



FORMULA SAE MICHIGAN

SPONSOR SKILLSHOPS

Wednesday, May 8, 2019

AVL

9:45 – 11:15 a.m.

Suite 216

Performance Trade off Analysis

What if decisions for your next car will be made on objective numbers rather than subjective feedback from previous team members? Using simulation tools early in the development process can help to speed up the development significantly. Not only that, if done in a structured way it can help vehicle performance on track and justify your design decisions. AVL will present a process on how to focus the development of your car on the “right” technical measures using a virtual environment.

Presenter: Thomas Mueller-Werth, Group Leader - Vehicle Engineering

ZF

9:45 – 11:15 a.m.

Suite 218

[0 to 60: From Formula SAE to Career - A dynamic panel of professionals discuss their career paths and experiences](#)

Only one year ago Justin Rujan and Filipp Balayev were where you are today – tirelessly building and perfecting their cars as part of University of Michigan – Dearborn’s Formula SAE team. Justin and Filipp learned valuable technical and leadership skills as they helped build, compete and manage multiple top 10 cars. They carried these engineering skills and experiences past graduation and into their careers. Today, they are both calibration engineers within ZF’s powertrain group.

Eric Shelleman earned his degree from Clemson University and honed his skills in the university machine shop. Now as a part of the ZF Race Engineering group, Eric develops, produces and distributes ZF core products in the field of driveline and chassis technology for race car applications to various motorsport series around the world. Eric’s basic introduction to chassis tuning and setup, will focus on dampers – giving Formula students an understanding of the role of dampers in a race chassis.

Attendees will gain tips and lessons learned on finding the right job to start a career, and what it’s like to work for one of the world’s largest automotive suppliers.

Presenters: Justin Rujan, Automatic Transmission Calibration Engineer, Formula SAE Alumni, Filipp Balayev, Automatic Transmission Calibration Engineer, Formula SAE Alumni, Eric Shelleman, Product Design Engineer, Motorsport Dampers



FORMULA SAE MICHIGAN

SPONSOR SKILLSHOPS

Wednesday, May 8, 2019

MathWorks

10:00 - 11:30 a.m.

Suite 215

[Success in Formula Student – How Modeling and Simulation can help!](#)

Modeling and Simulation help you gain insights into your design while saving time and money! Learn how MathWorks tools can help you model systems, optimize and tune designs and win! This session will introduce you to using different MathWorks tools such as Simulink, Simscape and Powertrain Blockset for application areas like suspension tuning, vehicle modeling, tire modeling, etc.

Presenter: Connell D'Souza, Student Competition Technical Evangelist

MAHLE Industries

10:00 - 11:30 a.m.

Suite 217

[Piston and Ring Pack Development for Modern Passenger Car Engines](#)

This would include gathering customer requirements and target setting, R&D, design, simulation, validation testing and production.

Presenter: Paras Sethi

Siemens

12:15 – 1:45 p.m.

Suite 216

[Downforce CFD Simulation Best Practices & Composites Cost-Reduction](#)

Brief overview of Siemens & Mentor automotive engineering software packages & how to get no-cost software, no-cost online training & tech support to power your team's success. Carbon Composite Cost & Labor Saving Techniques Want to save up to 40% of your carbon fiber costs and save fabrication time? To be competitive at the highest level, your car needs weight-saving carbon composite for your downforce package and chassis. Instead of finding manufacturing flaws after costly fabrication, use a unique fabrication-simulator to find and fix flaws at design time, to save precious \$ cost and labor with real-life examples from a leading FSAE team. Also learn about integration with Finite Element Analysis (FEA) for strength optimization as well as CNC ply-cutters. Illustrated with Fibersim software. Best practices for aerodynamics downforce design with CFD simulation. Learn how to be more efficient at improving aero designs, increase accuracy. Enable more experiments to optimize downforce versus drag and decrease lap times. Learn how STAR-CCM+ can help you speed through typical struggles associated with CFD (cleaning/swapping CAD, meshing, etc) so you can test more designs. This includes an overview of the software and available online training content, along with demonstrations.

Followed by Q&A and grant application forms how-to.

Presenters: Leigh Anderson, Business Development Manager Student Competitions Worldwide and Chris Penny, Academic Competitions Program Manager - N.America & CFD Instructor



FORMULA SAE MICHIGAN

SPONSOR SKILLSHOPS

Wednesday, May 8, 2019

Altair Engineering

12:15 – 1:45 p.m.

Suite 218

[Improve the aerodynamics of your vehicle](#)

Join Altair in learning how Virtual Wind Tunnel application can be used to accurately and easily understand the aerodynamics of your vehicle. We will be doing a live demo and training to show how to set up your model for best results. First 30 students to attend will receive a wireless charger

Presenter: Nicolas Zagorski, Senior Project Engineer and Specialist

Cooper Tire & Rubber Company 12:30 - 2:00 p.m.

Suite 217

[Vehicle Dynamic Testing – Use of Testing for Vehicle Design](#)

For many Formula SAE teams, vehicle testing ends up as an afterthought. In the testing that does happen, the idea of whether the car is drivable or controllable is usually lost in the myriad of reliability testing. So, while reliability is critical, the vehicle also has to be designed to be operable by a human driver. Similar to how factors of safety are design goals for reliability, handling goals can also be design goals. This presentation will cover fundamentals of vehicle handling related to human perception, simple testing procedures such as skidpad and slalom, and use of data from vehicle testing and tire testing to tune handling of the current car and set design goals for future cars. The presentation will also cover some simple simulation tools that can be used to quickly evaluate high level handling design goals. Finally, the presentation will address using a 'systems engineering process' to plan vehicle design.

Presenters: Alex Jones – Original Equipment Test Development Engineer and Evaluator and Bennett Norley – Vehicle Dynamics Engineer

Cummins Inc.

2:00 – 3:30 p.m.

Suite 216

[Transmission Integration and Designing Tractive Force](#)

This skillshop will cover topics related to transmission integration and will include discussion addressing Formula SAE transmission design related to vehicle tractive force. The following aspects will be discussed: topics on engine/transmission integration, transmission construction, engine/transmission performance analysis, and designing tractive force.

Presenter: Gabriel Moreno, Transmission Integration Subject Matter Expert



FORMULA SAE MICHIGAN

SPONSOR SKILLSHOPS

Wednesday, May 8, 2019

Dassault Systemes Solidworks 2:00 – 3:30 p.m. **Suite 218**

[Fine Tuning with SolidWorks](#)

Come in and learn what's new in SolidWorks for 2019. Do you have questions about Design, Simulation, PDM, PCB, Electrical? Join us to find the answers.

Presenters: Ryan Koehler and Mike Sande

Stanadyne LLC 2:15 – 3:45 p.m. **Suite 215**

[Accelerating Product Development Cycle Through Analysis Led Design, Advanced Reliability and Failure Analysis Techniques](#)

In designing and testing your vehicle for Formula SAE, you likely encountered failures or experienced situations that did not go as planned. Reliability is an essential aspect of any product development and getting it right the first time is an exceptional challenge all on its own. Attend this workshop to learn the advanced techniques that are used by the best automotive companies in the world to predict, test and correct potential failures ahead of production, reducing the length of the overall development cycle, and minimizing the risk and cost of a product development project. The sophisticated techniques you will learn during this session include analysis led design, advanced reliability methods, failure analysis methods, and how the combination of these three tools will lead to a versatile and well-designed product. We'll show you real-world examples that highlight the tools you'll need to predict potential weaknesses in your designs, eliminate issues early in the design cycle, and understand and solve the development failures that do happen.

Presenter: Angie Cheung, Chief Metallurgical Engineer

MacLean-Fogg 2:15 – 3:45 p.m. **Suite 217**

[Engineering Basics of Threaded Fastener Design and Analysis](#)

This skill shop will give the basic overview of fastener engineering including design, function, materials, common failure modes and applications. Additionally, a discussion of locking fasteners, why they are needed, the different types of locking fasteners, and how they function will be addressed.

Presenters: Ken Rimatzki ME, MBA, CFS, Senior Application Engineer, Fastener Components, MacLean Fogg Component Solutions, Chesterfield, MI and Kyle Kapa MET, MSEM, CFS, Senior Application Engineer, Fastener Components, MacLean Fogg Component Solutions, Chesterfield, MI



FORMULA SAE MICHIGAN

SPONSOR SKILLSHOPS

Wednesday, May 8, 2019

Siemens

3:45 – 5:15 p.m.

Suite 216

[Downforce CFD Simulation Best Practices & Composites Cost-Reduction](#)

Brief overview of Siemens & Mentor automotive engineering software packages & how to get no-cost software, no-cost online training & tech support to power your team's success. Carbon Composite Cost & Labor Saving Techniques. Want to save up to 40% of your carbon fiber costs and save fabrication time? To be competitive at the highest level, your car needs weight-saving carbon composite for your downforce package and chassis. Instead of finding manufacturing flaws after costly fabrication, use a unique fabrication-simulator to find and fix flaws at design time, to save precious \$ cost and labor with real-life examples from a leading FSAE team. Also learn about integration with Finite Element Analysis (FEA) for strength optimization as well as CNC ply-cutters. Illustrated with Fibersim software. Best practices for aerodynamics downforce design with CFD simulation. Learn how to be more efficient at improving aero designs, increase accuracy. Enable more experiments to optimize downforce versus drag and decrease lap times. Learn how STAR-CCM+ can help you speed through typical struggles associated with CFD (cleaning/swapping CAD, meshing, etc) so you can test more designs. This includes an overview of the software and available online training content, along with demonstrations.

Followed by Q&A and grant application forms how-to.

Presenters: Leigh Anderson, Business Development Manager Student Competitions Worldwide and Chris Penny, Academic Competitions Program Manager - N.America & CFD Instructor