

# 2023 NACAT Conference



## Agenda

### Monday, July 10, 2023

All events at the hotel  
 9:00 am - 12:00 pm: Registration  
 10:30 am - 11:30 am: First-Time Attendee Meeting  
 12:00 pm - 2:00 pm: Opening General Session, Keynote, & Lunch  
 2:00 pm - 2:30 pm: Break  
 2:30 pm - 4:00 pm Training  
 4:00 pm - 4:30 pm: Break  
 4:30 pm - 6:00 pm: Training  
 6:00 pm - 7:00 pm: Welcome Reception

### Tuesday, July 11, 2023

All events at Pasadena Convention Center  
 (transportation provided)  
 7:30 am - 8:00 am: Breakfast  
 8:00 am - 9:30 am: Training  
 9:30 am - 10:00 am: Break  
 10:00 am - 11:30 am: Training  
 11:30 am - 12:30 pm: Lunch and Exhibits  
 12:30 pm - 4:30 pm: Exhibits  
 4:30 pm - 6:00 pm: Valve Cover Races  
 6:00 pm - 7:30 pm: BBQ and Networking

### Wednesday, July 12, 2023

All events at San Jacinto College (transportation provided)  
 7:30 am - 8:00 am: Breakfast  
 8:00 am - 9:30 am: Training  
 9:30 am - 10:00 am: Break  
 10:00 am - 11:30 am: Training  
 11:30 am - 12:30 pm: Lunch  
 12:30 pm - 2:00 pm: Training  
 2:00 pm - 2:30 pm: Break  
 2:30 pm - 4:00 pm: Training  
 4:00 pm - 4:30 pm: Break  
 4:30 pm - 6:00 pm: Training  
 7:00 pm: Additional outing (more details coming soon)

### Thursday, July 13, 2023

All events at San Jacinto College (transportation provided)  
 7:30 am - 8:00 am: Breakfast  
 8:00 am - 9:30 am: Training  
 9:30 am - 10:00 am: Break  
 10:00 am - 11:30 am: Training  
 11:30 am - 12:30 pm: Lunch  
 12:30 pm - 2:00 pm: Training  
 2:00 pm - 2:30 pm: Break  
 2:30 pm - 4:00 pm: Training  
 6:30 pm - 7:00 pm: Cocktail Reception  
 7:00 pm - 8:00 pm: Awards Dinner (additional charge)

## Monday, July 10, 2023

Code	Training	Begins	Ends	Instructor
S1-1	Advanced Automotive Module Programming <b>Sponsored by OE Alternatives</b>	2:30pm	4:00pm	Mike Christopherson
S1-2	Competency Based Evaluations	2:30pm	4:00pm	Jason Bronsther
S1-3	Ford Battery Electric Technology <b>Sponsored by Ford Motor Company</b>	2:30pm	4:00pm	Alan Ritter
S1-4	Next Generation Automotive Programs with Augmented and Virtual Reality <b>Sponsored by zSpace</b>	2:30pm	4:00pm	Nikki Lester
S1-5	Strategies for Teaching Hybrid and Electric Vehicle Technology <b>Sponsored by Electude</b>	2:30pm	4:00pm	Darcy Wedel
S1-6	Teaching Gas Direct Fuel Injection Control <b>Sponsored by Consulab</b>	2:30pm	4:00pm	Al Santini
S2-1	ASE Registered Apprenticeship for Students <b>Sponsored by ASE Educational Foundation</b>	4:30pm	6:00pm	George Arrants
S2-2	Competency Based Evaluations	4:30pm	6:00pm	Jason Bronsther
S2-3	EVPro+ Training with National Certification <b>Sponsored by Future Tech Auto</b>	4:30pm	6:00pm	Ken Mays
S2-4	Preparing Students for Successful MLR Technician Jobs <b>Sponsored by G-W Publisher</b>	4:30pm	6:00pm	Luke Thompson
S2-5	Strategies for Teaching Hybrid and Electric Vehicle Technology <b>Sponsored by Electude</b>	4:30pm	6:00pm	Darcy Wedel
S2-6	The Brake Issue That Requires More Than Just Replacing Parts <b>Sponsored by ProCut</b>	4:30pm	6:00pm	Steve Smith

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Code	Training	Begins	Ends	Instructor
S3-1	Behind the Grill: ADAS (Hands-On)	8:00am	11:30am	Pam Oakes
S3-2	Iron Sharpens Iron <b>Sponsored by Consulab</b>	8:00am	9:30am	Tim Dwyer & Jeff Curtis
S3-3	Teaching High Voltage Batteries <b>Sponsored by Joliet Junior College &amp; Pearson Education</b>	8:00am	9:30am	Curt Ward
S4-1	Hybrid and Electric Vehicle Air Conditioning Systems <b>Sponsored by Joliet Junior College &amp; Pearson Education</b>	10:00am	11:30am	Curt Ward
S4-2	Iron Sharpens Iron <b>Sponsored by Consulab</b>	10:00am	11:30am	Tim Dwyer & Jeff Curtis

## Wednesday, July 12, 2023

Code	Training	Begins	Ends	Instructor
S5-1	ADAS and Autonomous Automobiles (Hands-On) <b>Sponsored by Consulab</b>	8:00am	9:30am	Tim Dwyer
S5-2	Brake Systems Diagnosis and Repair <b>Sponsored by ACDelco</b>	8:00am	11:30am	Jerry Mungle
S5-3	Current & Updated Relay Technology Class (Hands-On) <b>Sponsored by Consulab</b>	8:00am	11:30am	Dick Krieger
S5-4	Diagnosing by the Numbers <b>Sponsored by ATech Training</b>	8:00am	11:30am	Jim Wilson
S5-5	Electric Vehicles - Teaching High Voltage Batteries and Motors SAFELY (Hands-On) <b>Sponsored by Megatech Corporation</b>	8:00am	9:30am	Mark Bone
S5-6	The Four Horsemen of Drivability <b>Sponsored by Endeavor Business Media</b>	8:00am	11:30am	Pete Meier
S5-7	You Teach, Why Do Students Not Learn? <b>Sponsored by ATech Training</b>	8:00am	11:30am	Sam Houston
S6-1	ADAS and Autonomous Automobiles (Hands-On) <b>Sponsored by Consulab</b>	10:00am	11:30am	Tim Dwyer
S6-2	Electric Vehicles - Teaching High Voltage Batteries and Motors SAFELY (Hands-On) <b>Sponsored by Megatech Corporation</b>	10:00am	11:30am	Mark Bone
S7-1	Advanced Driver Assistance Systems <b>Sponsored by ACDelco</b>	1:00pm	4:30pm	Jerry Mungle
S7-2	ADAS and Autonomous Automobiles (Hands-On) <b>Sponsored by Consulab</b>	1:00pm	2:30pm	Tim Dwyer
S7-3	Current & Updated Relay Technology Class (Hands-On) <b>Sponsored by Consulab</b>	1:00pm	4:30pm	Dick Krieger
S7-4	Electude and You (Hands-On) <b>Sponsored by Electude</b>	1:00pm	4:30pm	Dr. Alex Richards
S7-5	Emerging Technologies, Evolving Repair Strategies <b>Sponsored by Industry Attends</b>	1:00pm	2:30pm	Justin Kidd
S7-6	Working with the VW Group CAN Bus <b>Sponsored by WORLDPAAC</b>	1:00pm	4:30pm	Cameron Conover
S7-7	You Teach, Why Do Students Not Learn? <b>Sponsored by ATech Training</b>	1:00pm	4:30pm	Sam Houston
S8-1	Breaking Bolts: And Why We Should Teach Students How to Break Them (Hands-On) <b>Sponsored by Consulab</b>	3:00pm	4:30pm	Jeff Curtis
S8-2	Emerging Technologies, Evolving Repair Strategies <b>Sponsored by Industry Attends</b>	3:00pm	4:30pm	Justin Kidd

# 2023 NACAT Conference



Thursday, July 13, 2023

Code	Training	Begins	Ends	Instructor
S9-1	HVAC 2023 - Keeping It Cool <b>Sponsored by Standard Motor Products</b>	8:00am	11:30am	Ryan Kooiman
S9-2	HVAC: HV Batteries (Hands-On)	8:00am	11:30am	Pam Oakes
S9-3	Hybrid and Electric Vehicle Maintenance and Repair <b>Sponsored by ACDelco</b>	8:00am	11:30am	Jerry Mungle
S9-4	Teaching Low Speed, High Speed and K Line CAN Bus <b>Sponsored by Consulab</b>	8:00am	11:30am	Al Santini
S9-5	TPMS - Technology, Diagnosing, and the Future (Hands-On) <b>Sponsored by Continental</b>	8:00am	11:30am	Sean Lannoo
S9-6	Understanding and Analyzing a Parallel Circuit (Hands-On) <b>Sponsored by ATech Training</b>	8:00am	11:30am	Jim Wilson
S9-7	VW/Audi 4cyl, Evolution of EA888 <b>Sponsored by WORLDPAAC</b>	8:00am	11:30am	Cameron Conover
S10-1	Audi Hot V (HSI) Engines <b>Sponsored by WORLDPAAC</b>	1:00pm	4:30pm	Cameron Conover
S10-2	HVAC: HV Batteries (Hands-On)	1:00pm	4:30pm	Pam Oakes
S10-3	Labscope Power User <b>Sponsored by Standard Motor Products</b>	1:00pm	4:30pm	Ryan Kooiman
S10-4	Mastering The Art of Electrical Troubleshooting <b>Sponsored by Endeavor Business Media</b>	1:00pm	4:30pm	Pete Meier
S10-5	Teaching Low Speed, High Speed and K Line CAN Bus (Hands-On) <b>Sponsored by Consulab</b>	1:00pm	4:30pm	Al Santini
S10-6	TPMS - Technology, Diagnosing, and the Future (Hands-On) <b>Sponsored by Continental</b>	1:00pm	4:30pm	Sean Lannoo
S10-7	Understanding and Analyzing a Parallel Circuit (Hands-On) <b>Sponsored by ATech Training</b>	1:00pm	4:30pm	Jim Wilson

## Pricing Details

	Before April 30, 2023	After April 30, 2023
NACAT Members	\$520	\$595
Non-Members	\$620	\$695



## Hotel

South Shore Harbour Resort  
2500 South Shore Blvd  
League City, TX 77573

Cost: \$149 per night plus tax

**TRAINING COURSE SELECTION:** Selections must be made in advance and are available on a first-come, first-served basis.

**MEALS:** Continental breakfast is served on Tuesday, Wednesday, and Thursday. Lunch is served Monday, Tuesday, Wednesday, and Thursday. Refreshment breaks are each day.

**NACAT Member Discounts:** NACAT Members receive a \$100 discount on registration packages. Visit [nacat.org](http://nacat.org) to become a member.

**AWARDS DINNER:** Attendees may purchase tickets for \$60 each. Tickets are limited so early registration is encouraged.

**REGISTRATION & PAYMENT:** To register, please complete the online registration form at [www.nacat.org](http://www.nacat.org). Registrations must be received no later than July 3, 2023. Registrations accepted ON-SITE ONLY after July 3, 2023. We cannot guarantee availability for late or on-site registrants. A confirmation letter and detailed conference information will be e-mailed in late-June.

**CANCELLATION AND REFUND POLICY:** Full refunds will be granted, less a \$30 processing fee, if cancellation is received in writing by June 1, 2023. No refunds will be granted after June 1, 2023. Name substitutions will be accepted.

## NACAT 2023 CONFERENCE COURSE DESCRIPTIONS

### **ADAS and Autonomous Automobiles: The Butterfly Effect (S7-2)** *by Tim Dwyer*

Who will need to own a car in the future?

Whether you believe autonomous vehicles are coming to stay or not, this concept is worth discussion! In this presentation, we will literally SEE the ADAS inputs that a vehicle has to receive in order to create “sensor fusion” needed for autonomy! This will include LiDAR, Radar, ultrasonics, cameras with object detection and more.

In addition, we need to consider the effect it could have on the way we live and the future of our industry.

How will this mode of transportation change the current business model we now have and what opportunities will it create as well?

Come join in the discussion as we paint a picture of the arena that our students will be competing in. Tim will be using Consulab's new EV-360 ADAS trainer in the class to demonstrate with there also being a hands-on component to the training.

### **ADAS and Autonomous Automobiles: The Butterfly Effect (S6-1)** *by Tim Dwyer*

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### **ADAS and Autonomous Automobiles: The Butterfly Effect (S5-1)** *by Tim Dwyer*

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### **Advanced Automotive Module Programming (S1-1)** *by Mike Christopherson*

This class is a journey through the caveats faced when programming and re-programming vehicle modules. The class includes demonstrations as well as case studies. Information on dealing with newer locked modules is discussed.

### **Advanced Driver Assistance Systems (S7-1)** *by Gerald Mungle*

This seminar will cover the types of Advanced Driver Assistance Systems (ADAS) that utilize Sonars, Radars, Sensors, and Cameras. There will be an overview of how these systems function to assist drivers to operate, park and avoid nearby objects. Diagnosis and repair procedures such as determining sources of malfunctions and component setup will be discussed.

### **ASE Registered Apprenticeship for Students (S2-1)** *by George Arrants*

This session will assist you in understanding how the ASE registered apprenticeship can provide your students and employers with the opportunity to engage in a competency-based and entry-level apprenticeship for secondary and post-secondary programs.

### **Audi Hot V (HSI) Engines (S10-1)** *by Cameron Conover*

AUDI Forced Induction 'V' Motors

- Oil Consumption Issues
- Crankcase Ventilation and oil Separator
- Secondary Air Injection System Maintenance
- Timing Chain Noise
- Supercharger Maintenance
- Special Tools and procedures
- Engine Layout and Geometry, HSI configuration
- Spark Plug Tube Oil Leaks
- Lifter Roller Failure
- Central Fuel Injectors
- Audi Valve Lift implementation
- Hot V turbochargers, integrated Exhaust manifold
- Vacuum Boost Control and Why
- Evap system, Venturi Suction-Jets
- New Gear Driven Engine Timing
- Thermal Management components and operation

### **Behind the Grill: ADAS Sensor Fusion Calibration/Recalibration (S3-1)** *by Pam Oakes*

Deep dive into

- \* V2V/V2x -- OE and aftermarket update
- \* Sensor fusion, new types of sensors being introduced
- \* Alignment factors and their importance
- \* Dynamic versus static calibration/recalibration
- \* Hands-on lab (in-classroom) on how to perform recalibration (Pythagorean Theorem)

### **Brake Systems Diagnosis and Repair (S5-2)** *by Gerald Mungle*

This Seminar focuses on braking system diagnosis, and covers components, operation, and proper service practices. This course highlights real world case studies to address brake noise, pulsation, pad wear, fluid leaks, and concerns with power assist systems. Enhanced braking system designs and features by various manufacturers will also be covered.

### **Breaking Bolts: And Why We Should Teach Students How to Break Them (S8-1)** *by Jeff Curtis*

This class will actively involve the attendees in a study of clamping force, torque, torque-to-turn and other methods related to the science of clamping forces and how this relates to the ConsuLab 145 series diesel and gasoline engine bench mechanical training systems.

The roots of this class are imbedded in the pioneering work of Tim Gilles and his utilization of the Skidmore-Wilhelm bolt tensioning tool.

This class will be highly interactive and NOT be based around a linear slide deck(.ppt). Come and have some fun with us as we explore these critical concepts of tension. And how to break that tension and promote student learning.

Attendees will walk away with a different perspective of how to teach the critical concepts of clamping forces and empower their students to learn these concepts.

#### **Competency Based Evaluations (S1-2) by Jason Bronsther**

Many automotive teachers struggle with the fact that they evaluate their automotive students using a pen, paper and a desk. Within Quebec's automotive program, students are evaluated based on what they can do and how they perform tasks related to the automotive trade. The student's efforts are compared to an industry professional standard, not their peers or other unrelated measures. This is called competency based evaluation. Competency based evaluation can be used for both formative and summative evaluations. In this workshop, we explore what a competency based evaluation looks like and learn how to create a competency based evaluation using dichotomous marking. In attending this workshop, you will leave with an example of a competency based evaluation that has been created by a group of professional automotive teachers. This will allow you as a teacher to better interpret if your students are ready for the automotive repair industry.

#### **Competency Based Evaluations (S2-2) by Jason Bronsther**

Many automotive teachers struggle with the fact that they evaluate their automotive students using a pen, paper and a desk. Within Quebec's automotive program, students are evaluated based on what they can do and how they perform tasks related to the automotive trade. The student's efforts are compared to an industry professional standard, not their peers or other unrelated measures. This is called competency based evaluation. Competency based evaluation can be used for both formative and summative evaluations. In this workshop, we explore what a competency based evaluation looks like and learn how to create a competency based evaluation using dichotomous marking. In attending this workshop, you will leave with an example of a competency based evaluation that has been created by a group of professional automotive teachers. This will allow you as a teacher to better interpret if your students are ready for the automotive repair industry.

#### **Current & Updated Relay Technology (S7-3) by Dick Krieger**

Do you think you understand relays? Relay technology has dramatically changed in recent years. Instructors, students and technicians must understand what is new and different. This hands-on class discusses relay basics and suggested teaching strategies, but also covers new operational designs, testing procedures and service precautions that are required for proper diagnosis. PCB, Bi-stable, GM Hi-Power and other new relay technologies will be covered. Don't get left behind. Join us and learn what's new with relays.

#### **Current & Updated Relay Technology (S5-3) by Dick Krieger**

Do you think you understand relays? Relay technology has dramatically changed in recent years. Instructors, students and technicians must understand what is new and different. This hands-on class discusses relay basics and suggested teaching strategies, but also covers new operational designs, testing procedures and service precautions that are required for proper diagnosis. PCB, Bi-stable, GM Hi-Power and other new relay technologies will be covered. Don't get left behind. Join us and learn what's new with relays.

#### **Diagnosing By the Numbers: DVOM Application with the Modern Automobile (S5-4) by Jim Wilson**

Do your students ever ask why there are other buttons on a digital multi meter? Would you like to take their meter usage training to the next level? This course will cover the advanced features a DMM will offer to a technician. Hands on activities will enhance your knowledge on applying the DMM's features and diagnosing circuit failure.

#### **Electric Vehicles - Teaching High Voltage Batteries and Motors SAFELY (S6-2) by Mark Bone**

With the increased number of Electric Vehicles on the road, our students will need to know about basic operation and circuitry on EVs and hybrids. In this workshop, you will use the Megatech Locktronics benchtop training system to build circuits and perform measurements with lead-acid batteries, Lithium-Ion batteries, different types of motors, and electronic controls.

These activities are designed to help understand:

- the difference between lead acid and lithium-ion batteries
- how battery capacity is calculated (what do those kWh ratings mean?)

- voltage converters
- powering DC motors and three-phase motors
- how three-phase generators work
- contactor (isolation relay) operation

This workshop will employ a hands-on approach with small groups of instructors actually building these circuits. You will also use Digital Multimeters and Digital Oscilloscopes to observe and test circuit operation.

#### **Electric Vehicles - Teaching High Voltage Batteries and Motors SAFELY (S5-5) by Mark Bone**

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This workshop will employ a hands-on approach with small groups of instructors actually building these circuits. You will also use Digital Multimeters and Digital Oscilloscopes to observe and test circuit operation.

#### **Electude and You: Getting the Most Out of the Next Generation of Electude Classroom (S7-4) by Dr. Alexander Richards**

Electude has a new suite of products for 2023, and we are excited to share them with you and talk about some of the changes that we made, why we made them, and how they can better deliver learning outcomes within your classroom! Join us for a practical presentation that will showcase our Classroom product, and show you how you can improve student retention and skills using the tools provided. Best of all, you'll leave the presentation with actionable items that you can take back to your students the next day and implement!

#### **Emerging Technologies, Evolving Repair Strategies (S8-2) by Justin Kidd**

Helping educators navigate new technologies with new failure patterns, using equipment, protentional resources and peer networks.

What Students will learn:

Help instructors find resources for there students.

Equipment available not only from the OE but the aftermarket like iSCAN and ATS, etc. Resource pages and industry information such as the important of groups like NASTF.org and Industryattends.com.

Preparing students with the necessary tools for there career journey after vocational schools.

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### **EVPro+ Training with National Certification for Electrified Vehicle Systems and Technologies (S2-3) by Ken Mays**

The Electrified Transportation (EV) Pro+ Training and Certification Program ensures professionals across all transportation industries are consistently trained in Electrified Vehicle Systems and Technologies using ONE national training standard. Completion of a blended training program at each level prepares the technician to complete both the practical and written exams for earning their 5-year SAE ITC Certification for any or all of the four (4) Levels offered in this program. This comprehensive program is supported by several organizations including: SAE-Industry Technologies Consortia® (SAE ITC) as the Authentication and Certification Body, FutureTech Auto provider of the on-demand, hands-on training, and testing content components, Today's Class Technician for the Adaptive Learning component, and CDX Learning as the Publisher with a Course Book and other materials structured to support elements of this program.

Electric Vehicle Instructor, Ken Mays, will discuss opportunities for college instructors to develop their own EV programs with planning, certifications, and funding opportunities. Ken will share about two specific tools that are popular in the diagnostics of electric motors and inverter testing. Let's talk about your success for EV program development.

### **Ford Battery Electric Technology (S1-3) by Alan Ritter**

Review of current BEC and Hybrid systems on Ford vehicles

### **HVAC 2023 -Keeping It Cool (S9-1) by Ryan Kooiman**

As environmental regulations continue to demand more fuel efficient and clean burning engines, manufacturers have introduced more efficient HVAC systems. While these systems still operate on basic refrigeration principles, there have been changes that require a different diagnostic approach when systems do not blow as cold as they ought.

Another change is the increased use of networked modules, sharing data and commands.

The goal of this class is to refresh technician knowledge of refrigeration principles as they relate to diagnosing a fault in the refrigerant portion of the HVAC system. Effective diagnosis, component replacement, and service will be demonstrated on R-1234yf equipped vehicles as well as on R-134a equipped vehicles. We will teach system and schematic analysis to improve the technician's diagnosis of cooling fan, compressor, and in-car controls which all play a role in keeping the customer comfortable. After completing this class, a technician will be able to:

- Identify new technologies and their impact on HVAC
- Understand the usefulness of an enthalpy chart in diagnosing cooling problems
- Properly diagnose and service R-1234yf systems
- Properly replace HVAC components
- Perform correct HVAC service
- Diagnose cooling fan and airflow issues

### **HVAC: HV Batteries (S9-2) by Pam Oakes**

- \* Introduction to dual AC compressors
- \* Independent coolant systems for heat pumps
- \* Electronic expansion units, valves
- \* HV thermal breakdown
- \* Hands-on (in classroom) lab (build a heat pump at the desk!)



### **HVAC: HV Batteries (S10-2) by Pam Oakes**

- \* Introduction to dual AC compressors
- \* Independent coolant systems for heat pumps
- \* Electronic expansion units, valves
- \* HV thermal breakdown
- \* Hands-on (in classroom) lab (build a heat pump at the desk!)

### **Hybrid and Electric Vehicle Air Conditioning Systems (S4-1) by Curt Ward**

This presentation will highlight the information needed to understand hybrid and electric vehicle air conditioning systems. The heating and cooling of the passenger compartment, the high-voltage battery, and the high-voltage power electronics will be covered. Specific case studies and classroom experiences from the past couple of years will be used to increase the learning.

### **Hybrid and Electric Vehicle Maintenance and Repair (S9-3) by Gerald Mungle**

This training event will focus on maintenance service procedures that aftermarket technicians can perform on hybrid electric vehicles. Participants will receive a high-level overview of the operation of hybrid components, related safety concerns, and serviceable systems. These include high voltage system operation, supporting systems such as HVAC and brake systems, and internal combustion engine.

### **Iron Sharpens Iron (S4-2) by Tim Dwyer and Jeff Curtis**

Every year more and more automotive instructors attend the NACAT conference and we realize what a resource this is to the new instructor as well as the veteran instructor. So, we want to tap into all the collective experience that is available! This presentation will be by you and for you – today's automotive instructor in today's classroom!

What we want to accomplish here is to share ideas of what you are doing in your classroom that is working (or NOT working!), what resources do you use with success, and what are your struggles? So, now is your chance to make a short 5 minute presentation and let's spread the good stuff around! Anyone who wants to initiate a discussion on a topic can claim a time and a space – (tdwyer@consulab.com)

Or you are encouraged to just come and lurk!

We also want you to share your desired takeaway from this conference – why are you attending this conference? What do you want to learn and hope to take back to your own classroom and apply?

The accumulative years (300+) of knowledge and experience from all the dedicated instructors attending NACAT absolutely must be shared for the benefit of our students. Come join us and let's see where this goes!

### **Iron Sharpens Iron (S3-2) by Tim Dwyer and Jeff Curtis**

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#### **Labscope Power User (S10-3) by Ryan Kooiman**

The labscope is a powerful diagnostic tool that often is not used to its full potential. Many technicians understand the basics of labscope use, but would like to go further. This class is meant to bring both the novice and the experienced labscope user to the next step, becoming a labscope power user. In this class we will begin by bringing the class up to speed with a quick review of the basics and then move on to illustrating, through case studies, how to use advanced labscope techniques. Many real-world case studies will be used in this class. After completing this class, a technician will be able to:

- Set up a labscope properly for the signals being investigated
- How to effectively use a trigger
- Diagnose ignition system faults
- Perform and analyze a relative compression test
- Acquire a cam-crank waveform
- Access module connectors in order to acquire signal access
- Effectively use an amp probe to diagnose faults
- Diagnose pressure faults using a pressure sensor

#### **Mastering The Art Of Electrical Troubleshooting (What Every Student NEEDS To Know Before Leaving Your Program) (S10-4) by Pete Meier**

After teaching professional technicians of all skill levels around the country, it is clear that the vast majority do not understand fundamental electrical principles or the technique of voltage drop testing. This session will focus on addressing those needs with the hope that attending teachers can go back to their students and ensure that they master this fundamental testing tool - thus preparing them for the troubleshooting challenges they will surely face in the field.

#### **Next Generation Automotive Programs with Augmented and Virtual Reality (S1-4) by Nikki Lester**

Prepare your students for certifications and industry-related experience before even stepping foot in an auto shop. In this session, you'll discover how school districts, career centers, and community colleges are using augmented and virtual reality (AR/VR) to support Transportation career pathways, boost technical certification test scores, and better prepare students for automotive careers in Hybrid, Electric, and Diesel Technology, Heavy Equipment, Light Gas and Trucks, and Small Engine Technology.

Within an AR/VR learning environment, learn how students are training in a safe environment where repairs can be practiced and repeated - anytime, anywhere. In addition to higher engagement and deeper understanding of automotive concepts, AR/VR also:

- Reduces total training space required
- Minimizes recurring costs for materials / equipment
- Prepares students for professional certifications allowing for more experience and training on demand

#### **Preparing Students for Successful MLR Technician Jobs (S2-4) by Luke Thompson**

If you're looking to engage your entry-level students in the shop while providing enough theory in the classroom, this session provides a first-hand look at a unique, effective, interactive training program designed to empower automotive instructors. Developed by Luke Thompson, Maintenance and Light Repair Technician caters to all different learning styles, featuring a good

visual design with step-by-step procedures, job sheets, and an emphasis on safety. Special features include Career Profiles of newly hired technicians, Diagnostic Scenarios with analytical questions and audio clips, Smart Phone Tips and Tricks, Habits of a Successful Technician, Hybrid and EV Technologies, Applied Science, and ASE Review Questions and Practice Exams. The complete program includes a textbook and shop manual, plus an online, self-paced program with 60 step-by-step lessons, videos, and relevant photos.

#### **Strategies for Teaching Hybrid and Electric Vehicle Technology (S2-5) by Darcy Wedel**

In times past, teachers often taught vehicle mechanical systems by having students remove, disassemble and reassemble. This way of teaching worked well for topics such as engines and transmissions, but what about the Electric vehicle? Can you learn how an inverter works by taking it apart and studying the insides?

The increasingly complex and often abstract technologies found in today's hybrid and electric vehicles will require new instructional strategies and tools to help students understand how electric and hybrid vehicle systems operate. In this presentation we will discuss:

1. Understanding the challenges hybrid and electric vehicle technology presents to both teachers and students.
2. Strategies for simplifying the complex (using DC/AC inverter for example).
3. Employing new instructional methods and tools to help students understand the invisible and abstract.

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#### **Teaching Gas Direct Fuel Injection Control (S1-6) by Al Santini**

In this seminar we will look how a GDI fuel system functions. We will discuss the use of a scanner as the primary diagnosis tool and review scans from vehicles

#### **Teaching High Voltage Batteries (S3-3) by Curt Ward**

This presentation will highlight the many tasks that need to be covered when teaching high-voltage batteries as part of a hybrid and electric vehicle class. Included will be successful and not so successful moments from the past couple of years. The presentation will include specifics related to vehicles and components that will make this topic easier for the students to understand.

#### **Teaching Low Speed, High Speed and K Line CAN Bus (S9-4) by Al Santini**

The basics of CAN Bus from a teaching standpoint will start off this training session. We will cover the use of low speed, high speed and K Line bus. The class will utilize a Honda system and trainer but will be representative of most systems currently on the road. A simple diagnostic procedure that can be taught in class will be taught hands on.

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#### **The Brake Issue That Requires More Than Just Replacing Parts (S2-6) by Steve Smith**

Covers the current causes and solutions for the industry wide brake pulsation issues. Also covers how the various OEM handle this issue under warranty and non-warranty brake service. Will also cover the latest EV brake information.

### **The Four Horsemen Of Drivability (Troubleshooting Engine Performance When The Engine Isn't Performing) (S5-6) by Pete Meier**

The class focuses on using a logical process and modern diagnostic equipment to troubleshoot engine performance customer concerns - with or without a related Diagnostic Trouble Code. Attendees will meet the 4 Horsemen that can wreak havoc on an engine's ability to run as it should, resulting in low performance, poor fuel economy, and higher emissions. They will also be taught who their REAL customer is when faced with a drivability customer complaint.

### **TPMS - Technology, Diagnosing, and the Future (S9-5) by Sean Lannoo**

- › Why TPMS?
- › System types and how they operate
- › Preventive maintenance
- › Importance of the relearn procedure
- › Hands-on tool and vehicle relearn demonstration
- › Vital TPMS service tools and functions
- › Correct maintenance and service techniques
- › Could we see talking tires?

**\*\*Giveaway of TPMS Tool included**

### **TPMS - Technology, Diagnosing, and the Future (S10-6) by Sean Lannoo**

- › Why TPMS?
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- › Correct maintenance and service techniques
- › Could we see talking tires?

**\*\*Giveaway of TPMS Tool included**

### **Understanding and Analyzing a Parallel Circuit (S9-6) by Jim Wilson**

This course will take a deep dive into the classic automotive parallel circuit. Strategies are unveiled that will assist new technicians in comprehending and diagnosing a parallel circuit failure. From Ohm's Law to Kirchhoff's Law, we will cover them all, in an exciting format that will help you develop your technician training program. Concepts will be introduced in a basic format that will build complexity with hands on activities.

### **Understanding and Analyzing a Parallel Circuit (S10-7) by Jim Wilson**

This course will take a deep dive into the classic automotive parallel circuit. Strategies are unveiled that will assist new technicians in comprehending and diagnosing a parallel circuit failure. From Ohm's Law to Kirchhoff's Law, we will cover them all, in an exciting format that will help you develop your technician training program. Concepts will be introduced in a basic format that will build complexity with hands on activities.

### **VW/Audi 4cyl, Evolution of EA888 (S9-7) by Cameron Conover**

VW/Audi 4 Cylinder (E888) Engines

- Camshaft Bridge Issues on 4-Cyl. Engines

- Water Pump Failures and Proper Repair
- Timing Chain & Tensioner Issues and Repair Techniques
- Timing Chain Tools and proper usage
- Direct Injection Fuel System Operation and Evolution
- Turbocharger - Diagnosis and Effective Fixes for Boost DTCs
- Audi Valvelift System Operation
- Variable displacement Oil pump design, function, and testing
- Innovative Thermal Management Strategy (Gen3)
- VCDS and Scan Tool Navigation and Use, including How and When to Adapt Individual Components

#### **Working with the VW Group CAN Bus (S7-6) by *Cameron Conover***

VW/Audi CAN class that discusses:

- VW/Audi CAN architecture
- Types of busses and their modules
- Physical CAN connections, wiring, crimps, repairs
- Understanding CAN messages
- Decoding OE CAN messages for logging and display purposes
- How CAN sniffers can aid CAN bus Diagnostics
- Aftermarket CAN accessories
- Building a CAN network for aftermarket accessories

#### **You Teach, Why Do Students Not Learn? (S5-7) by *Sam Houston***

Has a student asked you a question that you already answered five minutes ago? Why do students not grasp the concepts you delivered the first time? This course will analyze learning issues and discuss new approaches to classic automotive tasks. Learn how to use ATech's Classroom Management Program to enhance the hands-on learning experience. Participants will walk away with strategies for setting up quality lab training exercises that will increase your student's daily engagement.

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