



SOLAR CAR CONFERENCE 2023

Equipping solar car teams for the Formula Sun Grand Prix and the American Solar Challenge

CONFERENCE SESSIONS

Altair Optistruct for Accurate & Efficient Simulation of Laminated Composites

Kory Soukup (Altair)

This presentation is intended to provide an overview of the composites model-build workflow using Altair Hyperworks. We will show the basic concepts of modeling a composite laminate using a simplified ply-based approach. Material characterization/homogenization, ply definition, fiber orientation, draping analysis, classical lamination theory, and optimization prep are all topics to be covered. In-depth training for your team can be set up with an Altair Sponsorship <https://altairuniversity.com/sponsorshipapp/>

All About Braking

Brian Call

This session will cover a deep dive into braking systems - brake design, bleeding air out of hydraulic systems, what does "independent system" really mean, etc.

An Insider's Look at ASC Route Design

Byron Hopps & Gail Lueck

This session will explore how routes are determined for the American Solar Challenge. Get a peak behind the scenes of how the route development team goes from a general route concept to a detailed route book. Teams may wish to take some of these route design considerations into account when planning their own practice/training routes.

Basics for Mechanical

Brian Call & Bill Elliott

Hear directly from the mechanical inspectors on what your team needs to include in the Mechanical VDR to get a green. Basics of good mechanical design, including frame stiffness, center of gravity, and more will be discussed.

Battery Technology

Steve McMullen

This session will cover battery technologies and why we are using Lithium based technologies, New Technologies and their production status and new models and many of their characteristics will be discussed.

Best Benefits in the Business

Emma Deye

Having a strong cross-functional team can be the driving force in leading a team to succeed not just on the track, but also in your career post university. My time as the Business Team Lead on UKSC had a monumental impact on getting me to where I am in my career today. This talk will review how to recruit and retain individuals to lead and run your team's Business/Marketing, as well as the benefits that joining a business team can give you as an engineering student.

BPS

Dan Bohachick

Join a discussion of design and construction considerations for measurement and control of lithium battery protection.

Design for Electrical Reliability

Hai-Yue Han

TBA

Design of Composite Suspensions for Multi-Occupant Vehicles

Giangiacomo Minak

Design and manufacturing methods for composite suspensions will be shown, with a particular focus on composite springs.

Effective Leadership

Senait Nuguse

The goal of this session is to give you advice on how to be a more effective leader within your team. During the session, we will discuss leadership principles, tips specific to handling the challenges behind leading solar car teams, and advice on how to conduct effective team building.

Fundraising for Fun

Jason Nolte

This session will cover venture fundraising basics and how they might apply to solar car fundraisings. It is intended to be participatory. Those who may wish to attend are folks interested in or responsible for fundraising for the team, people interested participating in this discussion and sharing lessons learned, and those focused on the business/project management aspects of the team.

How to Build a Battery Pack

Steve McMullen

Characterizing cells why or why not, providing balancing, why or why not, & how to assemble the modules into a pack to make it last multiple rayce events. This session covers MSDS/PSDS and they provide along with how to find & interpret manufacturer's specifications and provides the do's and the don'ts to building a rayce pack.

Impound in Vehicle (Both Classes)

Evan Stumpges

Impound in Vehicle is becoming an option across both MOV and SOV classes starting with FSGP 2023. Teams who are planning to utilize this method are encouraged to attend this session to ask questions and learn more about our requirements and expectations for becoming certified for Impound in Vehicle.

Interconnects, Interfaces, and Interference: Designing a Reliable Electrical System

Byron Hopps

This session will discuss design considerations for solar car electronics, with an emphasis on common problems that keep teams off the road. Many teams have experienced unexpected challenges with flaky connectors disconnecting, radios interfering with other systems, things working on the bench but not the car, and wiring mishaps resulting in catastrophic damage. These can be minor annoyances or race-ending disasters. This talk aims to help teams identify common pitfalls and mitigate them before they become major headaches.

Late Night Regulations Discussion

Tyler Coffey

Join the Regulations Manager as we go over 2022 to 2023 changes, including the things changing in Rev B. Bring your regulations questions!

Legal Admin (Agreements, Insurance, and More)

Sharon O'Leary

The Team Participation Agreement and Proof of Insurance requirements can sometimes leave teams challenged in navigating this legal side of participating in FSGP/ASC events. Come to this session to get your questions answered regarding the Team Participation Agreement and Proof of Insurance requirements.

Lightweighting

Erik Larson (Altair)

In this session we will cover the optimization driven design process using Altair Inspire. We will be learning how to create/import geometry, then set up the model for topology optimization, analyze the design concepts generated and then recreate geometry for final design.

Maximum Power Point Tracking of Solar Array

Elmar Peters

This session will cover how to get the most power out of your array by selecting the optimal number of maximum power point trackers for your array, maximum power point tracking algorithms, how to use (smart) bypass diodes, and tricks to get more power out of your array while decreasing MPPT conversion losses.

Mechanical Q&A

Brian Call & Bill Elliott

Join this open discussion of all things mechanical - ask questions, get answers, and participate in the discussion.

Motion Analysis

Erik Larson (Altair)

The intention of this session is to give instruction on the details of building and correlating full vehicle MBD models, starting with basic input data. During this class, an introduction to basic vehicle dynamics terminology and concepts is presented.

MOV Scoring, Practicality, & Strategy

Evan Stumpges

Reviewing the MOV scoring formula, the practicality judging process, and open discussion of multi-occupant vehicle design and race operation strategies. Will also include time for discussion of potential future evolution of MOV scoring regulations.

MOV Scrutineering, Charging, & Energy Metering

Evan Stumpges

We've now had a few competitions with MOV scrutineering and for teams who have gone through it a time or two are hopefully starting to get an idea of what it takes to come prepared for this station. This session will cover some of the things that have tripped teams up in this station and provide recommendations for coming to the event fully prepared for metered MOV charging.

On-Road Operations & Navigation

Jake Herbers

This session will discuss how to safely and effectively race a solar vehicle caravan during ASC. Intra-team and inter-team communications, interfacing with observers & officials, safety protocols, important vehicle maneuvers, and real-life examples will be included. There will be a focused case study on Navigation.

Optimization & Strategy

Dan Bohachick

This session will cover an overview of factors and methods for establishing a decision framework in which your team can maximize benefits at each phase in your vehicle's design, construction, test, and race plans.

Project Management - Goals, Metrics, & People

Paul Park

How to set project goals and use the goal to make decisions & manage the team.

Shop Tour - ETS

ETS

Come take a virtual tour of the ETS Eclipse solar car shop followed by Q&A with the team.

Shop Tour - Principia

Brian Kamusinga

Come take a virtual tour of the Principia solar car shop followed by Q&A with the team.

Solar Car Aerodynamic Design

David Sims-Williams

This talk will outline the aerodynamic design of a solar car including both CFD and wind tunnel processes and what to look for in evaluating candidate designs. Interactions with other aspects of the design, such as packaging and array geometry will also be discussed.

Solar Car Arrays

Alain Chuzel & Linda Bozarth

Solar array fundamentals and more.

Solar Car Arrays Open Forum

Alain Chuzel & Linda Bozarth

Bring/submit your questions about anything solar car array related including how to build your own array.

Solar Car Driver Forum

Jonathan Mullen

Have you been a solar car driver? Are you thinking about being a solar car driver? Do you need to train your team's solar car drivers? This will be an open forum to discuss what it is like to drive a solar car in FSGP/ASC and how to prepare accordingly. There will be an open time for asking questions, sharing methods, and discussing issues.

Solar Car Driving

Monon Rahman

Driver selection can be a lot more than just choosing who can fit in the car. Discussion of what to look for from solar car drivers as well as info on basic data acquisition and analysis to help validate feedback and performance. Will also have a brief overview of the overlap between solar car racing and professional motorsports, what teams can learn from the industry, and possible career ideas for anyone interested in going pro.

Solar Car Leadership & How to Turn It into a Career

Sam Cheatham

A discussion about how to be a leader of a solar car team in order to succeed, and how to find work that you love once you leave the team.

Solar Car Project Budgeting

Linda Bozarth & Gail Lueck

Budgeting - don't let it overwhelm you! We will look at the "how to" of building and managing to a budget. Learn from both the project manager's and treasurer's perspective in keeping a project on budget.

Solar Car Teams and Startups: Parallels

Michael Srimongkolkul

Discuss lessons learned and experience from solar car and how it benefits working at a startup.

Suspension Design

Bill Elliott

This session will explore several elements of suspension design that should be considered including steering, ackerman, bump steer, and what is good and efficient suspension design.

Sustainability Discussion

Delphine Rey

Sustainability in Solar car racing: What is sustainability? How can teams practice sustainable design? How can FSGP and ASC promote sustainability?

Team Leader Roundtable

Jonathan Mullen (facilitator)

Join other student Team Leaders to discuss the topics that are on your mind. Topics may include general leadership of a team, working with officials, recruiting, and much more including specific challenges you are facing getting back to normal following the years of restrictions and uncertainty. This is an opportunity for those in team leadership roles to share and learn from others in similar roles.

The 13 Problems of Starting a Solar Car Team and Getting Your First Lap

Michael Srimongkolkul

The KU Solar Car Team (university of Kansas) started in November of 2017 and entered its first race at FSGP 2022. This presentation will cover the 13 biggest problems in chronological order of how the KU Solar Car Team started and competed for the 1st time. Many teams starting out face very similar problems and act as a resource towards rookie teams.

Track Q&A

Travis Hilton (HMP)

A representative from Heartland Motorsports Park (where FSGP 2023 is being held) will be available in an open "Q&A" format for any teams that have questions about the facility, track, garages, etc.

Using MATLAB & Simulink for Model Based Design

Sam Reinsel (MathWorks)

MATLAB and Simulink are used across the automotive industry for modeling and data processing tasks. This session aims to cover what the sponsored MATLAB license provides to teams, as well as different approaches to modeling that can be useful to teams. We will also briefly cover how to interact with hardware from MATLAB and deploy code to supported devices.

Writing and Architecture Embedded Software for Solar Cars

Jonathan Mullen

Every solar car needs embedded software; start working on it early! This session will discuss architecture choices that can help get your car on the road sooner and how to write software that won't keep you off the road or track at a competition.

Sessions as of 12/23/2022. Sessions are subject to change.