

	Track 1	Track 2	Track 3	Track 4
<b>Registration and Demos Open at 8:45 AM</b>				
9:30 – 10:10	ST Time of Flight (ToF) Technology Overview	Avoiding Common Security Flaws Partner Presentation: Praetorian	Cloud Sensor Nodes with STM32	BlueNRG-2 based IoT node Hands-On Workshop: Learn how to jump start your next IoT design with the BlueNRG-2 Bluetooth low energy (BLE) SOC and ST sensors Hands-on training  (9:30 – noon)
10:20 – 11:00	Getting the Most Out of ST's Time of Flight products	Platform Level Security for IoT Devices	ST SmartTag : NFC Enabled Sensor Node	
11:10 – 12:00	Embedded Graphics Possibilities Using the STM32	Wireless Charging in Consumer Applications	How to Design a NFC Reader Application: a Step-by-Step Approach	
12:00 – 1:00	<b>Lunch</b>			
1:00 – 1:40	Unicleo GUI to Evaluate and Configure SensorTile	USB Type-C PD	Athlete monitoring area using LoRa and LoRaWAN Partner Presentation: RoweBots	STM32 Motor Control Hands-on Training Workshop  (1:00 – 4:30)
1:50 – 2:30	Understanding Bluetooth Low Energy (BLE) for Industrial applications	Power Over Ethernet	Overview of Vehicle-to-Everything (V2X) Communications	
2:30 – 3:00	<b>Afternoon Break</b>			
3:00 – 3:40	ST IPAD™ Technology: a Key Enabler for IoT Miniaturization	48V to Pol Direct Conversion	Teseo LIV3F GNSS Module for IoT Wireless Charging	
3:50 – 4:30	Low Power Microphone Acquisition and Processing for Always-on Applications	How SiC Can Boost Efficiency and Reduce Costs in Power Conversion		

# Technology Tour 2018

Austin, TX | April 18

Austin, TX



## Track 1 Abstracts

### **Introduction to ST's Time of Flight Technology: FlightSense™**

**Speaker:** John Kvam, STMicroelectronics

**Time:** 9:30 – 10:10 AM

ST has developed and patented its own technology, called FlightSense™, using Time-of-Flight (ToF) principles in order to propose a new generation of high-accuracy proximity sensors. In this session, attendees will learn how ST's Time-of-Flight sensor works, how to integrate it into their industrial design and understand key performance indicators. We will also go through an overview of the Evaluation Kit and supporting GUI during the session.

### **Getting the Most Out of ST's Time of Flight Products**

**Speaker:** John Kvam, STMicroelectronics

**Time:** 10:20 – 11:00 AM

A deeper dive into ST's Time of Flight technology.

### **Embedded Graphics Possibilities Using the STM32**

**Speaker:** Steve Miller, STMicroelectronics

**Time:** 11:10 – noon

Looking to add an intuitive graphical user interface to your next embedded design? Need to understand which displays can be used with a microcontroller: LED, LCD, Color TFT, or MIPI-DSI? Are you aware of the graphic tool kits available to quickly create graphical images and display them with your MCU?

In this session you will learn what options are available for displaying graphics using the STM32 family of microcontrollers. The presentation will cover:

- Graphic peripherals available within the STM32 family
- Common display types and resolutions supported
- Graphical tool kits and libraries available to assist in your next graphical user interface design
- Performance features available to fully optimize and improve STM32 CPU performance enhancing your next embedded design

An overview of the STM32 ecosystem showing available hardware, software and documentation necessary to realize your next graphics based embedded design will also be included.

### **Unicleo GUI to Evaluate and Configure SensorTile**

**Speaker:** Mauro Scandiuzzo, STMicroelectronics

**Time:** 1:00 – 1:40 PM

The ST SensorTile is a tiny, square-shaped IoT module that packs powerful processing capabilities leveraging an 80 MHz STM32L476JGY microcontroller and Bluetooth low energy connectivity based on BlueNRG-MS network processor as well as a wide spectrum of motion and environmental MEMS sensors, including a digital microphone. During this session, you will learn how to do fast evaluation and development based on SensorTile and UNICLEO GUI. Using UNICLEO GUI you can configure run time the sensors without debugger, without writing code in order to achieve a Fast Prototyping, reduce time to market in a plug a play small system solution. We will also give examples of how you can use the SensorTile platform to reduce the time to market using available HW, SW, GUI and algorithms.

## Track1 Abstracts - Continued

### **Understanding Bluetooth® Low Energy (BLE) for Industrial Applications**

**Speaker:** Hary Radakichenane & Raffaele Riva, STMicroelectronics

**Time:** 1:50 – 2:30 PM

This class will focus on the key challenges of designing Bluetooth® low energy (BLE) IoT nodes for Industrial applications. Range, reliability, security, and proximity detection are among the most important aspects in this application space. To effectively address them, three key technologies will be discussed in details: Bluetooth Mesh, BLE Beacons, and simultaneous BLE and Sub-GHz communication. Participants will learn how to understand their key performance indicators and how to leverage on ST solutions for developing their Industrial applications.

### **ST IPAD™ technology: A key enabler for IoT miniaturization**

**Speaker:** Andrea Tranchida, STMicroelectronics

**Time:** 3:00 – 3:40 PM

STMicroelectronics proprietary IPAD™ (Integrated Passive and Active Devices) technology is leading the way in reducing the footprint of peripheral electronics surrounding intelligent ICs. In addition to resistors, capacitors, and inductors, IPAD can also incorporate ESD diodes and TVS functions for high density protections, filters, and impedance matching circuits. In this discussion, attendees will learn how the broad ST portfolio can help reduce size and cost of their IoT devices.

### **Low Power Microphone Acquisition and Processing for Always-on Applications**

**Speaker:** Luca Spelgatti, STMicroelectronics

**Time:** 3:50 – 4:30 PM

This session will focus on the tradeoff between performance and low power consumption in embedded IoT platforms used for always on microphone acquisition. It will show different system architectures based on Cortex®-M microcontrollers, with one microphone acquisition and processing depending on the power budget and overall system performance, targeting always-on microphone acquisition as input for automatic speech recognition algorithms.

## Track 2 Abstracts

### **Avoiding Common Security Flaws**

**Speaker:** Matt Eble, Praetorian

**Time:** 9:30 – 10:10 AM

From thousands of hours of security assessments on IoT devices and ecosystems, the Praetorian team has identified a handful of common security flaws that appear over and over. This same set of flaws appears across industry verticals – critical infrastructure, medical devices, industrial automation, smart homes, vehicles – indicating that development teams are almost universally facing the same challenges. This talk will describe these common flaws, their causes, the impact, and best practices to avoid them. The goal is for a developer to walk away with a basic idea of how to avoid including these issues in their products entirely.

### **Platform Level Security for IoT Devices**

**Speaker:** Bob Waskiewicz, STMicroelectronics

**Time:** 10:20 – 11:00 AM

An essential requirement for any IoT device is its trustworthiness. In this session, using an example of a secure IoT platform, we'll explore implementation-techniques for protecting code, over-the-air updates, provisioning and tamper detection, being used in concert to establish a well-fortified platform.

## Track 2 Abstracts - Continued

### Wireless Charging for Consumer Electronics

**Speaker:** Paolo Battezzato, STMicroelectronics

**Time:** 11:10 – noon

Connecting technologies and deploying them in new cyber-physical environments extends the attack area in an ecosystem. Increasingly, providers are leveraging software-based mechanisms to control feature-enablement of their devices, leading to the question: How do you ensure the security and integrity of the IoT device? A unique, immutable and unclonable identity is the essential first step to securely verifying the authenticity of your devices. A strong hardware based root-of-trust is needed. Provisioning these strong identities at the hardware level allows for protection against identity spoofing and key compromise. This talk will showcase how time-proven PKI technologies along with key protection solutions like TPMs and PUFs can imprint a unique thumbprint, a Strong Device Identity to your IoT device and establish the needed trust within your IoT ecosystem.

### USB Type-C PD

**Speaker:** Greg Gosciniak, STMicroelectronics

**Time:** 1:00 – 1:40 PM

USB standard has evolved from a data interface capable of supplying limited power to a primary provider of power with a data interface. The new USB Type-C PD is now enabling a new ecosystem. Different use cases will be explained, showing implementations and major products involved.

### Power Over Ethernet

**Speaker:** Paolo Battezzato, STMicroelectronics

**Time:** 1:50 – 2:30 PM

Power over Ethernet (PoE) is a widely adopted technology used to transfer both data and electrical power over an RJ-45 cable. ST offers solutions for PoE applications, on the powered devices (PD) side, compliant with both the more recent IEEE 802.3at specification, commonly known as PoE+, and the former IEEE 802.3af (PoE). ST offers now solutions also for the most recent IEEE 802.3bt with power up to 99.9W with the PM8805 which is a system in package for powered devices (PD) applications within the PoE world. It embeds: two active bridges and their driving circuitry, a charge pump to drive high-side MOSFETs, the hot-swap MOSFET and the standard single-signature interface IEEE 802.3bt-compliant, including detection, classification, UVLO and inrush current limitation. The device targets the highest possible efficiencies with the smallest footprint providing the interface section of PoE switch mode power supplies and a PGD signal that can be used to enable a PWM controller, a DC-DC converter or a LED driver.

### 48V to PoL Direct Conversion

**Speaker:** David Bates, STMicroelectronics

**Time:** 3:00 – 3:40 PM

This presentation will present an IC chipset that allows a novel, multi-cells, multi-topology, direct conversion architectures from 48V/54V down to PoL (CPU, DDR, GPU, ASICs). This novel control scheme provides an attractive alternative to traditional power-distribution topologies using 12V input voltage for the point-of load conversion. The implementation of this direct conversion from 48V down to PoL eliminates the intermediate 12V rail used in the conventional power distribution architectures ensuring excellent results in terms of efficiency, flexibility and dynamic voltage management capable of withstanding the most aggressive digital load requirements. This chipset represents the “state of the art” alternative to the traditional approach no longer adequate for today's Data Centers power demand. Several key features are offered by this extremely flexible, multi-architecture, chipset and will be described in this presentation.

### How SiC Can Boost Efficiency and Reduce Costs in Power Conversion

**Speaker:** Jeff Fedison, STMicroelectronics

**Time:** 3:50 – 4:30 PM

Wide band-gap materials like Silicon Carbide (SiC) have long promised a dramatic leap in performance in power electronics. That promise has now become a reality due to ST's MOSFET and diode SiC power discretes. The session will describe how SiC allows engineers to improve power electronic systems in size, efficiency, and cost, and how many more applications than may be expected can benefit.

## Track 3 Abstracts

### **Cloud Connected IoT Sensor Nodes with STM32**

**Speaker:** Manuel Cantone, STMicroelectronics

**Time:** 9:30 – 10:10 AM

In this session, we will present the various solutions from ST to connect your IoT node to AWS IoT Core, Microsoft Azure IoT Hub and IBM Watson IoT. The IoT node will transmit sensor data and receive commands to and from Cloud services. These SW packages can jump-start any end-to-end IoT development, saving time in the integration of the different basic functions needed for a sensor-to-cloud development environment.

### **ST SmarTag: NFC Enabled Sensor Node – Hands On Training**

**Speaker:** Gianmarco Ferrari, STMicroelectronics

**Time:** 10:20 – 11:00 AM

ST SmarTag is a sensor node that can sense temperature, humidity, pressure, motion and transmit the data when triggered by an NFC reader. It can be scaled down based on requirement of several applications, ranging from supply chain, asset tracking to medical, smart apparel, packaging and agriculture. Participants will learn about the ST SmarTag reference platform and its deliverables to accelerate their own design.

### **How to design a NFC Reader application: a Step-by-Step approach**

**Speaker:** John Tran, STMicroelectronics

**Time:** 11:10 – Noon

This presentation will focus on the key challenges of designing a NFC reader application.

Product selection, Antenna tuning, Layout optimization, Read Range, Noise reduction, Power Consumption optimization, Testing and Certification are among the most important aspects in this application design space. Participants will learn how to develop a NFC Reader application leveraging ST High Performance Reader ICs and evaluation tools.

### **Athlete Monitoring Area Using LoRa and LoRaWAN**

**Speaker:** Kim Rowe, RoweBots

**Time:** 1:00 – 1:40 PM

This presentation will cover applications of offline power supply, running from American or European main voltage for a power level of up to 15 watts. Discussion will include application tricks to optimize EMI, efficiency, layout, standby power consumption and external component counts. ST's online design tool, the eDesign suite will be used to show various design iterations for 0-15 watts of AC-DC switch mode power supply.

### **Overview of Vehicle-to-Everything (V2X) Communications**

**Speaker:** Raed Shatara, STMicroelectronics

**Time:** 1:50 – 2:30 PM

Vehicle-to-Everything (V2X) Communications is a key technology for automotive safety applications based on Dedicated Short Range Communication (DSRC) technology. V2X communication is an obstruction resilient 360° secure channel that works in high mobility conditions and delivers performance immune to extreme weather conditions. An overview of V2X technology for safety applications and how these will provide greater levels of vehicle autonomy will be provided.

### **Teseo LIV3F GNSS Module for IoT**

**Speaker:** Mike Slade, STMicroelectronics

**Time:** 3:00 – 3:40 PM

Introducing the tiny Teseo LIV3F GNSS module for IoT applications. Ideal for compact designs requiring ultra fast time to market. Based on the popular Teseo3 GNSS chipset, and offers the same world class level of performance & configurability. LIV3F GNSS XNucleo board enables co-development with STM32, ST MEMs, and other XNucleo offerings.

## Track 4 Hands-on Training

### **BlueNRG-2 based IoT Node Hands-On Workshop: Learn how to jump start your next IoT design with the BlueNRG-2 low power Bluetooth Low Energy (BLE) System-on-Chip and ST sensors**

**Presenter:** Raffaele Riva & Francesco Doddo; STMicroelectronics

**Time:** 9:30 AM – 12:00 PM

This hands-on workshop will show you how to simplify the integration of sensors, low energy Bluetooth®-smart connectivity, a low-power microcontroller and sensor fusion libraries into your next IoT design using the SensorTile development kit.

The hands-on training is a working session. Please bring your laptop either a Windows Laptop (Windows 7, Windows 8, or Windows 10) or MacBook running Windows (Parallels, VM Fusion). Note that Administrator rights are needed for software and driver installation. ST will provide the required eval board and the companion software.

### **STM32 Motor Control Hands-on Training Workshop**

**Presenters:** Jeff Blauser, Pasu Raja, and Giovanni Tomasello; STMicroelectronics

**Time:** 1:00 – 4:30 PM

This session will present the STM32 ecosystem for advanced field oriented control (FOC) development of motor control applications with a hands on approach. First, we will review integrated motor drivers for driving solenoid, relay or motors (both 3-phase BLDC and Brush DC). Next, using the motor control Nucleo pack for the hardware and the new SDK v5.0, we'll explore how to characterize a 3-phase motor with the Motor Profiler and finally, walk through an improved development approach using the motor control workbench GUI with a workflow supporting the STM32CubeMX GUI configurator while using a motor control firmware library now based on the STM32Cube HAL/LL libraries. This will provide developers with an introduction to a full motor control ecosystem to implement the high-performance and high-efficiency solutions required for standalone and IoT applications of the future.

This is a hands-on training working session – please bring your laptop either a Windows® Laptop (Windows 7, Windows 8, or Windows 10) or MacBook running Windows (Parallels, VM Fusion, etc.). Note: Administrator rights are needed for software and driver installation. ST will provide the required Motor Control Nucleo Pack (P-NUCLEO-IHM002) and software.

SPACE IS LIMITED FOR THIS SESSION – FIRST COME, FIRST SEATED. Must be present, have a PC with administrator rights and stay for training to receive free kit.