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Title	Speaker	Abstract	Presentation	Recording
Battery technology update 2025	Yevgen Barsukov	This presentation gives an overview of New Battery Technology Development during last few years. The main technology trends are diverging into pursuing higher energy cells through either capacity increase or voltage increase. Both trends have seen some breakthrough developments, where Si-anode batteries with higher capacity finally appear on the market and need new algorithm developments. At the same time battery companies are focusing on cost reduction through replacing expensive Co with cheaper and more price-consistent Ni, Mn and Fe in cathode materials. Specially low cost LiFePO4 become most common, and LMFP is being introduced. Power Backup / Grid Management is becoming an important area where many chemistries complete. Sodium battery promises the lowest cost possible for grid and automotive. Some extreme long-living battery (million miles EV) has been demonstrated with single crystal NMC. Finally, futuristic technologies such as Li-metal cells with solid electrolytes are being tested in vehicles.	View	Will not be shared
Powering humanoids – battery monitoring and charging solutions for safe, efficient operation	Giovanni Campanella	As humanoid robots advance toward real-world deployment, efficient and safe energy management becomes a foundational requirement. These systems demand battery solutions that balance high power density, long runtime, fast charging, and advanced safety mechanisms—all within compact, lightweight form factors. This presentation focuses on two key components: battery monitors and charging systems. Devices like the BQ76972 enable precise cell monitoring, balancing, and protection, while chargers such as the BQ25756 support intelligent, high-efficiency charging. Together, they play a critical role in ensuring the reliability, safety, and performance of battery systems in humanoid robots.	View	Will not be shared
Battery gauging fundamentals – a primer for engineers	Evan Gonzalez	Are you a battery engineer new to gauge concepts? Do you want to learn how gauges work? The humble battery cell is a complex dynamic electrochemical component that requires advanced algorithms to determine the remaining capacity available at any given time for the specific conditions present in your system. Join this session if you are a new engineer working with gauges, or if you are looking for a refresher on gauge fundamentals.	View	Watch
Linear chargers explained – core principles and applications	Juan Ospina	Industry trends in personal electronics and wearable health have driven up the cost of real-estate on application PCBAs, requiring smaller and smaller charging solutions. Automotive safety-redundancy requirements demand secondary sources of power. Complex battery management systems have driven up the engineering resources required for implementation. Heightened signal fidelity standards require quieter EMI environments. Linear topologies provide advantages that can meet system requirements in low-power, space-constrained, engineering constrained, or noise constrained applications.	View	Watch

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Advanced battery gauging – mastering TI impedance tracking technology	Dominik Hartl	Have you mastered gauge fundamentals and are ready to get deeper into the concepts? This module will explain in detail how different TI gauging algorithms work based on battery cell characteristics. We will also cover the pros and cons between each of these algorithms, and how you can get to market faster.	View	Will not be shared
Battery charger fundamentals	Wyatt Keller	Before selecting a charger for any application it is important to understand the options available, and what the tradeoffs between them are. This presentation will cover the basics of battery charger topologies. It will also discuss the key feature differences between a charger and DC-DC converter, such as power-path control, battery safety, and input source detection.	View	Watch
How to develop an accurate gauging solution from start to finish	Jonny Trevino	This presentation will take you through the steps needed to bring a gauge from a TI evaluation module to production and functioning properly as you design your application. We will discuss chemistry ID selection, calibration, golden image creation and more.	View	Watch
Integrating a USB-C® controller into battery chargers	Khalid Bairuti	The recent EU and India mandates requiring USB-C® for personal electronics is driving a market shift toward widespread USB-C® adoption. A variety of end equipment do not need the full feature set of a USB-PD Controller to implement USB-C® charging, but instead only need USB-C® or USB-C PD negotiation and some key protection features like liquid detection. Combining the USB-C® / USB-C PD negotiation into the battery charger is the next major step in highly integrated charging solutions. This presentation goes into detail about the benefits of integrating USB-C® Detection and USB-C PD features such as Liquid Detection into battery charger products.	View	Watch
Comprehensive EIS solution for early fault detection, calibration accuracy, and system-wide health monitoring	Jiayi Li, Bassem Ibrahim	With new standards from GB (China) and NHTSA (USA) emphasizing early thermal runaway detection in EVs, a battery monitoring system enhanced by Electrochemical Impedance Spectroscopy (EIS) is more critical than ever. TI's new generation of automotive BMS monitors, including a full pack EIS reference design enables highly accurate EIS measurements of every single cell in an EV, with less than 1% error. By sensing the impedance characteristics of the cells inside the application, EIS can achieve: core temperature sensing of every individual cell, early fault detection and improve State of Charge and State of Health estimates. It will advance safety, capacity utilization and charging performance.	View	Watch
Power backup for critical systems	Ethan Galloway	A capacitor backup or “last gasp ” circuit provides a short boost of backup power for when the main power fails. A capacitor backup is a common requirement across a wide variety of applications and this is a critical need to make sure MCUs can shut down safely, volatile memory can be stored, safety doors can open, or to provide a small boost of power during a blip in the main power. This presentation is going to introduce backup charging solutions for different applications.	View	Watch

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Flexible hardware design and robust EMC/EMI performance in high voltage BMS applications	Wayne Liu, Quentin Silic	In high voltage BMS design, multiple battery cell configurations are potentially needed. Rather than developing separate designs for each variation, this presentation will outline how to minimize the number of BMUs, in the case of multiple cell configuration down to 4S, this reduces development, increases flexibility, reduces test time and simplifying manufacturing process. In addition, the application environment are often susceptible to electromagnetic interference (EMI/EMC) aggressor interference. This discussion introduces the commonly known EMI/EMC challenges and recommendations to reinforce the hardware design to be more robust against the stringent application environment, including improved circuit design, layout, added protection components/Bill of Materials, and component selection recommendations.	View	Watch
Versatile 3A charger solution for multimode applications in a compact package	Jeff Falin	The BQ2569x family is more than a low cost 3A up to 7S Li or super cap charger in a 4mmx3.5mm package. With 2 of these chargers in parallel, fast charging up to 6A can be reached in a small total footprint with distributed heat sinking (no PCB hot spots). In addition, in applications with two USB-C PD ports like power bank, one charger can charge (sink) while the other operates in reverse (sources). Having backup mode (i.e. fast turn on reverse mode) makes it a great fit for UPS and e call applications. With the addition of a small dual MUX chip like TPS2121, the charger can easily switch between solar and adapter/port power. Lastly, having both internal and external bypass mode capability means even higher charge and discharge currents are possible. This presentation provides examples and test results from each of these 4 applications.	View	Watch
Overcoming energy storage challenges – integrated battery monitoring solutions	Summer Huang	As the world looks to more renewable energy sources like solar and wind, technology capable of storing and distributing this energy is more important than ever. Energy storage systems (ESS) have increased in popularity as an answer, and the demand has grown for system solutions, particularly in battery management. This paper offers an overview of the battery ESS markets, system requirements and architectures, and our BMS products development targeted for ESS. We will also cover our reference designs with examples that help customer build safer and cost-effective high-voltage energy storage systems.	View	Watch
ESD protection simplified – design strategies for gauge compliance	Anthony Baldino	TI gauges often must pass board level ESD testing according to IEC 61000-4-2. This requires board level design considerations for both components and layout adjacent to the TI gauge. TI presents best practices and examples of component selection and layout decisions to pass standardized ESD testing.	View	Watch

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Using TI's FMECA tool – tailoring safety mechanisms for automotive and industrial applications	Felipe Garza	TI's Functional Safety Compliant products leverage our TÜV SÜD-certified functional safety hardware and software development processes to help our customers design for the highest Automotive Safety Integrity Level (ASIL) and Safety Integrity Level (SIL) in their applications. This presentation gives a quick general overview of the FMECA functional safety analysis technique, followed by instruction leveraging the TI FMECA spreadsheet tool to tailor safety mechanism implementation to meet customers' functional safety requirements.	View	Will not be shared
Maximizing run time with Dynamic Z-Track™ technology	Jose Couso	Dynamic Z-Track™ technology enhances state of charge and state of health accuracy under dynamic loads which helps extend run time in power tools and consumer devices. The session will explain the technology, present test results, and discuss applications with a comparison of traditional methods like Dynamic Z-Track™ technology.	View	Watch
Complex Device Driver - achieving automotive safety standards through flexible diagnostic software	John Du	How to utilize software solution to effectively achieve automotive diagnostics goals? With increasing functional safety requirement in automotive applications, software solution is being heavily relied on for achieving safety goals. This presentation discusses how to use the highly flexible and configurable software solution (complex device driver) to implement the diagnostics needed to be completed within the limited fault timing detection interval cycle time, to achieve the targeted ASIL standards. The Complex Device Driver can manage both monitoring and diagnostics tasks in parallel, while being incorporated onto customer's custom diagnostics needs.	View	Watch
Securing battery packs – how EU regulations are shaping cryptographic solutions in your BMS design	Kipp Hayes	In March 2022, the European Parliament passed Regulation (EU) 2023/1542, establishing new requirements for batteries and waste batteries. One key implication of this regulation is the increased emphasis on battery authentication, which is now a necessity for many designers. This presentation explores how these regulatory changes are impacting battery management system (BMS) design—particularly the role of authentication. We will examine a range of architectural options for implementing battery pack authentication, and take a deeper look at the theory and application of common cryptographic methods such as SHA-1, SHA-2, ECC, and future emerging techniques. Texas Instruments battery gauges have supported authentication for nearly two decades and offer a robust suite of tools to help you integrate secure authentication into your system.	View	Watch

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