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April 27, 2007

Celebrating 100 years of Engineering at Idaho

University of Idaho

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Welcome from President White

Welcome to the University of Idaho Engineering Design Expo 2007! This premier showcase of student research and achievements is your chance to get an up close and personal look at the groundbreaking work of our students. Expo 2007 is especially exciting since it takes place during the centennial year of our College of Engineering.

During the past 100 years, the College of Engineering has educated and mentored some of the world's most innovative leaders. Many of these leaders got their start at this very event. As you visit with our students and view their remarkable projects, you'll understand not only the global impacts, but also the quality and innovation of our future engineers.

This year, the more than 60 senior projects and team inventions involving nearly 300 engineering students are truly impressive. They represent months — in some cases years — of student, faculty, staff, alumni and industry partners innovating hand-in-hand.

The Engineering Design Expo and the College of Engineering serve as true examples of how the University is our classroom and the world is our laboratory. On behalf of all of us at the University of Idaho, I hope you enjoy your visit, and thank you again for being a part of this amazing event.

Sincerely,

Timothy P. White
President

Welcome from Dean Elshabini



On behalf of the College of Engineering, I'd like to welcome you to Engineering Design Expo 2007. Since 1907, this campus has been home to our engineering college, and with that, endless innovation, discoveries and achievements.

On this very campus, biodiesel was pioneered; the first hybrid vehicle was created and electronic technology was and continues to be developed for use by NASA. Many of these groundbreaking discoveries have roots to Expo, our signature event and the largest event of its kind in the Northwest. These projects are examples of the sustained impact our more than 13,000 graduates have made on Idaho, the nation and the planet.

The talented students you'll meet today are part of our 100th graduating class of the College of Engineering. We're delighted this year's Expo and the many wonderful projects on display are a part of our centennial celebration. Once you visit with our students and see the results of their hard work, I'm sure you'll understand why this is truly one of my favorite times of the year. This event would not be possible without the hard work of our faculty and staff that serve as mentors, educators and behind-the-scenes organizers of these projects, as well as our college operations.

I am so glad you're here with us today and look forward to meeting you in the Micron Exhibit Hall, outside the Student Union Building or around campus during Engineering Design Expo 2007.

Aicha Elshabini
Dean, College of Engineering

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1907
CENTENNIAL
2007

College of
Engineering

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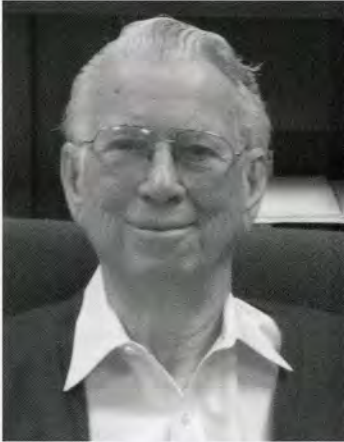
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B THERE OR B²

Green Design



Raymond A. Hanson

Taking Engineering to the Next Level

1:00 – 2:00 PM

Borah Theater

When Raymond A. Hanson started pioneering ways to make farming easier and more efficient, he considered himself a farmer with an idea.

What the 19-year-old didn't know was that this invention would take engineering to the next level and impact agriculture around the world for generations to come.

By his early 20s, he had built and sold more than three dozen "Hanson Automatic Levelers" for combine harvesters. This was not enough for Ray. "I asked myself what else could I level?" he said.

Little did he know, his next invention, the canal construction machine, would mark yet another level – this time helping Colfax, Washington, keep river levels at bay after a devastating flood in the 1940s.

Today, the list of patents he holds includes a joint forming apparatus for concrete surfaces; a bi-directional rotary excavator; canal construction machines; a highway surfacing trimmer and spreader; a compactor for soil surfaces; a steering system—the list goes on.

After he founded the R.A. Hanson Company, Raymond designed a method to slipform large concrete in-place pipes in the early 1960's and also developed continuous pick-up, load-out, and material transfer

machines. Raymond's work has been used throughout the world: he introduced new, large trimming and concrete slip form machines during the construction of the California Aqueduct in 1965. In 1971, he manufactured a 2,000 ton gantry crane for the Grand Coulee Dam and a special backfilling machine for the Alaska Pipeline. This list goes on as well!

To describe Raymond, however, his engineering achievements are just part of the story. His list of community activities is long as well, including the Washington State Governors Key Business Leaders Advisory Board, director of the United Way, the Chewelah Basin Ski Corporation, the Boy Scouts, Spokane Rotary and several University of Idaho advisory boards.

When not discovering how to raise his work to the next level, Raymond enjoys adjusting his aim back down while skiing. He also is an avid motorcyclist and dedicated family man. An inventor, innovator, entrepreneur and avid outdoorsman, Raymond's true love is his wife of 41 years, Lois.

Join Ray as he talks of the past, present and future of engineering. This exciting talk will highlight Ray's work in global agricultural economies, diverse projects and things he learned along the way.

Program

EXPO 2007 Schedule



	Time	Event	Place
	7:30 a.m.	Coffee Talk (Meet and Greet)	Chiefs Room
	7:30-8:30 a.m.	Registration	Registration Desk
8:00	8:15 a.m.	Judges Forum	Gold Room
	8:45-9:00 a.m.	Opening Ceremonies	Micron Exhibit Hall
9:00	9:00-10:15 a.m.	Space Exploration & Beyond Technical Sessions (Terminal Velocity; Thermasense; Lunartics; Zephyr)	Silver Room
	9:00-10:20 a.m.	Transportation & Technology Technical Sessions (Smart Signals; Vandal Racing; Operation Charge; Vandal Pullers; Clean Snowmobile)	Gold Room
	9:00 a.m.-3:00 p.m.	Student Designs: Booths and Posters (SUB Ballroom, Foyer & Patio); Corporate Sponsors' Booths	Micron Exhibit Hall
10:00	10:30 a.m.-11:30 p.m.	New Fundamental Equations Masters Thesis Defense	Cataldo Room
	10:30-11:45 a.m.	Energy & Electronics Technical Sessions (Cutthroat Energy; Team Protection; Shear Performance; Sleep Sound)	Silver Room
	10:30-11:45 a.m.	Land & Water Resources Technical Sessions (Clearwater Aid; H2Oasis; Zephyr; Splitting Edge)	Appaloosa Room
	10:30 a.m.-12:20 p.m.	Chemical Engineering Technical Sessions (Pyridine Recovery; Biofuel; Silica Removal; Economic Pyridine Recovery)	Borah Theater
11:00	11:45 a.m.	Leave for tour with team Cutthroat Energy	Silver Room
12:00	Noon-1:00 p.m.	Itron Centennial Luncheon (Hosted by Mechanical Engineering)	Silver & Gold Rooms
1:00	1:00-2:00 p.m.	Ray Hanson: Taking Engineering to the Next Level	Borah Theater
2:00	1:30-2:30 p.m.	Golden I Alumni Dessert (with the Dean)	Chiefs Room
3:00	3:00-4:00 p.m.	Schweitzer Engineering Laboratories Awards Reception	Micron Exhibit Hall
5:00	5:15 p.m.	ASME Sponsored Picnic (For sponsors, judges, faculty and staff)	Ghormley Park

Expo door prizes compliments of Vandal Athletics and University of Idaho Bookstore.

Exhibit Judging Criteria

Awards will be presented to the exhibits, posters and technical sessions that address selected important criteria in engineering accreditation. Exhibits will be judged based on interviews with team members. Specific criteria include thoughtful use of design methodology, knowledge of appropriate engineering standards and constraints, awareness of potential project impact on society and development of life-long learning skills in the course of the project.

Posters and technical sessions will be judged on the ability to communicate concepts to a technical audience. Specific criteria include clear statement of purpose, organization of supporting content, appropriate style/format of presentation and use of visual aids.

One People's Choice Award will be presented. This award is based on votes cast by all Expo registrants (including exhibitors) and has no specific criteria.

EXPO 2007 Steering Committee

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Roger Korus, Vice Chair
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Matt Strange, Director of Communications
Becker Gutsch, Biological and Agricultural Engineering
Tom Hess, Biological and Agricultural Engineering
David Drown, Chemical Engineering
Bill Junk Computer Science
Joe Law, Electrical and Computer Engineering
Steve Beyerlein, Mechanical Engineering

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TechHelp, University of Idaho,
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To learn more about Expo sponsorships,
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Design Expo Awards

Booth Awards

Four awards given \$200

Poster Awards

Two awards given \$200

Technical Session Awards

Four awards given \$200

People's Choice Award

\$200

Idaho Research Foundation

Innovation Awards

\$150

Two awards given

A Guide to Expo 2007

You'll notice this year's Expo features some exciting new additions. To help guide you through the exhibits and learn more about students, we've organized projects by subjects rather than departments. Each subject is represented with an icon throughout the program.

Icons also can be found on student name badges along with home-towns and majors. This will help you not only learn more about students, but where to find them in the Micron Exhibition Hall as well.

To locate a particular project, reference the map on page 7. These numbers will match corresponding ones from the project abstracts on pages 8-10 and 15-21.

A Guide to the Icons



Energy & Electronics



Land & Water Resources



Space Exploration & Beyond (misc)



Transportation & Technology

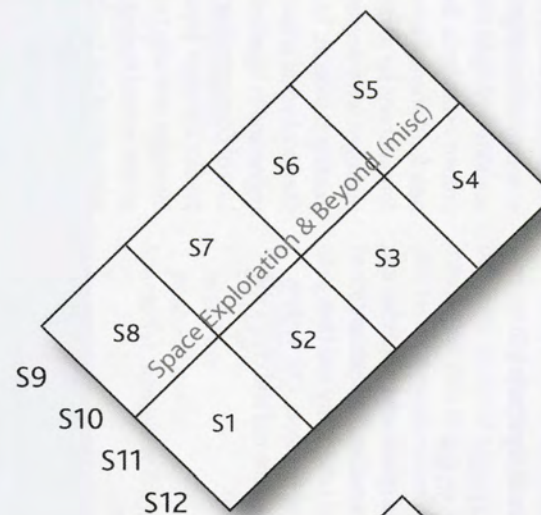
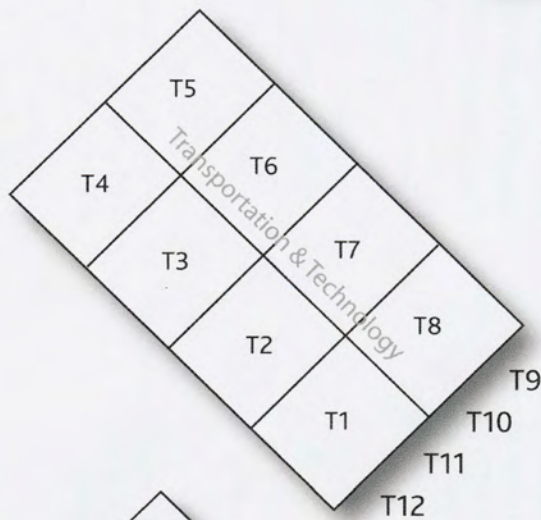
If you have further questions, contact someone with a green name tag or the Expo Information Desk located in the Student Union Building lobby.

Stage

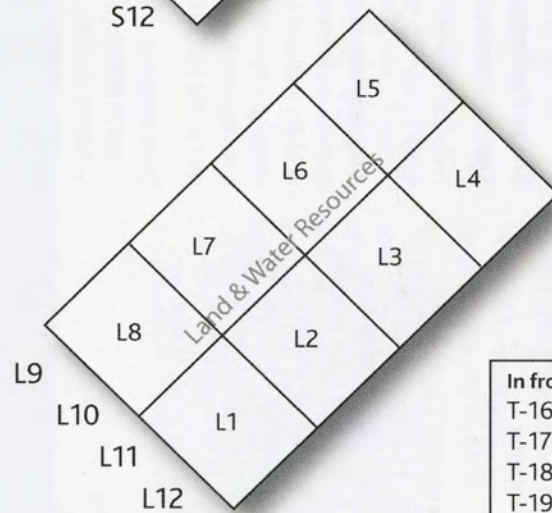
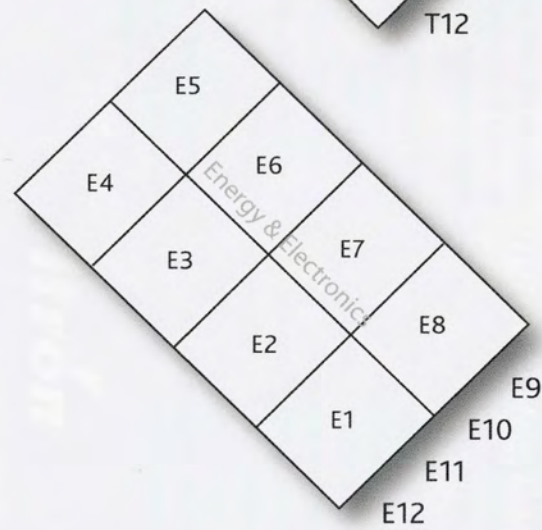
T14

S9

T13



T15



- | |
|------------------|
| In front of SUB |
| T-16 |
| T-17 |
| T-18 |
| T-19 |
| In Gauss-Johnson |
| E-13 |
| E-14 |

Engineering Design Expo 2007 Micron Exhibition Hall





Energy & Electronics

Bio-Fuel Production from Cattle Manure Utilizing Supercritical Methanol E9

Technical Presentation:
Borah Theatre - 10:30 AM

Cattle manure remains a problematic waste, however, it has great potential as a biofuel. Using a high-temperature, high-pressure reactor, this team exposed the manure to supercritical methanol, which resulted in creating a bio-fuel. An economic analysis of the process indicates tax subsidies would be required to make it feasible at the current prices of methanol and crude oil.

Team Members:
Aaron Cline
Robert Hoover
Jacob McCoskey
Brady Tucker
Matt Yahvah

Sponsor(s): University of Idaho
Department of Chemical Engineering,
University of Idaho Environmental
Research Institute, Pan-American Silver
Advisor(s): Dr. David Drown, Dr. Wudneh
Admassu, Dr. Armando McDonald, Dr. Ron
Crawford

Cutthroat Energy: Battery Management System E13

Technical Presentation:
Silver Room - 10:30 AM

Cutthroat is a fully autonomous, electric submarine, located in Bayview, Idaho. It is used for acoustic testing. During high velocity runs, the submarine's electrical system experiences a voltage drop and under certain conditions causes emergency protocol to interrupt testing. The goal of this project is to develop and evaluate possible supplemental voltage solutions for Cutthroat.

Team Members:
Chris Byrne
John Finley
Nicole Hochstrasser
Jim Klein
Doug Taylor

Sponsor(s): Alan Griffiths; Naval Surface
Warfare Center, Acoustic Research
Detachment
Advisor(s): Dr. Brian Johnson, Dr. Herb
Hess, Dr. Joe Law

Shear Performance: Fuel Rod Spacer Removal System E5

Technical Presentation:
Silver Room - 10:30 AM

A helically wound spacer wire needs to be removed from nuclear fuel elements at Idaho National Laboratory and then chopped into smaller pieces. Our system frees the wire from the rod and chops the wire in one motion.

Team Members:
Justen Bock
Alberto Castro
Richard Fries
Chris Johnson
Sponsor(s): Idaho National Laboratory
Advisor(s): Dr. Steve Beyerlein

Sleep Sound: Infant Monitoring Sleepwear E7

Technical Presentation:
Silver Room - 10:30 AM

This project incorporates a variable inductor embedded into sleepwear to detect stopped breathing of an infant, such as a SIDS event. A signal sent from the circuit on the clothing to a base unit sounds an alarm if no breathing movements are detected for a given time period.

Team Members:
Colby Austin
Chris Curtis
Lloyd Daugherty
Jennifer Hasenoehrl
Jeff Otto
Bart Semmler
Sponsor(s): Idaho National Laboratories
Advisor(s): Dr. Donald Elger
Mentor(s): Lloyd Gallup

New Fundamental Equations of State for Parahydrogen, Normal Hydrogen, and Orthohydrogen

Masters Thesis Defense:
Cataldo Room - 10:30-11:30 AM

The potential boom in the global hydrogen economy will strengthen the need for accurate hydrogen thermodynamic property standards. Based on these needs, new fundamental equations of state formulations for parahydrogen and normal hydrogen were developed to replace the existing standards. To accurately predict thermophysical properties near the critical region and in liquefied states, the Quantum Law of Corresponding States was applied to predict the vapor pressure curve for normal hydrogen and selected single phase data on the normal hydrogen surface. Once adequacy of the theory was established, pure orthohydrogen data were predicted and an orthohydrogen equation of state was developed.

Team Member:
Jacob Leachman
Sponsor(s): National Institute for
Standards and Technology (NIST), Richard
B. Stewart
Advisor(s): Dr. Richard Jacobsen, Dr. Steve
Penoncello, Dr. Thomas Bitterwolf

SPSMV: Synchronized Power System Measurement Visualization Tool E2

Last fall, a team started work on a project for Schweitzer Engineering Laboratories (SEL) to display data from Phasor Measurement Units around the world. This Spring, a team continued the project and produced a stable client that interacts with SEL's data server. The client package displays PMU data overlaid on a Google Map, allows the user to set data alarm levels, and stores the received data in a database to support future queries for selected data.

Team Members:
Andrew Brown
Brian Finnegan
Adam Lamar
Jeremy McLain
Sponsor(s): Schweitzer Engineering
Laboratories
Advisor(s): Dr. William Junk

Synchrophaser Visualization System E12

This project developed a visualization tool infrastructure that allows power system operators and engineers to see a graphical and diagrammatic representation of power system measurements, such as frequency and phasor angles taken from phasor measurement units (PMUs) all over the world.

Team Members:

Chris Abplanalp
Scott Carter
Luke Dupin
Patrick Swanson
Jon Woffenden

Sponsor(s): Schweitzer Engineering Laboratories

Advisor(s): Dr. William Junk

Mentor(s): Dr. William Junk

Team Protection: Transformer Testing Station E14

Technical Presentation:

Silver Room - 10:30 AM

Design a test environment to test the sensitivity of a microprocessor relay to internal transformer faults. Key to the test bed is the design of a transformer with internal tap able to survive fault currents plus test and measurement points. A safe, precisely timed mechanism for initiating faults and data collection was also designed.

Team Members:

Eevi Maki
Jared Mraz
Jacob Pomeranz

Sponsor(s): Schweitzer Engineering

Laboratories

Advisor(s): Dr. Joe Law

Mentor(s): Normann Fischer

Wireless Photovoltaic Monitoring System E11

Technical Presentation:

Borah Theatre - 10:30 AM

The wireless photovoltaic monitoring system measures actual power produced by a photovoltaic (PV)-inverter system and compares the measurement with the power that theoretically should be produced by the system. The monitoring system is compatible with 120V/60Hz or 240V/50Hz, utilizes wireless technology and displays the comparison on a LCD screen.

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Team Members:

Sean Mollberg
Blake Parkinson
Crystal Piekarski

Sponsor(s): University of Idaho Department of Chemical Engineering, University of Idaho Environmental Research Institute, Micron Technology, Inc.

Advisor(s): Dr. David Drown, Dr. Wudneh Admassu

Mentor(s): Dr. David MacPherson



Land & Water Resources

Boji Earthen Dam L10

The 10-15-year-old Boji Dam failed because of a 40 meter blowout. This team has designed a way to maximize storage in the reservoir, redesign the dam, improve the operational efficiency of the irrigation inlet and system, and construct catch basins for excess water.

Team Members:

Ace Clark
Amy Foster
Garrett Frei
Andy Heitmann

Sponsor(s): TerraGraphics Environmental Engineering Inc.

Advisor(s): Dr. S.J. Jung, Dr. Thomas Weaver

Clearwater Aid: Purification for Africa L6

Technical Presentation:

Appaloosa Room - 10:30 AM

Team Clearwater Aid is developing technologies for producing safe drinking water for the Maasai tribe in Kenya. Representatives from the team traveled to Africa for field testing and to build relationships with Maasai community leaders. Clearwater Aid will be displaying slow sand-filter technology and a kit for field testing of water quality.

Team Members:

Matt Aldrich
Gregory Contreras
Nicholas Mendenhall
Whitney Menzel
Mark Rogers
Diana Rudeck

Sponsor(s): Eric Morris

Advisor(s): Dr. Donald Elger, Dr. Tom Hess

Mentor(s): Lloyd Gallup

Economic Recovery of Pyridine from an Impurity Stream

Technical Presentation:

Borah Theatre - 10:30 AM

The goal of this project is to recover pyridine from an impurity stream for recycle back to the process. Several methods for the separation of the pyridine and 3-methylpyridine from the impurity stream are examined for the lowest processing cost that meets the targeted payback criteria.

Team Members:

Nick Gebert

Sponsor(s): University of Idaho Department of Chemical Engineering

Advisor(s): Dr. David Drown

H2Oasis: Water Catchment System L8

Technical Presentation:

Appaloosa Room - 10:30 AM

The Maasai are nomadic herders in Kenya that, during the dry season, suffer from dehydration and starvation while in search of water. Capturing water in ponds during rainy seasons will provide water at safe traveling distances. Well-designed catchment ponds in dry areas will store enough water to meet the needs of the Maasai, support vegetation that provides nutrition, shade, fire wood and evaporation control, and has areas for rest, grazing, and cultural activities. The ponds must be constructed of native materials, be self-sufficient, avoid adding any burden to users, and be cost effective to build and maintain.

Team Members:

Kristina Beaulieu
Morgan Bruno
Dan Funke
Jake Gano
Brandon Humble
Caitlin Sluder

Sponsor: Eric Morris

Advisor(s): Dr. Tom Hess, Dr. Donald Elger

Continued on page 15

University of Idaho

Celebrating 100 years of Engineering Excellence (1907-2007)

Boise State University

Idaho State University

CAES
Center for Advanced
Energy Studies

Idaho National Laboratory

University of Idaho



True Genius of Engineers

University of Idaho
College of Engineering

The true genius of engineers lies in their ability to relentlessly tweak an abstract concept until it functions in the real world, where unseen forces as diverse as gravity and common sense are at play.

Ideas are not subject to these forces. Their implementation decidedly is.

Engineers march bravely into that dark, formless place between idea and implementation and emerge with some really useful stuff, including biofuels; hybrid vehicles; clean water; batteries that last; automation of all ilks; nanotechnologies that redefine communications, keep our food safe and allow us to explore deep space; safe car seats for our kids; French fries; asphalt; prosthetics that grow with the children who wear them; even a glimpse at the weather on Saturn's moon, Titan.

In the past 100 years, Idaho engineering alumni, faculty and students have in fact contributed to the creation of all of these innovations, and to hundreds if not thousands more. In 2007, its centennial year, the University of Idaho College of Engineering salutes its more than 13,000 alumni, tips its hat to students and faculty, and recognizes the tenacity it takes to bring ideas to life.

A brief look at the college's history reveals that when you aim to change the world, 100 years represents a pretty good start.

College of Engineering Centennial

100 Years of Innovation

Idaho Engineering: Where We've Been

In 1907, the University's College of Engineering was established in cooperation with the College of Mines. In the following decades, administration and faculty forged a strong partnership with the Department of Public Works and began to focus their research on the challenges of planning, building and surfacing Idaho's roads.

"The early research focused on the development of concrete and road surfacing aggregates," recalls Sheila Janssen-Klages '53, daughter of then-Idaho student, and later dean of engineering, Allen Janssen '37. "In the 1930s and '40s, the University's materials lab was considered the top laboratory for the state of Idaho."



1898. College of Engineering students and faculty with surveying equipment on the old Administration Building steps.



1930s. Students from the engineering motor mechanics class worked on community members' vehicles in this lab.

In 1932, scientists split the atom, and changed the world forever. Meanwhile, on the Moscow campus, Idaho coed Grace Fenton also was changing the world, or more aptly, like all good engineers, tweaking it for fuller function: In 1938, Grace (Fenton) Roberts became the first woman graduate of the College of Engineering.

That same year, Jesse E. Buchanan—who received his degree from Idaho in 1927 and was the first to graduate with a perfect GPA—was named engineering dean.

In 1939, Germany marched on Poland and World War II began with hardly a ripple in the American consciousness, but when bombs fell on Pearl Harbor in 1941, the impact reverberated profoundly in Idaho. Male students, faculty, staff and administrators left in droves to defend the nation. In 1946, many of those who had left almost four years before returned to their University posts. Dean Buchanan, who served with the Army Corps of Engineers, was among them. He soon left the college to take the University's helm. Allen Janssen, fresh out of the Navy Seabees and a trusted colleague, was named dean.

College of Engineering

Ivan C. Crawford, C. E., Dean

THE University of Idaho College of Engineering was made a separate institution in 1911. Charles N. Little, its first dean, headed the college until 1923, when it came under the present incumbent, Dean Ivan C. Crawford. It now has four distinct departments fully equipped to give the students every advantage in learning the profession.

In civil engineering, there is a full equipment of field instruments with well-appointed drafting rooms, a complete cement testing laboratory and a 200,000-pound universal Olsen testing machine. A road-material laboratory equipped for testing both bituminous and non-bituminous materials has been provided and is available for the instruction of students and for the service of highway officials throughout the state in making tests needed in the course of road construction.

The electrical engineering laboratory is equipped to demonstrate the action of various types of generators, motors, converters, transformers, and other electrical apparatus by using commercial machines of convenient size. In addition to the photometric and radio laboratories, an electrical standardization laboratory is maintained.

The mechanical laboratory is equipped for experimental work on steam, gas and oil engines; on gas producer, air compressor, feed pump and heater, and injectors; on automobile motors, carburetors, ignition and starting apparatus. The chemical engineering laboratories

are not segregated from those of the Department of Chemistry. However, with the new Science Hall, the Chemistry Department has all necessary equipment.

The Idaho Engineer, a semi-annual magazine, published the first time, May, 1924, by

the students of the College of Engineering, has grown to have a thousand circulation. The magazine prints articles by Idaho graduates in the field of engineering, by national authorities, and reviews the engineering projects of the Northwest. Through its columns, students report research work done in the college and items that may be of interest to alumni.

Professors in the College of Engineering are: Carl Leopold von Ende, Ph. D.; J. H. Johnson, E. E.; H. F. Gauss, M. E.; J. A. Kostalek, Ph. D.; A. P. Ludberg, C. E.; F. W. Candee, M. S.; C. L. Farrar, B. S. (E. E.).

Instructors are: J. L. Hemmert, B. S. (C. E.); N. P. Bailey, B. S. (M. E.); I. N. Carter, B. S. (C. E.); and A. H. Knudson, B. S. (M. E.). Harry Frazier is the shop foreman.



1920s. College News

The war's end released a flood of returning GIs.

"After the war, you really had a different student," said Janssen-Klages. "Older, married and veterans, they were independent thinkers. They were, for example, not very interested in living in dormitories," she adds with a laugh. "It was a whole different atmosphere, and rather exciting."

In the 1950s, the college's main research focus was still highway materials, "though research in water resources was coming to the forefront," recalls George Russell '43, a longtime Idaho professor of civil engineering and former associate dean of the college.

In the '50s, the College of Engineering and its research grew. The Engineering Isotope Laboratory was built, as was a new research and teaching partnership between the University and Idaho National Engineering Laboratory (INEL), now Idaho National Laboratory (INL). The Kirtley Laboratory, later named the Gauss Building, and the Engineering Classroom Building, later renamed the Janssen Engineering Building, also were constructed during Janssen's tenure.

"Ultimately, the college's legacy is its graduates. Idaho has turned out many leaders in engineering, and continues to do so."

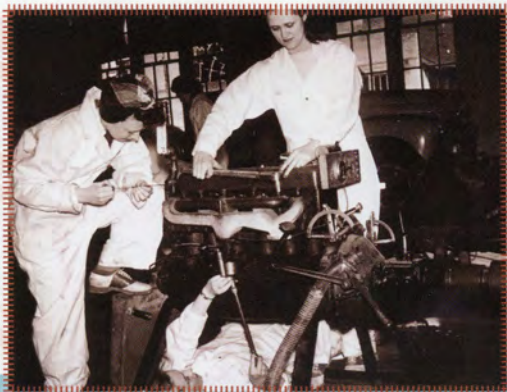
— Shleia Janssen-Klages

As the post-war economy boomed, the demand for University of Idaho engineering graduates intensified. Idaho graduates and faculty were actively sought by Boeing, Morrison Knudsen, Battelle, GE, Dow Chemical and other industry leaders willing to pay high salaries the University could not match. Janssen faced a daunting challenge in his search for new faculty.

The '60s and '70s brought radical social and technological change. The advent of the calculator and the computer revolutionized research and

curriculum in every field. "We had a big jump in the number of computer science students in the 1970s, and had quite a bunch of women students enrolled," Russell recalled.

Russell witnessed many changes in curriculum and research focus over six decades. By 1985, "There was increased exposure to humanities and social sciences, and a change in computational usage; computers changed the focus from numerical methods to graphical methods," said Russell.



1940s. Women's Auto Mechanic Course



1950s. The intermediate step between an idea and the actual building construction is putting the plan on blueprint.



1960s. An instructor is explaining to his students the IBM® Key Punch machine for punching program cards.



1970s. Idaho's internationally recognized biodiesel research program began in the 1970s.

One thing did remain consistent across the decades, the opportunity for talented undergraduates and graduate students to perform engineering research was available when Russell was an Idaho student and remains a unique and distinguishing trait of Idaho engineering today.

Russell saw the development of a broader range of research, growing through the 1980s, which included more emphasis on environmental issues, better use and conservation of natural resources, clean air and water, improved food handling, the search for alternative energy sources, and improved construction and building materials.

Idaho Engineering: YOU are HERE

In the new millennium, the college's faculty, in six departments and 10 research programs and institutes, conduct \$14 million in research annually and teach a broad range of topics, many of which cross departmental and disciplinary boundaries.

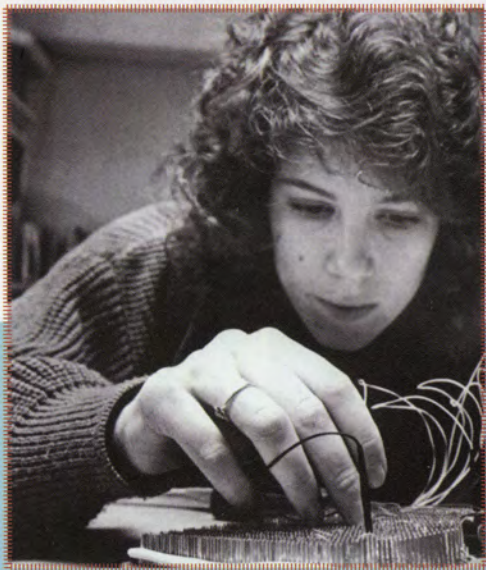
Current faculty and student research includes clean running snowmobiles; building a buoyant cement canoe; intelligent control of autonomous systems; ground, surface and waste water issues; transportation systems and infrastructure;

sustainable use practices and products, including biological herbicides and fungicides; soil dynamics; thermodynamics and energy; cloning; design and manufacturing; acoustics; bioscience; nanoscience and much more. To effectively achieve its research goals, partnerships have been forged internally, across disciplines, and externally, with industry and government.

In 2006, the College of Engineering celebrated yet another milestone by appointing its first female dean, Aicha Elshabini. Along with a lifetime technical achievement award in microelectronic engineering, Elshabini brought a microelectronic packaging laboratory, skilled faculty and students to run it, and several large contracts to fund it. This laboratory, the first in Idaho and one of only two in the Northwest, will provide leading multidisciplinary research opportunities to students from Idaho and around the world.

While research is important and keeps Idaho educators and their students on the cutting edge of their fields, it is just one reflection of the college's evolution and its impact.

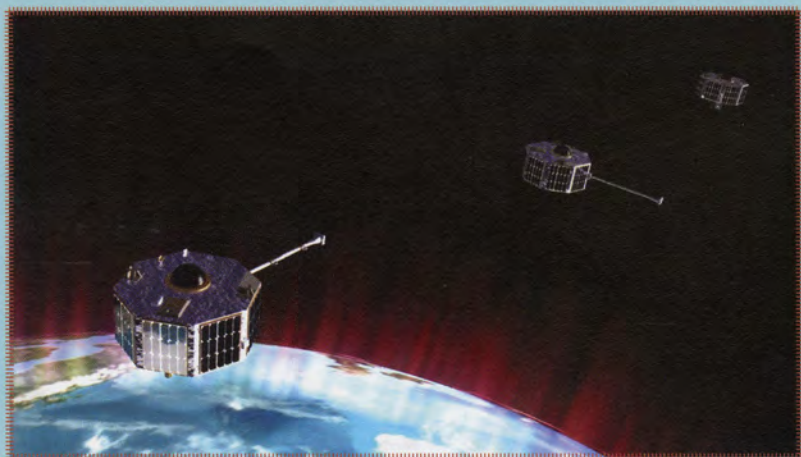
"Ultimately, the college's legacy is its graduates," said Janssen-Klages. "Idaho has turned out many leaders in engineering, and continues to do so." ■



1980s. Engineering expands to offer a degree in computer science.



1990s. Engineering/Physics Building is completed; engineering complex grows to five buildings.



2000s. Idaho researchers at the Center for Advanced Microelectronics Biomolecular Research develop low power solutions for NASA's orbiting micro-satellites.

Continued from page 10

Precision Till:

Fertilizer Distribution System L4

Most dry fertilizer is applied by depositing material at the bottom of the furrow. This project adapted a conventional air seeder for uniform fertilizer placement between 2-8 inches in a strip till application.

Team Members:

Ben Feider
Tyson Meeks
Tim Miller

Sponsor(s): USDA

Advisor(s): Dr. Steve Beyerlein

Pyridine Recovery and Separation of Organics from an Industrial Recycle Stream

Technical Presentation:

Borah Theatre - 10:30 AM

Pyridine is important in industrial organic chemistry as both a fundamental building block and as a solvent and reagent in organic synthesis. During the pyridine production separation process, useful

product is lost to various streams. Using separation technologies, pyridine and 3-methylpyridine can be economically recovered and purified.

Team Members:

Jim Erwin
Nick Jordan
Dieter Olson

Sponsor(s): University of Idaho Department of Chemical Engineering, Jim Erwin, Nick Jordan, Dieter Olson

Advisor(s): Dr. David Drown

Reduction of Waste During the Growth of Silica Nanowires L9

Experimental and computational methods are used to study the reduction of the amount of waste generated during the growth of silica nanowires. Recent work has shown uses for silica nanowires in biological applications, and the keys to commercialization are improvement of yield and reduction of waste during the vapor-liquid-solid growth process.

Team Members:

Noritoshi Araki
Ryan Culbertson
Brian Lassiter

Advisor(s): Dr. Keith Primbrey, Dr. David McIlroy

Sanitary Lift Station Replacement L12

The city of Moscow, Idaho, has an existing sanitary lift station where Highway 95 crosses the South Fork of the Palouse River. This project involves the replacement of the current 30 foot deep station. The deliverables include the design of a new station, site configuration, and logistics of retaining system operability during construction.

Team Members:

Christopher Horgan
Alexander Mockos
David Watkins

Sponsor(s): City of Moscow

Advisor(s): Dr. Erik Coats

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Silica Removal by Electrocoagulation from Inland Brackish Water L2

Technical Presentation:
Borah Theatre - 10:30 AM

The high silica levels in Inland Brackish water sources are a concern for Reverse Osmosis systems, causing fouling within the membrane system and limiting the recovery of fresh water. Bench scale testing has determined the optimum operating conditions for a continuous electrocoagulation system that will precipitate silica, preventing the fouling of the membrane. Full-scale design for a community of 200,000 and economics have been evaluated.

Team Members:

Jesse Bazley
Dusty Berggren
Tyler Vincent

Sponsor(s): University of Idaho Department of Chemical Engineering, University of Idaho Environmental Research Institute,

Pan-American Silver
Advisor(s): Dr. David Drown, Dr. Wudneh Admassu, Dr. Ron Crawford

Splitting Edge: Improving Simplot's Water Knife Sharpening System L5

Technical Presentation:
Appaloosa Room - 10:30 AM

Simplot currently uses a large amount of human resources sharpening the water blades used in their french fry plants. The goal of our project is to create an automated system and devices that reduce the use of human resources. This will also increase safety and productivity in the workplace.

Team Members:

Pat Beyers
Neal Bradshaw
David Polehn
Randall Storms

Sponsor(s): Simplot
Advisor(s): Dr. Steve Beyerlein
Mentor(s): Jason Sagen

Space Exploration & Beyond



Catalytic Ignition Temperatures of Propane-Oxygen Mixtures S10

The ignition of propane/oxygen mixtures over a platinum wire catalyst was studied in low Re flow regimes. Nitrogen is the diluent. Experimentally obtained ignition temperatures are compared with a finite element model. The model shows good agreement between calculated and measured average wire temperatures as a function of the rate of heat loss.

Team Members:

Bob Lounsbury
Sponsor(s): NIATT
Advisor(s): Dr. Judi Steciak

Computer Science Recruiting Tool S3

The University of Idaho's Computer Science Department has a problem: enrollment has declined. One solution to this problem

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outreach@uidaho.edu
(800) 824-2889

is to develop a tool designed to advertise and promote the Computer Science Department's program. This tool is to be accessible, interactive, aesthetically pleasing, and to the point.

Team Members:

Dylan Cone
Maksim Goleta
Jason Hoetger
Sarah Park
Chad Yates

Sponsor(s): University of Idaho Computer Science Department

Advisor(s): Dr. William Junk

Design and Fabrication of a Ballistic Gas Compressions Apparatus S11

The object of this work is to design and fabricate a ballistic gas compressor intended to verify the accuracy and calibration of piezoelectric pressure transducers used in closed vessel testing. A variable volume code has been developed to predict the internal pressures generated within the ballistic compressor to ensure structural integrity of the device

Team Members:

Russell Glass

Sponsor(s): National Institute for Advanced Transportation Technology

Advisor(s): Dr. Karl Rink

Project Reporting System 4.0 S9

The initial version of Project Reporting System was developed in Spring 2005, and this team has added more capabilities to it including automated support for Project Task Lists, Risk Assessments, and plotting of information contained in the defect data base. In addition the project has been investigating the integration of StatCVS code base tracking and the ability to monitor code base turmoil.

Team Members:

Justin Engler
Austin Holland
Nathan Larson
Bradley Olson
Levi Risky

Sponsor(s): University of Idaho Computer Science Department

Advisor(s): Dr. William Junk

Lunartics: Robotic Lunar Manipulator S5

Technical Presentation:

Silver Room - 9:00 AM

As part of a multi-university project sponsored by the Idaho Space Grant Consortium, our team has designed, built and tested a robotic prototype that collects soil samples and digs trenches in a lunar environment. The platform is flexible for future instruments and repair work

Team Members:

Matthew Blake
Jennifer Founds
Jason Giuffre
Aaron Goodin
Juergen Pfingstner
Victor Ponce

Sponsor(s): NASA Idaho Space Grant Consortium, Ames Research Center

Advisor(s): Dr. Steve Beyerlein, Dr. Dave Atkinson

Mentor(s): John Lacy

Powder Metallurgy S12

The project's goal is to compare UTS and Elongation as well as micro-structure under different heat treatment conditions in copper infiltrated steel. The intended application is for Climbing Equipment.

Team Members:

Lucas Fowler
Sean McCormick
Alex Struble

Sponsor(s): Western Sintering/Clayton

Advisor(s): Dr. Keith Prisbrey

Mentor(s): Dr. Bob Stephens

Terminal Velocity: High Velocity Descent Probe S1

Technical Presentation:

Silver Room - 9:00 AM

Construct a high velocity atmospheric descent probe for the sub-orbital reentry experiments (SOAREX) project at NASA Ames Research Center. The probe will be launched on an experimental rocket from Wallops Flight Facility to an altitude of 500km and released into free descent. During the descent, the probe will be tracked via radar to determine atmospheric parameters such as density, pressure, and temperature.

Team Members:

Josh Benton
Nathan Bialke
Sean Bradburn
Liana Garbowski
Robert Lane
Garrett Manfull

Sponsor(s): NASA Ames Research Center

Advisor(s): Dr. Joe Law

Mentor(s): Austin Howard



Founded in 1991 through a NASA initiative, the NASA Idaho Space Grant Consortium (ISGC) is one of 52 national consortia. It focuses on providing NASA research and educational opportunities across the state of Idaho. The ISGC is comprised of Idaho's nine colleges and universities, and the Idaho

National Laboratory, Idaho Academy of Science, Idaho Museum of Natural History, Discovery Center of Idaho, Idaho Mobile Space Station, Craters of the Moon National Monument and Preserve, Bruneau Sand Dunes State Park, Division of Aeronautics, Palouse Discovery Science Center, Idaho Science Teachers Association, Idaho Department of Education, TenXsys Inc., and the Warhawk Air Museum & NASA Space Place.

The University of Idaho College of Engineering coordinates the program in cooperation with the College of Education.

**Thermasense:
A Wireless Temperature Sensor
for Heat Shields S7**

Technical Presentation:
Silver Room - 9:00 AM

As a group we designed and tested a wireless system to be implanted into the heat shields of NASA space craft. This system will measure the shield temperature readings and will give NASA an idea of how close they are coming to the point of heat overload in the Thermal Protection System. The wireless technology will eliminate the need to create a hole for wires in the shuttle and increase safety and portability. This technology can be applied to nearly any spacecraft.

Team Members:

Daren Berk
Tye Reid
Justin Schlee

Greg Swanson
James Wagoner
Sponsor(s): NASA
Advisor(s): Dr. Joe Law, Dr. David Atkinson
Mentor(s): Austin Howard

**VAST: Vandal Atmospheric
Science Team S8**

VAST is a multidisciplinary program targeted at students from all departments in the College of Engineering, as well as Physics, Chemistry, Life Sciences, Education, and other departments. The goal of the Idaho VAST program is to develop the capability to design, build, test, fly, and recover high altitude science and engineering instrumentation. The project provides excellent experience for student participants in the areas of teamwork, documentation, communication, and various technical areas. To date, VAST has flown 10 times, reaching altitudes of over 100,000 feet.

Team Members:

Austin Howard (Director)
Nathan Bialke (Co-Director)

Team Leaders:

Dustin Fleener
Brandy Holmes
Justin Schlee
Jessica Smith
Rody Wilcox

Members:

Kelli Anderson
Charlie Blake
Blair Carter
Gabriel DeRuwe
Benjamin Edwards
Jeffrey Eggebraaten
David Eld
Joshua Gatherer
Evan Hart
Benjamin Kemery
Jeffrey King
Tim Konzek
Beth Madsen
Matthew Mihelish
Alexander Odom
Christopher Walker
Gabriel Wilson

Sponsor(s): NASA Idaho Space Grant Consortium
Advisor(s): Dr. Dave Atkinson

**Zephyr: Controlled Air Flow
Source Facility S9**

Technical Presentation:
Silver Room - 9:00 AM

This project's goal is to design an air flow source that will provide a controlled, uniform air flow in the range of 3-250cfm which will allow for accurate flow rate measurements and P versus Q curve generation (for CPU fan testing), as well as note variations in humidity, temperature, pressure, and viscosity.

Team Members:

Guillermo Conde
Charles Harding
Kelly Harkins
Matt Iriondo
Dima Myedvyedyev
Sponsor(s): Intel Corporation
Advisor(s): Dr. Donald Elger
Mentor(s): John Dugan

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AICHE Hydrogen Fuel Cell Car T13

Each year, the American Institute of Chemical Engineers challenges undergraduate students to create a model car that runs on alternate energy. University of Idaho Chemical Engineering students were able to create a hydrogen fuel cell, known as "Midnight Special." This fuel cell car runs solely on hydrogen and is something you don't want to miss.

Team Members:

Jeff Brown
Khara Hidalgo
Felicia Holmquist
Josh Hunt
Thor Kooda
Jeff Miller
Brittany Muntifering
Melissa Piekarski
Andy Weakley

Sponsor(s): College of Engineering,
Department of Chemical Engineering,
ASUI, Parents Advisory Board, University of
Idaho Students

Advisor(s): Dr. David Drown

ASCE Student Steel Bridge T15

Every year, the ASCE Steel Bridge Team works to design and construct a one-tenth scale steel bridge to compete at a regional and national level. Bridges are judged on deflection, construction speed, weight, and aesthetics and the University of Idaho has won past honors for strength, construction speed, economy and structural efficiency.

Team Members:

Cort Anderson
Jared Barr
Jared Bauder
Peter Degner
Brian Hansen
Dirk Hendricks
Christopher Horgan
Alexander Mockos
Kristyn Scott

Sponsor(s): American Society of Civil
Engineers

Advisor(s): Dr. Edwin Schmeckpeper

ASME: American Society of Mechanical Engineering T1

Today's ASME is a 120,000-member professional organization focused on technical, educational and research issues of the engineering and technology community. Locally our ASME organization, led by University of Idaho students, is focused on the younger generation of Mechanical Engineers; specifically their involvement in hands-on projects as well as increasing their knowledge of viable resources.

Team Members:

Kurt Hall (Chair)
Tyler Merritt (Vice-Chair)
Scott Firkins (Secretary)
Abraham Shryock (Treasurer)
Kirk Zielke (Activities Coordinator)
Mandy McGrath (College Relations)
Garrett Guinn (Webmaster)
Heidi Ness (Underclassman Representative)
Michela Moreland (Student Section

Representative – District D, North)
Advisor(s): Dr. Steve Beyerlein

Clean Snowmobile Challenge T16

Technical Presentation:
Gold Room - 9:00 AM

The UICSC team is comprised of graduate and undergraduate students. Our objective is to create a snowmobile that is clean and quiet, while maintaining the reliability and performance of a stock machine. Each year, we attend the SAE Clean Snowmobile Challenge, where our team's snowmobile is tested against many other universities' designs. This year, the team has begun the shift from design and manufacturing toward research and development. We are working on many different ideas for this year and those to come.

Team Members:

Ben Armstrong
Ben Birch
Dylan Dixon



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Alex Fuhrman
Rachel Geerlings
Brian Hanson
Nick Harker
David Polehn
CJ Stock
Christopher Tockey

Sponsor(s): NIATT

Advisor(s): Dr. Karen DenBraven

Mentor(s): Andrew Findlay, Justin Johnson,
Ben Hanks

Comparison of Modeling and Assembly Capabilities with SolidWorks and CATIA T3

Issues in solid modeling and assembling a 1/4 scale Offenhauser engine in SolidWorks and CATIA were explored during Spring 2007 as part of a technical elective in Advanced CAD. Both software programs are featured in the new Idaho Design and Engineering Analysis (IdeaWorks) Laboratory within Mechanical Engineering.

Team Members:

Edwin Anderson
Phil Arpke
Aaron Goodin
Ben Hanks
Chris Huck
John Lacy
Katie Lechlitter
Charlie Pecht
Jessica Sampson
Matt Smith
Matt Soden

Advisor(s): Dr. Edwin Odom, Dr. Steve Beyerlein

Macon Sheep Bridge Replacement T9

The Bureau of Land Management has requested a design for replacement or rehabilitation of the Macon Sheep Bridge, in Camas County, Idaho, in response to the damage caused by excessive flows. Required analysis and design include hydrologic, hydraulic, geotechnical, and structural disciplines.

Team Members:

Aaron Miller
Cort Anderson
Fred Gomez

Sponsor(s): J.U.B. Engineering

Advisor(s): Dr. Richard Nielsen

Mentor(s): Dr. Fritz Fiedler, Dr. Edwin Schmeckpeper, Dr. Thomas Weaver

Operation Charge: Hybrid HUMVEE T18

Technical Presentation:
Gold Room 9:00 AM

Our team converted a Humvee vehicle for hybrid electric operation by implementing an auxiliary power unit that converts diesel fuel to electric power. A portion of our team has designed a thermal management system for a battery box that accommodates advanced lead-acid batteries.

Team Members:

Edwin Anderson
James Anson
Tim Croyle
John Gossi
Chris Hester
Katie Lechlitter
Shingis Madakhmetov
Scott Nedrow
Evan Penberthy
Matt Reznicek
Seth Solbrack

Sponsor(s): Office of Naval Research

Advisor(s): Dr. Steve Beyerlein, Dr. Herb Hess

Mentor(s): Dan Cordon, Jason Redmond

RadSAT T4

This project involves integrating two existing pieces of software and enhancing their capabilities. It is designed to automate testing for electromagnetic radiation during FCC compliance testing. The primary goal of the system is to minimize human interaction, and generally decrease the overall processing time.

Team Members:

Jordon Hamad
Kristopher Watts
Nick Mattausch
Matthew Ziegler

Sponsor(s): Dr. William Junk

Advisor(s): Dr. William Junk

Smart Signals: Traffic Controller T14

Technical Presentation:
Gold Room - 9:00 AM

This senior design project is part of an ongoing research effort to create smart, scalable traffic signals built around distributed control architecture to improve

signalized intersection performance. The objectives of this senior project center on the creation of smarter, more pedestrian accessible intersection controls for experimental deployment at a local intersection. Capabilities include more accurate countdown times and remote activation for the visually impaired. A final objective is to design a monitoring system to log system performance during field trials.

Team Members:

Gabe DeRuwe
Adam Hieb
Bryan Humphrey
Dan Miller
Kyle Schiepan

Sponsor(s): NIATT

Advisor(s): Dr. Brian Johnson

Mentor(s): Dr. Richard Wall, Dr. James Frenzel, Dustin Devoe

Third Street Pedestrian Bridge T11

In the city of Moscow, Idaho, Third Street abruptly ends at Paradise Creek. The city has requested the design of a walkway bridge to span the creek in this location. There will be designs made for steel, concrete, and wood structures to provide the city with a variety of options

Team Members:

Brian Hansen
Dirk Hendricks
Marie Sorbel
Scott Sumner

Sponsor(s): City of Moscow

Advisor(s): Dr. Edwin Schmeckpeper

US-26 Glencoe Road Interchange Analysis T12

Due to current deficiencies at the interchange of Glencoe Road and US 26 in North Plains, Oregon, a transportation, geotechnical and hydrologic analysis were integrated to create an upgraded interchange for the project site. The focus of the project is on transportation issues, including interchange design.

Team Members:

Matthew Reeves
Craig Schoenberg
Anthony Wilen

Sponsor(s): Kittelson & Associates, Inc.

Advisor(s): Dr. Ahmed Abdel-Rahim, Dr. Roger Ferguson

US-91 North Corridor Plan T10

This project looked at a troublesome intersection in Pocatello, Idaho. The intersection of US-91 and Tyhee Road was labeled as a problem intersection after the US-91 Corridor Study. The goal was to develop a solution which would increase the level of service and safety of the intersection.

Team Members:

Uriah Jones
Adam Miles

Sponsor(s): Idaho Transportation
Department

Advisor(s): Dr. Michael Dixon

Vandal Pullers: Quarter Scale Tractor Pull Team T19

Technical Presentation:

Gold Room - 9:00 AM

Our goal is to design and build a 1/4-scale tractor to compete in the annual American Society of Agricultural and Biological Engineers Quarter-Scale Tractor Pull Competition held in the Midwest in late May. The tractor is being designed around two 16-HP, Briggs and Stratton engines and traction tires, as supplied by the contest sponsors, and includes a CVT for power transmission.

Team Members:

Trent Fullmer
Kurt Hall
Jerry Lane
Nick Marchant
Michela Moreland
Ryan Schwartz

Sponsor(s): University of Idaho College of Engineering, Departments of Mechanical Engineering and Agricultural & Biological Engineering, College of Agricultural and Life Sciences

Advisor(s): Dr. Tom Hess

Mentor(s): Phil Arpke, Chris Huck

Vandal Racing T17

Technical Presentation:

Gold Room - 9:00 AM

The Vandal Racing 2007 car was designed to boldly address perceived limitations in previous vehicles. These include reducing vehicle weight by 15 percent to approximately 430 lbs, reducing engine sound below 108 db, boosting engine torque between 7500 and 10,000 rpm, and decreasing driver workload associated with shifting, steering, and braking.

Team Members:

Eric Broncheau
Eric Brurud
Tim Chadwick
Ryan Colver
James Crisler
Theron Eixenberger
David Eld
Caitlin Flynn
Brandon Folk

Kyle Griner

Chris Harris

Kalen Hollinberger

Derek Johnson

Ben Kemery

Evan Kooda

AJ Lafrenz

Cody McCallister

Kameron McKeehan

Brandon Naddell

Charles Pecht

John Pierce

Justin Ruegsegger

James Sessa

Matt Soden

Greg Staszak

Cam Stefanic

Sponsor(s): University of Idaho

Advisor(s): Dr. Edwin Odom, Russ Porter

Mentor(s): Phil Arpke, Chris Huck, Charles Dean, Jason Sagen

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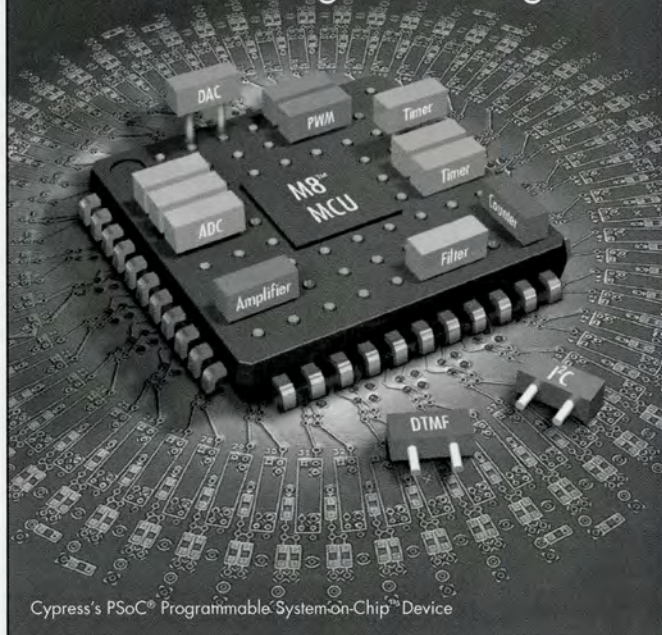
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3:00 PM Awards Presentations
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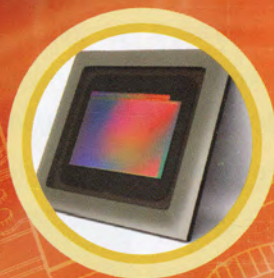
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