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Technovations in Transportation

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Formula Hybrid Champions

Vandal Formula Hybrid Racing Team Voltz N' Boltz Wins National Competition

by Rob Patton

After four days of competition and several hundreds of hours of effort, the University of Idaho's Vandal Formula Hybrid Racing Team returned from New Hampshire Motor Speedway winners of the 2014 national Formula Hybrid Competition.

The Vandal racing team – also known as Voltz N' Boltz – drove home with the competition's top prizes. The team earned the Chrysler Innovation Award, which recognizes innovative design and implementation, and the General Motors Best-Engineered Hybrid first place award, which is given to teams that demonstrate achievements in three categories: introducing new technologies and/or a remarkable implementation of existing technologies, making a positive difference and extraordinary vehicle balance.

In addition, the team placed second in the Skip Barber Teamwork Award, which is given to teams displaying the best overall collaborative teamwork skills.

Twelve teams competed in this year's hybrid division competition, including Yale University, the University of Michigan and Rensselaer Polytechnic Institute. Lawrence Technological University in Michigan placed second and Embry-Riddle Aeronautical University of Florida placed third, with Yale a close fourth.

In the midst of the 2014 Engineering Design EXPO opening ceremonies, Dean Larry Stauffer received news of the team's victory. To a crowded room Dean Stauffer read a quote from an email sent by the team's faculty advisor Dan Cordon.

"After all the pictures and celebrations, the team returned to the racing paddock to find representatives from both GM and Chrysler," said faculty advisor Dan Cordon. "The GM



team encouraged all of the students to leave resumes. The Chrysler team was there to personally invite every member of the team for a site visit and job interview at their headquarters."

Dean Stauffer added, "This win perfectly highlights one of the key features of Engineering Design EXPO, the collaborative effort between industry sponsors and our talented students and faculty. I am certainly impressed with the success of this team, their dedication and hard work to this project is evident by the recognition they received from GM and Chrysler."

The University of Idaho Formula Hybrid Team is composed of an interdisciplinary team of students including members of the mechanical engineering department: Jordan Anderson, Jonathan Andring, Derek Arrotta, Adam Bunch, Ignacio Lopez, Nathan Peterson, Bryan Tianiacos, Gillette Zenner and graduate mentors Mostafa Asfoor, Matt Kologi and Rory Lilley; Amos Bartlow from electrical and computer engineering; David Arnett from computer science; and Artemio Ambriz of the virtual technology & design department.

The team's faculty and staff advisors include: Professors Dan Cordon, Edwin Odom, Steve Beyerlein, Mike Santora, Herb Hess and machine shop manager Russ Porter.



"Last year the team experienced great difficulty integrating components at the last minute and eventually could not compete," said faculty advisor Steve Beyerlein. "FHSAE is one of the most complicated engineering competitions out there, challenging teams to integrate large-scale electrical and mechanical elements. This year's success is largely due to our failures last year and the tremendous improvements initiated over the summer and having resources in place.

The Vandal Hybrid racing team is sponsored by University of Idaho's National Institute for Advanced Transportation Technology's (NIATT), University Transportation Center (UTC), Transportation for Livability by Integrating Vehicles and the Environment (TranLIVE). TranLIVE is focused on developing technologies to reduce the environmental impact of the transportation system and funded by a grant from the United States Department of Transportation (DTRT12GUTC17). TranLIVE contributed funding for student travel, parts and other equipment for the Vandal formula hybrid vehicle.

"The Vandal formula hybrid team's victory is, once again, a testimony of the quality of our greatest asset, our students. Their technical abilities, exceptional team attitude, and intelligent integration of different vehicle components have certainly paid off. We are very proud of each student on the team and professor Dan Cordon," said Interim Director for NIATT Ahmed Abdel-Rahim.

Other University of Idaho sponsors include: The College of Engineering and Department of Mechanical Engineering, The University of Idaho Chapter of Engineering Students Advisory Council (ESAC-UI), Associated Students University of Idaho (ASUI), UI Facilities. The team is also very fortunate to be supported by University of Idaho FHSAE & FSAE alumni.

The Vandal Hybrid team relies heavily on support from several external partners including: Aurora

Bearing, Bayshore Systems, the Boeing Company, Cartesian Tube Profiling, DATAQ Instruments, Fastenal, Forest City Gears, Janicki Industries, Nelson Metal Technology Inc., Schweitzer Engineering Lab, UTS Systems and Wagstaff Engineering.



Founded and run by Dartmouth College, the annual Formula Hybrid Competition challenges college and university students to design, build, and compete high-performance hybrid and electric vehicles. Building on the Formula SAE program, Formula Hybrid competition adds an extra level of complexity: fuel efficiency. For more about the competition, visit www.formula-hybrid.org.

Pictured above: Hybrid Team members from left to right: Mostafa Asfoor, Amos Bartlow, Matt Kologi, Phil Petersen, Derek Arrotta, Jon Andring, and Dan Cordon (faculty advisor) enjoying seeing their faces on the cake (see inset for detail) at NIATT's end of the semester gathering and victory celebration.

In Memoriam: Michael Dixon

by Rob Patton



University of Idaho civil engineering professor Michael Dixon suddenly and unexpectedly passed away of an apparent heart attack May 7, 2014.

"It is with great sadness that we learned of Mike's passing. He was in the prime of his career, he was a well-respected colleague and researcher and inspiring instructor, and his passing is a great loss to the university community. Our thoughts are with Mike's family at this difficult time," said Larry Stauffer, dean of the College of Engineering.

Michael Dixon was a professor in civil engineering at the University of Idaho since 2000 and a licensed professional engineer in Idaho since 2004. He was promoted to full professor earlier this year. Mike earned his Ph.D. degree in civil engineering at Texas A&M University and his master's and undergraduate degrees from Brigham Young University.

Mike was a vital part of the University of Idaho's transportation research team working within the National Institute for Advanced Transportation Technology (NIATT). Mike's research focused on emerging traffic detection techniques and technologies, intelligent transportation systems and transportation systems modeling. He was an active member of the Transportation Research Board's Committee on Highway Capacity and Quality of Service, and served in several leadership roles on that committee. He collaborated with a number of researchers from around the U.S. and was highly regarded.

He was widely published and was an acting principal investigator on several large research projects. His grant work in progress included: Improving Pedestrian and Bicycle Safety by Identifying Critical Intersections and Street Segments; Modeling Passing Behavior on Two-Lane Rural Highways: Evaluating Crash Risk under Different Geometric Configurations; and Daily Travel Feedback to Encourage Eco-Routing.

Mike taught several key courses on transportation engineering and traffic systems. During his time at the University of Idaho he developed several online training modules and instructional software tools to help students better understand traffic systems design. He was also the current advisor to

over 20 undergraduate and graduate civil engineering students.

Mike was both an avid cyclist and winter sports enthusiast and loved taking his family skiing in McCall. He and his children participated in the annual Seattle to Portland Bicycle Classic, one of the biggest recreational bicycle rides in the country. Mike and his family are members of the Church of Jesus Christ of Latter-day Saints. He is survived by his wife, Cecily, and their eight children.

Contributions can be made to the "Michael Dixon Donation" Zions National Bank. The fund is for his children's education. For more information you may contact Zions National Bank directly.

Faculty at a Glance

by Heloise Abtahi



Armando McDonald, Ph.D., Professor, Biomaterials and Bioproducts

A New Zealand native, Professor Armando McDonald has been with University of Idaho since 2001. Originally a chemist and now working as a professor in the Department of Forest, Rangeland, and Fire Sciences, Professor McDonald now works with a diverse group of scientists investigating methods for producing biofuels. Working with Professor David McIlroy of the Physics department, Professor McDonald's current NIATT project looks at converting biomass into crude oil (or synthesis gas) and then catalytically converting that intermediate product into fuel. Initially, Professor McDonald and McIlroy's project gasified biomass in order to produce hydrogen and carbon monoxide and then used a catalyst to form hydrocarbons. But their current project uses wood that is heated to a lesser temperature than gasification requires and condenses the product into a crude oil called bio-oil which is then converted into fuel via the use of nanocatalysts.

Professor McDonald's fascinating work for NIATT as well as UI provides an ideal platform for graduate (and undergraduate) students to, as McDonald puts it, take "ownership" of their work and the project they are involved with. By providing goals and allowing students to actively participate in the development of a project, Professor McDonald strives to cultivate a learning environment in which students can not only receive an invaluable education, but also where they can develop problem-solving skills that will allow for a kind of practical experience. Professor McDonald believes NIATT is somewhat unique in that it allows for a student-centric environment that is still heavily invested in developing research, creating a student community that can become a productive part of the research community. Though he has always tried to make his research student-friendly, NIATT provides a particularly ideal platform for this kind of student involvement, allowing the cultivation of both practical skills applicable outside of the classroom as well as the skills to push and continually develop new research.



Steve Beyerlein, Ph.D., Professor, Mechanical Engineering

Professor Steve Beyerlein has been with University of Idaho since 1987. In that time, he has become an integral part of the College of Engineering as well as NIATT. Working primarily with engine testing and design methodology, Professor Beyerlein has worked closely with the Formula Hybrid project, the Clean Snowmobile project, and many other projects through NIATT. He has seen both the Clean Snowmobile project as well as the Formula Hybrid project through multiple generations of students and teams. Additionally, he has worked with students on projects for the UI Engineering Design Expo each spring, an event

which brings him in contact with an interdisciplinary group of students and faculty working on projects associated with NIATT. Professor Beyerlein also works with the IEW (Idaho Engineering Works), a group of graduate students focused on improving interactions between graduate students and faculty members. His work with the IEW has demonstrated the efficacy of the encouraging mentorship efforts between students and faculty, something NIATT has also consistently promoted.

Dr. Beyerlein believes that the efforts of NIATT to place some focus on undergraduate education and participation provides a unique opportunity for students to get and stay involved. Many undergraduates work on NIATT projects (either as an intern or as part of a senior design team) and eventually move into graduate work. The experience, Professor Beyerlein says, is an important one. "That model of graduate student mentors working with undergraduates on projects can make a lot of magical things happen... There's a whole cycle of... helping to recruit graduate students and then to train graduates to work with undergraduates." Professor Beyerlein works with a broad range of faculty and students in the College of Engineering, and he says NIATT is a great way for the students, especially to be involved with interdisciplinary work. Because NIATT is able to fund, either partially or totally, such a wide variety of students and projects, there are a lot of different things going on under the same roof. A great way, Dr. Beyerlein notes, to encourage the cultivation of a vibrant research community that is able to work together for a common goal. "In academia, we always want to give awards to individuals. But the truth of the matter is that the biggest accomplishments are done by more communities of people, not just by individuals."

Highlights of Spring/Summer 2014 Graduates

by Heloise Abtahi

Congratulations to NIATT's Graduating Students!



Pictured above: Some NIATT graduates for spring and summer (not all spring/summer graduates pictured). From left to right: Derek Arrotta, Jon Andring, Mostafa Asfoor, Amos Bartlow, Ryan Cook, Alex Grover, Ismail Cevik, Sherief ElBassuoni, Yimeng Wang, and Ryan McGrath.



Ismail Cevik, Ph.D. Electrical and Computer Engineering

Ismail Cevik has been a graduate student at University of Idaho since 2011, and graduated this May with his Ph.D. in Electrical and Computer Engineering. He has worked on a project with NIATT for the past year with Dr. Suat Ay developing a camera system for traffic control. Specifically, Ismail's group focused on the design of the camera chip itself. Though he has not had a great deal of experience working with NIATT, his experience within the past year has been a good one. He says of NIATT: "They don't push you...they let you work freely." Ismail sees this as a rare attitude in the research world, and says that NIATT's more results-based approach makes it a very nice place to work.

While working with a senior (undergraduate) design team on traffic-control software, Ismail enjoyed working with a wide range of students towards a common goal. He says his priority is academics, and he would eventually like to teach in his home country. Still, he says he values gaining experience outside of the academic world so that he can bring a broader perspective to his students. Looking back on his graduate career, Ismail wishes he had found NIATT sooner so that he might have been able to push his work a bit further before his graduation. His main recommendation to new and incoming students? Get involved with NIATT as soon as possible!



Riannon Heighes, B.S. Civil Engineering

After graduating with her B.S. in Civil Engineering this May, the first place Riannon Heighes is headed is Bolivia. As a part of the University of Idaho chapter of Engineers Without Borders, Riannon will help to develop a drinking water system for a small community. At UI, Riannon has worked in close proximity with NIATT as an intern for TranLIVE, working with Professor Ahmed Abdel-Rahim to study vehicle emissions. For her, working with NIATT has been a "big learning experience" that allowed her to work closely with teachers and get involved with their work. Riannon, like many undergraduates involved with NIATT, sees the opportunities NIATT provides as a chance to be involved in a learning experience usually only available to graduate students. By working closely with professors on their projects and being able to participate in part of the research, Riannon says NIATT's unique brand of student involvement promotes an interest in undergraduates that might not otherwise be cultivated. Indeed, it is because of the great experience she had with NIATT that Riannon will be returning to UI for her Master's degree focusing in transportation.



Ryan Cook, B.S. Mathematics and Civil Engineering

After working as an undergraduate intern for NIATT for two years, Ryan Cook has now graduated and is moving into the job market. Though he plans to find work as an actuary (he double majored in Mathematics and Civil Engineering), Ryan wants to keep the door open to work in Civil Engineering, something that is due in no small part to the quality of his experience with NIATT. Not only was Ryan able to gain valuable job experience to build up his resume, he was also able to work closely with his professors on graduate-level research. He worked with Professors Michael Dixon and Michael Lowry on developing methods of collecting high-resolution traffic data. In particular, Ryan was able to work with VISSIM in order to create simulation models needed for the larger project. His internship experience, he says, was on par with that of a graduate student, allowing Ryan to gain a significant edge in terms of his education. He gained a good deal of programming experience because of his work with NIATT, and says that more undergraduate students should seek to involve themselves with NIATT.

Mike Lowry Awarded Outstanding Young Faculty Award

by Heloise Abtahi



Assistant Professor Mike Lowry, Ph.D., has been with University of Idaho since 2009. Recently, he was awarded the 2014 Outstanding Young Faculty Award in the College of Engineering. This is an honor Dr. Lowry does not take lightly—his commitment to honing his teaching abilities is a serious one. When asked how his perspective on teaching has changed since he arrived at UI, Lowry said he had mainly come to realize the importance of taking plenty of time to be available for his students. Over the past few years, he has worked with undergraduate and graduate students on a variety of projects, and open communication and availability have consistently yielded results for Lowry.

Because he is a younger faculty member, Lowry says he does feel that this helps students see him as a bit more relatable. Though the student/teacher relationship is still there, he says, there is a sense of friendliness that allows him to offer grads and undergrads alike a lot of helpful guidance. In terms of his overall teaching philosophy, Lowry emphasizes the importance of engaging students through both the use of real-world examples and current events/research in the classroom as well as his friendly yet professional manner. It's a bit of a balancing act, but Lowry continues to develop his teaching style by reviewing not only his original philosophy, but also his students' feedback.

Dr. Lowry holds a somewhat unique appointment at UI in that his position is shared across two programs: Civil Engineering and Bioregional Planning (a part of the College of Art and Architecture). This has allowed and encouraged Lowry to bring a consistently unique and mindful perspective to his work. Again, this can be a bit of a balancing act, but Lowry says an interdisciplinary approach is beneficial. Though there is value in the depth and focus that a singular discipline might bring to a project, Lowry says there is a great deal of value in evaluating a problem with a variety of perspectives in mind. In his current work for NIATT, Lowry is working on creating tools to help communities become more bicycle and pedestrian friendly.



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