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IEEE

2022 IEEE INTERNATIONAL WORKSHOP ON

Metrology for Automotive

MODENA, ITALY / JULY 4-6, 2022

WORKSHOP PROGRAM

For further information, visit the website
www.metroautomotive.org

ATHENA
BUSINESS AND TECHNOLOGY CONSULTING

2022 IEEE INTERNATIONAL WORKSHOP ON

Metrology for Automotive

MODENA, ITALY / JULY 4-6, 2022

Sponsored By

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IEEE MetroAutomotive 2022 Welcome Message

On behalf of the 2022 IEEE International Workshop on Metrology for Automotive, we warmly welcome you to the second edition of MetroAutomotive 2022 which is taking place at the Department of Engineering "Enzo Ferrari", here at the University of Modena and Reggio Emilia.

The first edition of this workshop, MetroAutomotive 2021, was hosted in a virtual format owing to the global lockdown and travel restrictions, that unfortunately have severely impacted our lives over the past two years, and continue today, albeit with less intensity.

After the success of the first edition, MetroAutomotive 2021, the Organizing Committee strongly supported and worked hard to organize the second edition of the workshop as a totally in-person event. MetroAutomotive 2022 has been hence scheduled here in Modena, in the Emilia Romagna region at the heart of the Italian Motorvalley.

The most genuine intention is to foster a return to in-person events, and as such the goal of this workshop is to bring together researchers from universities, research centers and industries to stimulate the sharing of the latest scientific and technological research findings, and discussion free of barriers of any nature in a common forum where innovative ideas can be exchanged to inspire further developments in the fascinating field of automotive.

The MetroAutomotive Technical Program consists of 3 Tutorial sessions, 2 plenaries, a round table and 7 technical sessions scheduled over three days, aiming to cover the several fields of metrology for automotive. Tutorials and plenaries will give a focus on the current and future trends as seen by some major players in the automotive scenario, from component manufacturers to telecommunications. An important opportunity to discuss emerging entrepreneurial potential in the automotive field will be the panel discussion, organized with the help of the Motor Valley Accelerator, with the participation of both new and consolidated startups. MetroAutomotive 2022 also benefits from a panel session organized by the IEEE Women in Engineering (WIE) Italy Section, with the aim of fostering discussion about the impact of gender-diversity in the design methodologies, in the technologies and approaches pursued into the automotive sector.

Plenaries, round table as well as presentations, will be followed by live Q&A. All accepted papers will be published in the workshop proceedings, while presented papers adhering to

the presentation requirements will be uploaded to IEEE Xplore. Authors of the proceedings papers are also eligible to submit an extended version of their work to the MDPI Sensors and MDPI Machines Special Issues dedicated to MetroAutomotive 2022.

Last, and by no means the least, we have to give recognition and special thanks to all the Technical Program Committee members and the reviewers who have contributed to making this possible. We all did our best for the success of this new edition of MetroAutomotive 2022, that we hope will allow attendees to increase their knowledge, meet up with established friends, and make new contacts.

We wish you all an enjoyable workshop!

General Chairs
Luigi Rovati, *University of Modena and Reggio Emilia, Italy*
Lorenzo Peretto, *University of Bologna, Italy*

GENERAL CHAIRS
Luigi Rovati, University of Modena and Reggio Emilia, Italy
Lorenzo Peretto, University of Bologna, Italy

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Roberto Tinarelli, University of Bologna, Italy
Federico Tramarin, University of Modena and Reggio Emilia, Italy

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Tommaso Fedullo, University of Modena and Reggio Emilia, Italy

TREASURY CHAIR
Luca De Vito, University of Sannio, Italy

SPECIAL SESSION CHAIRS
Raffaella Di Sante, University of Bologna, Italy
Alessandro Mingotti, University of Bologna, Italy
Pier Andrea Traverso, University of Bologna, Italy

IEEE WIE ACTIVITIES CHAIRS
Roberta Di Pace, University of Salerno, Italy
Cristina Costa, Fondazione Bruno Kessler, Italy

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Marcello Vanali, University of Parma, Italy
Rui Xiong, Beijing Institute of Technology, China

IEEE MetroAutomotive 2022 Plenary Speakers

5G, IoT and the future of Automotive

Alessandro **Magnino**
Vodafone Business

ABSTRACT
5G is set to disrupt many industries. Thanks to its key features (high speed, low latency, high capacity and edge computing) this technology, coupled with IoT, is already enabling new use cases and applications in the automotive industry. From car production to testing, from safety and security to entertainment, 5G is a game changer. We'll be talking about how Vodafone is supporting many automakers to embrace 5G and IoT with real examples and use cases.

SPEAKER BIO
Alessandro Magnino is Head of VGE Italy and Public Sector at Vodafone Business (Vodafone Italy), in charge of developing business and accelerating the digital transformation journey of Multinational Customers and Public Authorities. He held different roles at Vodafone at local and Group level with focus on Sales, Marketing, Innovation and General Management.
Before joining Vodafone in 2012, he worked at Nokia Siemens Networks (now Nokia) as Sales Manager Europe for Customer Experience Management Solutions. Magnino started his career in consulting at Value Partners Group (Value Team), where he led several consulting engagements for Corporate customers in Italy and abroad with focus on Telecoms and Media.

Wednesday, July 6, 2022 - H 09:00 CEST

The new trends shaping the automotive industry: a focus on alternative powertrains and vehicle connectivity

Domenico Dino **Brancale**
AVL

ABSTRACT

The automotive industry is experiencing a radical transformation and new trends are increasingly emerging in the fields of propulsion systems as well as vehicle architecture and functions. Hybridization and electrification of the powertrain are investing all the transport sector, where also hydrogen solutions play a crucial role.

The propulsion system is not the only big challenge in automotive. The move towards a more centralized SW and E/E architecture will come up with a significant new vehicle concept, that will be more connected and SW-oriented. AVL is deeply involved in these topics, through our own R&D projects and through several collaboration with the major worldwide OEM and Tiers1.

SPEAKER BIO

Mr. Domenico Dino Brancale. Born in 1966;

- Degree Electrotechnical Engineering at the TU Braunschweig Carolo-Wilhelmina and Università degli Studi Federico II of Naples;
- 1993-96: calibration engineer Engine Controls Unit Gasoline at Magneti Marelli Wolfsburg;
- 1996-98: Head of calibration department at MM Wolfsburg;
- 1998-2000: General manager of the MM North Europe Tech Center in Wolfsburg;
- 2000-2002: R&D responsible for German market products at Magneti Marelli Powertrain Bologna;
- 2002-2005: Ford Key account manager at MM Bologna;
- 2005-December 2012: Sales and marketing director at Eldor Corporation;
- January 2013 – actual: Managing Director at AVL Italy;
- October 2020: appointment as member of the Nomisma Scientific Committee.

IEEE MetroAutomotive 2022 Tutorials

Monday, July 4, 2022 - H 15:00 CEST

RedCube PressFit Technology

Domenico **Santoro**
Würth Elektronik, Vimercate(MB), Italy

ABSTRACT

Aim of seminar is to show benefits of PressFit Technology in high current applicationts and rough environment. How this technology works and how is electrically and mechanically certified. Will show PCB trace design suggestions to optimize the self-heating on pcb and the correct process of insertion by press.

SPEAKER BIO

Domenico Santoro has been working in Wuerth Elektronik since 2012 as an Account manager unitil the 2017 and as Field application Engineer for Electromechanical component nowadays. He has a degree in Electronic Engineering from University of Bologna.

Monday, July 4, 2022 - H 16:00 CEST

GPS to GNSS Navigation and Precise Positioning in Automotive

Domenico **Di Grazia**

STMicroelectronics srl

ABSTRACT

The introduction of the Global Positioning System technology has leaded to a revolution in the field of localization, navigation and in the synchronization of receiving equipments in automotive.

The challenges of positioning today are to exploit the interoperability of available satellite systems, GPS, GLONASS, Galileo, BeiDou, Navic, the management of inertial sensors and the development of modernization of satellite signals to improve the performance of positioning sensors and enable new precision goals.

Autonomous driving applications are raising in fact the requirements for onboard GNSS receivers to new highs. Position accuracy, protection levels, high availability, robustness of operation and integrity are the priorities shaping a new class of automotive components and architectures.

Aim of the seminar is to drive the audience in the evolutional path of satellite Navigation, from GPS to GNSS, till to Precise Positioning and to explain the milestones and the trends in this path.

SPEAKER BIO

Domenico Di Grazia has been with GNSS System Team at STMicroelectronics since 2007, where he is involved in DSP Software and Algorithm development for GNSS receivers. He has a Master degree in Telecommunication Engineering from University of Naples, Italy, in 2001. He holds several patents in the GNSS area and previously had experience in software development for Digital Radio receivers and in Digital Video Broadcasting field.

Technologies for the energy transition

Gianni **Baroni**
GRAF GASTECH

ABSTRACT
The energy transition started in Europe will impose significant changes in every sector of our society. GRAF Industries is on the frontline of this epochal challenge. The tutorial will describe GRAF's vision of future mobility scenarios with particular emphasis on energy sources and related technologies.

SPEAKER BIO
Since 2011 Gianni Baroni has been collaborating with GRAF GASTECH, where he brings his experience acquired in over 25 years of activity in the development of gas compression and measurement equipment.

In 1991 he obtained the degree of industrial expert, with mechanical specialization, and the qualification to practice the profession in 1994. He collaborated in the drafting of numerous projects and definitions of products and solutions in the CNG (Compressed Natural Gas) and LNG (Liquefied natural Gas) fields.

Today he holds the role of Sales Manager.

IEEE MetroAutomotive 2022 Venue

The workshop will be held at the first floor of building 25 at the "E. Ferrari" Engineering Department, via Vivarelli, 10, Modena.
The building is easily accessible both by public transport and by car. By public transport, the closest bus stop is Gottardi. By car, there are two free car parks.
The red arrows indicate the access routes to the department.

Address: Via P. Vivarelli, 10
        Modena

Established twenty-five years ago, the "Enzo Ferrari" Department of Engineering was founded in the Academic Year 1990-91. Its main building, which covers more than 160,000 sqm, meets the highest teaching and research requirements. The Department regularly cooperates with renowned firms in the car manufacturing, chemical, mechanical, ceramics and biomedical fields, as well as enterprises in the sectors of information technology, telecommunications and industrial electronics. The Department has benefited from this productive network, and over the years it has improved and has further developed the high quality level of its research and technological application. Its graduates can easily find employment, thanks to the training opportunities offered (apprenticeships and work placements). These experiences offer students the chance of further developing the knowledge acquired during the academic program and of taking a closer look at the job market.

Google Map

https://goo.gl/maps/QUan8SDA6KV9yFKr6

IEEE MetroAutomotive 2022 Social Events

WELCOME PARTY

Monday, July 4, 2022
H 19:00

The IEEE MetroAutomotive 2022 Welcome Party will be held at **Caffè Concerto**.
Address: Piazza Grande, 26 – Modena

GALA DINNER

Tuesday, July 5, 2022
H 20:30 – 23:00
Shuttle Bus Meeting Point H 20.00

The IEEE MetroAutomotive 2022 Gala Dinner will be held at **Agriturismo Cavaliera**
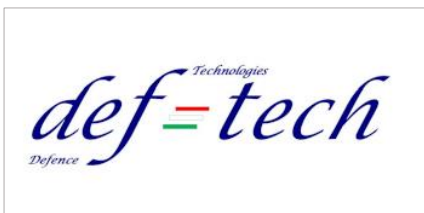**Address**: Via Cavalliera, Castelvetro di Modena - Modena.

SHUTTLE SERVICE. A shuttle bus will be available for the gala dinner. The bus will depart at **20.00** from the Conference Venue (Department of Engineering - Terminal Bus Gottardi).

IEEE MetroAutomotive 2022 Patronages

IEEE MetroAutomotive 2022 Sponsors

15:00 - 18:00
REGISTRATION
Room: University of Modena and Reggio Emilia - Building 25

15:00 - 16:00 CEST
TUTORIAL SESSION #1
Room: Building 25 - Room P1.1
Chairs: Federico Tramarin, *University of Modena and Reggio Emilia, Italy*
        Stefano Cattini, *University of Modena and Reggio Emilia, Italy*

RedCube PressFit Technology

Domenico Santoro
Würth Elektronik, Vimercate(MB), Italy

16:00 - 17:00 CEST
TUTORIAL SESSION #2
Room: Building 25 - Room P1.1
Chairs: Federico Tramarin, *University of Modena and Reggio Emilia, Italy*
        Stefano Cattini, *University of Modena and Reggio Emilia, Italy*

GPS to GNSS Navigation and Precise Positioning in Automotive

Domenico Di Grazia
STMicroelectronics srl

17:00 - 18:00 CEST
TUTORIAL SESSION #3
Room: Building 25 - Room P1.1
Chairs: Federico Tramarin, *University of Modena and Reggio Emilia, Italy*
 Stefano Cattini, *University of Modena and Reggio Emilia, Italy*

Technologies for the energy transition

Gianni Baroni
GRAF GASTECH

19:00
WELCOME PARTY
Caffè Concerto - Piazza Grande, 26 - Modena

Technical Sessions - Tuesday, July 5

08:30 - 17:00
REGISTRATION
Room: Department of Engineering - Building 25

08:30 - 09:00
OPENING CEREMONY - WELCOME ADDRESSES
Room: Building 25 - Room P1.2

09:00 - 09:45 CEST
PLENARY SESSION
Room: Building 25 - Room P1.2
Chair: Federico Tramarin, *University of Modena and Reggio Emilia, Italy*

5G, IoT and the future of Automotive

Alessandro Magnino, *Vodafone Business*

10:00 - 11:00 CEST
TECHNICAL SESSION 1
Innovative sensors and systems for the near future automotive world
Room: Building 25 - Room P1.2
Chairs: Elia Landi, *University of Siena, Italy*
　　　　Lorenzo Parri, *University of Siena, Italy*

10:00 **High Performance Analog MEMS for IoT Based Condition Monitoring, Characterization with a Bearing Failure Emulation Test Bench**
Elia Landi, University of Siena, Italy
Lorenzo Parri, University of Siena, Italy
Riccardo Moretti, University of Siena, Italy
Ada Fort, University of Siena, Italy
Marco Mugnaini, University of Siena, Italy
Valerio Vignoli, University of Siena, Italy

10:20 **A Wirelessly-Powered Embedded System for Temperature Measurements of a High Performance Electric Motor Rotor**
Mariano Nerone, HPE Coxa, Italy
Igor Valic, HPE Coxa, Italy
Matteo Zauli, University of Bologna, Italy
Alberto Leonardi, HPE Coxa, Italy
Nicola Matteazzi, HPE Coxa, Italy
Luca De Marchi, University of Bologna, Italy

10:40 **Roller Bearing Failures Classification with Low Computational Cost Embedded Machine Learning**
Matteo Bertocco, University of Padova, Italy
Ada Fort, University of Siena, Italy
Elia Landi, University of Siena, Italy
Marco Mugnaini, University of Siena, Italy
Lorenzo Parri, University of Siena, Italy
Giacomo Peruzzi, University of Siena, Italy
Alessandro Pozzebon, University of Padova, Italy

11:00 - 11:30
COFFEE BREAK

11:30 - 12:50 CEST
TECHNICAL SESSION 2
Sensors and instruments for improving the sustainability of e-vehicles on the distribution grid
Room: Building 25 - Room P1.2
Chairs: Marco Pasetti, *University of Brescia, Italy*
Stefano Rinaldi, *University of Brescia, Italy*
Carmine Landi, *University of Campania L. Vanvitelli, Italy*

11:30 **A TinyML Soft-Sensor for the Internet of Intelligent Vehicles**
Thommas Flores, Federal University of Rio Grande do Norte, Brazil
Marianne Silva, Federal University of Rio Grande do Norte, Brazil
Pedro Andrade, Federal University of Rio Grande do Norte, Brazil
Jord˜ao Silva, Federal University of Rio Grande do Norte, Brazil
Ivanovitch Silva, Federal University of Rio Grande do Norte, Brazil
Emiliano Sisinni, University of Brescia, Italy
Paolo Ferrari, University of Brescia, Italy
Stefano Rinaldi, University of Brescia, Italy

11:50 **The Role of Vehicle to Grid Technology for Enhancing Power Distribution System Flexibility**
Antonio Pepiciello, University of Sannio, Italy
Alfredo Vaccaro, University of Sannio, Italy

12:10 **Impact Analysis of Electric Vehicles on Distribution Grid by Hardware-In-The-Loop Simulations**
Fabrizio De Caro, University of Sannio, Italy
Nidhal Ben Mbarek, Université Clermont Auvergne, France
Firas Fredj, Université Clermont Auvergne, France
Alfredo Vaccaro, University of Sannio, Italy

12:30 **PWM Signal Measurement Issues**
Giuliano Cipolletta, University of Campania "Luigi Vanvitelli", Italy
Daniele Gallo, University of Campania "Luigi Vanvitelli", Italy
Antonio Delle Femine, University of Campania "Luigi Vanvitelli", Italy
Carmine Landi, University of Campania "Luigi Vanvitelli", Italy
Mario Luiso, University of Campania "Luigi Vanvitelli", Italy

12:50 - 14:10
LUNCH

14:10 - 15:50 CEST
TECHNICAL SESSION 3
General Session Part 1
Room: Building 25 - Room P1.2
Chair: Pier Andrea Traverso, *University of Bologna, Italy*

14:10 **A Triple-Band GNSS Receiver for High Accuracy Automotive Applications**
Domenico Di Grazia, STMicroelectronics
Fabio Pisoni, STMicroelectronics
Giovanni Gogliettino, STMicroelectronics
Simone Ardiero, STMicroelectronics
Giuseppe Avellone, STMicroelectronics

14:30 **Validation of Vehicle-to-Infrastructure scenarios based on the X-in-the-Loop-approach**
Moritz Waschle, Karlsruhe Institute of Technology, Germany
Wang Xi, Karlsruhe Institute of Technology, Germany
Xinlu Xhen, Karlsruhe Institute of Technology, Germany
Albert Albers, Karlsruhe Institute of Technology, Germany

14:50 **Measurement equipment and optimal approach for power line filter design for automotive**
Marco Bosi, University of Bologna, Italy
Alessandro Campanini, University of Bologna, Italy
Lorenzo Peretto, University of Bologna, Italy
Albert Miquel Sánchez, Emzer Technological Solution SL, Spain
Francisco Javier Pajares, Emzer Technological Solution SL, Spain

15:10 LiDARs detected signal and Target distance estimation: measurement errors from Target reflectance and multiple echos

Davide Cassanelli, University of Modena and Reggio Emilia, Italy
Stefano Cattini, University of Modena and Reggio Emilia, Italy
Giorgio Di Loro, University of Modena and Reggio Emilia, Italy
Luca Di Cecilia, CNH Industrial, Italy
Luca Ferrari, CNH Industrial, Italy
Luigi Rovati, University of Modena and Reggio Emilia, Italy

15:30 Experimental investigation on noise due to the cavitation phenomenon in proportional spool valves

Luca Romagnuolo, University of Naples Federico II, Italy
Emma Frosina, University of Sannio, Italy
Adolfo Senatore, University of Naples Federico II, Italy
Umberto Cesaro, University of Naples Federico II, Italy

15:50 - 16:20
COFFEE BREAK

16:20 - 17:40 CEST
TECHNICAL SESSION 4
Measurement for improving Quality, Reliability and Safety in Automotive Applications
Room: Building 25 - Room P1.2
Chairs: Lorenzo Ciani, *University of Florence, Italy*
    Gabriele Patrizi, *University of Florence, Italy*

16:20 Research on the Verification Method of the Electronic Police System for Capturing the Illegal Distance Between Vehicles

Hao Tang, Hunan Institute of Metrology and Test, China
Weixian Zeng, Hunan Institute of Metrology and Test, China
Wenhui Lin, Hunan Institute of Metrology and Test, China
Lan Yin, Hunan Institute of Metrology and Test, China
Yihong Xia, Hunan Institute of Metrology and Test, China
Qiuxi Deng, Hunan Institute of Metrology and Test, China

Zheng Peng, Hunan Institute of Metrology and Test, China
Fu Lin, Hunan Institute of Metrology and Test, China
Jiawei Yue, Hunan Institute of Metrology and Test, China
Feilong Wang, Potelissom Company Limited, China

16:40 **Entangled Bimodal Vision in Vehicles for Decision During Risk Situation**
Amit K. Kumar, Beijing Institute of Technology, China
Mansour H. Assaf, The University of the South Pacific, Republic of Fiji
Voicu Z. Groza, University of Ottawa, Canada
Emil M. Petriu, University of Ottawa, Canada

17:00 **Remaining Useful Life estimation for electric vehicle batteries using a similarity-based approach**
Marcantonio Catelani, University of Florence, Italy
Lorenzo Ciani, University of Florence, Italy
Francesco Grasso, University of Florence, Italy
Gabriele Patrizi, University of Florence, Italy
Alberto Reatti, University of Florence, Italy

17:20 **Assessment of the Efficiency Measurement Uncertainty and the Impact on Validation for Electric Drive Systems**
Uday Akasapu, AVL List GmbH, Austria
Michael Leighton, AVL List GmbH, Austria

17:40 - 18:40 CEST
ROUND TABLE
Room: Building 25 - Room P1.2
Moderator: Dr. Allegra Marini, *Venture and Innovation Advisor at Motor Valley Accelerator*

Experiences and opportunities for a new Motor Valley entrepreneurship

Prof. Francesco Leali, *Muner*

Prof. Bernardo Balboni, *C-lab*

Marco Baracchi, *CRIT Research*

Enrico Dente, *Plug and Play*

Loris Bruzzi, *Novac*

Roberto Montanari, *RELAB*

20:30
GALA DINNER
Agriturismo Cavaliera - Via Cavalliera, 1b, Castelvetro di Modena MO

SHUTTLE SERVICE. A shuttle bus will be available for the gala dinner. The bus will depart at 20.00 from the Conference Venue (Department of Engineering - Terminal Bus Gottardi).

08:30 - 15:00
REGISTRATION
Room: Department of Engineering - Building 25

09:00 - 09:45 CEST
PLENARY SESSION
Room: Building 25 - Room P1.2
Chair: Stefano Cattini, *University of Modena and Reggio Emilia, Italy*

The new trends shaping the automotive industry: a focus on alternative powertrains and vehicle connectivity

Domenico Dino Bracale, *AVL*

10:00 - 11:00 CEST
TECHNICAL SESSION 5
Electrical and mechanical measurement techniques for vehicles and automotive production
Room: Building 25 - Room P1.2
Chairs: Grazia Iadarola, *Polytechnic University of Marche, Italy*
             Susanna Spinsante, *Polytechnic University of Marche, Italy*

10:00   **Driver Drowsiness Detection based on Variation of Skin Conductance from Wearable Device**
        Andrea Amidei, University of Modena and Reggio Emilia, Italy
        Angelica Poli, Polytechnic University of Marche, Italy
        Grazia Iadarola, Polytechnic University of Marche, Italy
        Federico Tramarin, University of Modena and Reggio Emilia, Italy

Paolo Pavan, University of Modena and Reggio Emilia, Italy
Susanna Spinsante, Polytechnic University of Marche, Italy
Luigi Rovati, University of Modena and Reggio Emilia, Italy

10:20 **Using Periodic Sequences for HRTFs Measurement Robust Towards Nonlinearities in Automotive Audio Applications**
S. Cecchi, Università Politecnica delle Marche, Italy
V. Bruschi, Università Politecnica delle Marche, Italy
S. Nobili, Università Politecnica delle Marche, Italy
A. Terenzi, Università Politecnica delle Marche, Italy
A. Carini, University of Trieste, Italy

10:40 **Analysis of vehicle vibration through automotive radar signal**
Gianluca Ciattaglia, Polytechnic University of Marche, Italy
Grazia Iadarola, Polytechnic University of Marche, Italy
Lorenzo Minelli, Polytechnic University of Marche, Italy
Filippo Pimpini, Polytechnic University of Marche, Italy
Noemi Tridenti, Polytechnic University of Marche, Italy
Linda Senigagliesi, Polytechnic University of Marche, Italy
Susanna Spinsante, Polytechnic University of Marche, Italy
Ennio Gambi, Polytechnic University of Marche, Italy

11:00 - 11:30
COFFEE BREAK

11:30 - 12:50 CEST
TECHNICAL SESSION 6
Enhancing smart measurement systems and metrology with artificial intelligence for the automotive industry of the future
Room: Building 25 - Room P1.2
Chair: Alberto Morato, *IEIIT-CNR, Italy*

11:30 **A flexible machine learning based framework for state of charge evaluation**
Mattia Stighezza, University of Parma, Italy

Valentina Bianchi, University of Parma, Italy
Andrea Toscani, University of Parma, Italy
Ilaria De Munari, University of Parma, Italy

11:50 **On the Use of Artificial Intelligence and Sensor Fusion to Develop Accurate Eye Tracking and Driver's Emotional State Estimation Systems**
Tommaso Fedullo, University of Padova, University of Modena and Reggio Emilia, Italy
Valentina Di Pinto, University of Modena and Reggio Emilia, Italy
Alberto Morato, CNR-IEIIT, Italy
Federico Tramarin, University of Modena and Reggio Emilia, Italy
Stefano Cattini, University of Modena and Reggio Emilia, Italy
Luigi Rovati, University of Modena and Reggio Emilia, Italy

12:10 **Artificial Intelligence - Based Measurement Systems for Automotive: a Comprehensive Review**
Tommaso Fedullo, University of Padova, University of Modena and Reggio Emilia, Italy
Alberto Morato, CNR-IEIIT, Italy
Federico Tramarin, University of Modena and Reggio Emilia, Italy
Stefano Cattini, University of Modena and Reggio Emilia, Italy
Luigi Rovati, University of Modena and Reggio Emilia, Italy

12:30 **Drivers' Attention Assessment by Blink Rate Measurement from EEG Signals**
Antonio Affanni, University of Udine, Italy
Taraneh Aminosharieh Najafi, University of Udine, Italy

12:50 - 14:10
LUNCH

14:00 - 15:20 CEST
TECHNICAL SESSION 7
General Session - Part 2
Room: Building 25 - Room P1.2
Chair: Stefano Cattini, University of Modena and Reggio Emilia, Italy

14:00 **Simulating optical properties to access novel metrological parameter ranges and the impact of different model approximations**
Patrick Muller, University of Applied Sciences Dusseldorf, Germany
Alexander Braun, University of Applied Sciences Dusseldorf, Germany

14:20 **A vehicle integrated thermal management system for electric busses**
Luca Muratori, University of Bologna, Italy
Lorenzo Peretto, University of Bologna, Italy
Beatrice Pulvirenti, University of Bologna, Italy
Raffaella Di Sante, University of Bologna, Italy
Giovanni Bottiglieri, Webasto Thermo & Comfort, Italy
Federico Coiro, Webasto Thermo & Comfort, Italy

14:40 **Optical techniques applied to internal combustion engines for soot detection – a review**
Luca Marchitto, STEMS-CNR, Italy
Cinzia Tornatore, STEMS-CNR, Italy

15:00 **Online diagnosis of automotive wireline channels: the role of measurements and instrumentation**
Pasquale Daponte, University of Sannio, Italy
Gianluca Mazzilli, University of Sannio, Italy
Enrico Picariello, University of Sannio, Italy
Francesco Picariello, University of Sannio, Italy
Ioan Tudosa, University of Sannio, Italy

15:20 - 15:40
COFFEE BREAK

15:40 - 16:30 CEST
IEEE WIE ITALY SECTION AG Round Table
Room: Building 25 - Room P1.2

Exploiting the gender diversity impact in the Automotive sector

with a Special Focus on Metrology for Automotive

ORGANIZED BY:
Dajana Cassioli, *University of L'Aquila, IEEE WIE Italy Section AG Chair*
Roberta di Pace, *University of Salerno, Italy*

16:30 - 17:00 CEST
CLOSING AND AWARD CEREMONY
Room: Building 25 - Room P1.2