Lewis, University of Kansas; Lisa Blair, Southeast Kansas Education Service Center-Greenbush

BIOSENSE REU Site - Subsurface Sensing and Imaging Systems for the Development of Biomedical Applications and Devices at Northeastern University
Kristin Hicks*, Northeastern University

CAREER: A Quality Framework for Interpretive Engineering Education Research
Joachim Walther*, University of Georgia; Nicola Sochacka, University of Georgia; Nadia Kellam, University of Georgia
Making Connections: A Theory of Synergistic Learning in Engineering
Nadia Kellam*, University of Georgia; Joachim Walther, University of Georgia; Sandy Bird, University of Georgia; Kelly Gayotte, University of Georgia; Tracie Costantino, University of Georgia