6th International Conference and Exhibition on

Automobile & Mechanical Engineering

July 08-09, 2019 | Zurich, Switzerland

Keynote Forum

Day 1

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Marcinek M

Warsaw University of Technology, Poland

Applications of tailored electrolytes in different types of modern cells

The progress in the electromobility and energy storage will dramatically increase demand for cells. Currently, the technology is based on Li-ion batteries. But such situation leads to the research for new materials and solutions. This lecture presents lines of new lithium electrolytes and their sodium analogues as an alternative candidates for battery components based on the concept of tailoring new salts. The lecture will be illustrated by examples of application of newly designed electrolytes in preliminary cells with novel electrode materials and discussion on possible extension in other systems.

Biography

Marek Marcinek is an Associate Professor at Warsaw University of Technology. Born in1973 in Bytom. Polish scientist specializing in energy storage systems (Li-ion, Na-ion…) and entrepreneurship/management education.Marek Marcinek is an alumnus of the Faculty of Chemistry at Warsaw University of Technology, Warsaw School of Economics (Marketing and Management) and Law Department of Warsaw University /University of Poitiers (European Law) .He worked in USA (Lawrence Berkeley National Laboratory, CUNY New York), Canada, France and Germany. Marcinek was involved in many worldwide scientific projects. He is a member of European Research Institute Alistore and Electrochemical Society. He was one of initiators of PolStorEn universities joint initiative.

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Hakan Kaleli

Yıldız Technical University, Turkey

Nano tribology of nano particles added in engine oil and nano coatings of piston rings-cylinder liners in internal combustion engines

This speech is related to our old and purely new scientific work carried out in our Automotive Lab. Real piston ring-cylinder specimens were tested with reciprocating tribometer using five different nanoparticles added engine oil to investigate their wear and friction behavior. With regard to the experiments, it has been found that the best results were determined by TiO_2 and SWCNTs (SWCNTs) according to the BN (boron nitride), Multi-walled carbon nanotubes (MWCNTs) and graphene nanoparticles added to the engine oil, respectively. At the end of the tests, abrasive wear has been observed as the main wear mechanism. The tribological characteristics of piston ring against a cylinder liner in the presence of graphene nano-additives mixed into 5W40 fully synthetic engine oil was also investigated. The tribometer and engine test results showed that graphene nanoparticles are a potentially beneficial additive to engine lubricants. Chromium Carbon Nitride coating (CrCN) is deposited with (Physical Vapor Deposition) PVD method on cylinder liner. Friction and wear test were conducted using a reciprocating tribometer. Although the CrCN coating eliminated the wear of the coated liner, the restricted tribofilm formation and the high coating hardness led to more intense wear of the piston ring and showed slightly higher friction value related non-coated liner. Diesel engine cylinder liner is also coated with Graphene using Chemical Vapour Deposition (CVD) technique on the cylinder liner surface. Graphene coating showed slightly lower friction value between ball and coated cylinder liner pairs related non-coated liner.

Biography

Hakan Kaleli has completed his PhD at Yıldız Technical University, Faculty of Mechanical Engineering, Automotive Division in İstanbul-Turkey in 1995. He is teaching Internal Combustion Engines, Otto Engine Technology, Diesel Engine Technology, Tribology, Wear Lubrication, Oil Analysis and Cooling in Internal Combustion Engines. He has published many papers in reputed journals and is still working on Automobile-Engine Nano/Tribology.

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Julian F Dunne

University of Sussex, UK

The role of dynamics and control in cutting vehicle CO_2 emissions

There are only two ways of cutting CO_2 emissions from road vehicles: either i) by eliminating carbon from the propulsion source, or ii) by dramatically improving vehicle efficiency. Adopting either of these options affordably is by far from easy. This plenary lecture will focus on areas of vehicle technology where dynamics and control can be used expediently to improve vehicle efficiency for conventionally powered vehicles, Hybrid Electric Vehicles (HEV), and (battery) Electric Vehicles (EV). For example, in both conventionally-powered vehicles, and HEV, there are significant benefits of closed-loop combustion control to improve engine thermal efficiency and performance using different fuels. The state of indirect cylinder pressure sensing will be discussed. Another application where significant fuel economy improvements are possible in IC engines, is to replace the liquid cooling with evaporative cooling a novel approach to control two-phase spray evaporative cooling will be outlined. Yet another area for CO_2 emission reduction for HEV is the adoption of advanced Range Extender concepts. And a final example (where a novel optimal control approach will be discussed) is optimal flywheel-based kinetic energy recovery that offers durable vehicle range extension for both EV and HEV. In summary, a broad overview will initially be given of areas where dynamics and control alone can engender significant improvements in vehicle efficiency. Some of the realizable benefits and implementation challenges will be examined for the topics mentioned.

Recent Publications

1. S Jafari J F Dunne, M Langari Z Yang, J-P Pirault, C A Long and J Thalackottore Jose (2018) Control of spray evaporative cooling in automotive IC engines. ASME Journal of Thermal Science and Engineering Applications 10(4):1-11.
2. C Bennett J F Dunne, S Trimby and D Richardson (2017) Engine cylinder pressure reconstruction using crank kinematics and recurrently-trained neural networks. Journal of mechanical systems and signal processing 85:126-145.
3. J F Dunne and L A Ponce Cuspinera (2015) Optimal gear ratio planning for flywheel-based kinetic energy recovery systems in motor vehicles. ASME Journal of Dynamic Systems Measurement and Control. 137(7):071012.

Biography

Julian F Dunne is a Professor of Mechanical Engineering at the University of Sussex, UK. His expertise is in Dynamics and Control, with application interests in low emission vehicles, in particular, noise and vibration prediction for 'light-weighted' vehicles; control of combustion in downsized engines; evaporative cooling of Hybrid Electric Vehicle engines; kinetic energy recovery systems; and novel power generators. His special application interest is on efficient Range Extenders for Hybrid Electric Vehicles. He currently leads the 36-strong Dynamics, Control, and Vehicle Research Group at Sussex University. He has 78 refereed publications, and is an Editorial Board Member of three journals: *The Journal of Sound and Vibration, Vehicles, and Journal of Autonomous Intelligence*. His research has been externally-funded by the EPSRC, the EU, the UK Government, and Jaguar Land Rover. He has also received very significant support from Ford, Ricardo, and Denso (the Toyota subsidiary). In 2012, he has organized a very successful 2-day International Symposium at the University of Sussex on the Computational Modeling and Analysis of Vehicle Body Noise and Vibration.

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