20 YEARS OF EXCELLENCE IN INTERNATIONAL MEETINGS
alliedacademies.com



Christer Forsgren, J Ind Environ Chem 2019, Volume 3
DOI: 10.4066/2591-7331-C2-010

## Christer Forsgren

Chalmers University of Technology, Sweden

## BIOGRAPHY

Christer Forsgren has a background in Chemical Engineering and has been working as a Manager in different recycling companies for 30 years. He is Adjunct Professor in Industrial Material Recycling at Chalmers Technical University, Sweden. He holds the Chair in the Taskforce, Waste and Chemicals in the European Branch Organization for Recyclers, EuRIC.

christer.forsgren@stenametall.se

## URBAN MINING, A SUSTAINABLE BUT CHALLENGING SOURCE OF RAW MATERIAL

In a more circular economy the products of today should be part of the raw material for the products of tomorrow. To reach this we need to overcome a number of obstacles: Product design needs to take into account reuse, repair and recycling. Present Extended producer responsibility legislation does not give enough incentives; classification of waste is based on contamination content, should be based on risk; monopolies that only focus on reducing cost/maximize profit. Products and material that has been used in society one time, often loses all of its value when it becomes waste. In average <3% of the value is left. There are many reasons for this, fashion and legislation, to avoid extreme down-grading of waste by treating using energy recovery or landfilling, technologies like feed-stock-recycling needs to be applied. In most applications biodegradable plastics are non-sustainable; bio based in most cases the opposite. If a carbon atom is "black" or "green" does not make a big difference if it is circulated in society, but the possibilities to do so are today very limited.

20 YEARS OF EXCELLENCE IN INTERNATIONAL MEETINGS
alliedacademies.com



Kevin L Koudela, J Ind Environ Chem 2019, Volume 3
DOI: 10.4066/2591-7331-C2-010

## Kevin L Koudela

The Pennsylvania State University, USA

## BIOGRAPHY

Kevin L Koudela has led the design, fabrication and demonstration of multiple composite and hybrid composite prototypes for operational evaluation and has taught courses in composites, structural analysis and finite element analysis at The Pennsylvania State University, USA. He was the author or co-author of 24 referred journals and 43 technical proceeding articles and serves as a technical reviewer for the *Journal of Composite Materials, Journal of Composites Technology and Research, ASTM and ASME*. He was awarded the Navy Meritorious Civilian Service Award and was a co-recipient of the Defense Manufacturing Technology (ManTech) Achievement Award by the US Office of Naval Research.

klk121@arl.psu.edu

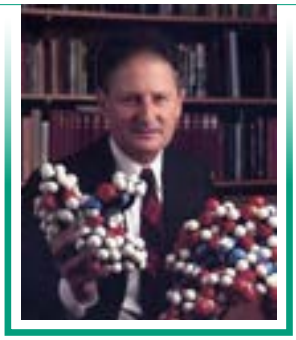
## DESIGN OF AN EMERGENT NET SHAPE FABRICATED THREE BLADE COMPOSITE ONE PIECE ROTORS FOR CAPEX AND OPEX REDUCTIONS

Marine Hydro Kinetic (MHK) turbines have shown promise as a method for harvesting energy from natural waterways. However, excessive fabrication and assembly and high life-cycle costs often preclude implementation of these energy harvesting devices. As such, our design process is focused on mitigation of implementation challenges by designing a novel low-cost, net shape fabricated single piece composite three-blade MHK turbine rotor to minimize both Capital Expenditures (CAPEX) and Operational Expenditures (OPEX) to enable cost of energy improvements. We believe that we are able achieve these cost reductions by leveraging our successfully demonstrated rapid design protocol, underpinned by our team-based concurrent engineering design approach, whereby we incorporate all key technology disciplines including selection of materials, implementation of robust design methods, ply kitting strategies for ease of blade manufacture, recommended non-destructive inspection methods and design of test and evaluation methods from rotor concept design through single piece composite rotor prototype detailed design. Author's presentation provides a summary of the three key emergent processes associated with our prototype design evolution: Design for turbine rotor manufacturability using computational fluid dynamics and finite element analysis; single piece composite turbine rotor net shape fabrication protocol and coupon and prototype threshold fatigue test methods to ensure MHK rotor structural robustness. They envision that this innovative team-based concurrent engineering approach will enable us to reduce CAPEX by eliminating complex assemblies and rotor machining while mitigating OPEX by use of non-corrosive e-glass/epoxy composite materials and implementing our state-of-the-art threshold fatigue design protocol to prevent onset of material degradation over the life of the MHK turbine rotor.

20 YEARS OF EXCELLENCE IN INTERNATIONAL MEETINGS
alliedacademies.com



Henry Sobell, J Ind Environ Chem 2019, Volume 3
DOI: 10.4066/2591-7331-C2-010



## Henry Sobell

University of Rochester, USA

## BIOGRAPHY

Henry M Sobell has completed his studies at Brooklyn Technical High School (1948-1952), Columbia College (1952-1956) and University of Virginia School of Medicine (1956-1960). Instead of practicing clinical medicine, then he went to the Massachusetts Institute of Technology (MIT) to join Professor Alexander Rich in the Department of Biology (1960-1965), where, as a Helen Hay Whitney Postdoctoral Fellow, he learned the technique of single crystal X-ray analysis. He then joined the Chemistry Department at the University of Rochester, having been subsequently jointly appointed to both the Chemistry and Molecular Biophysics departments (the latter at the University of Rochester School of Medicine and Dentistry), becoming a full tenured Professor in both departments (1965-1993).

sobell@localnet.com

## THE CENTERS OF PREMELTONS SIGNAL THE BEGINNING AND ENDS OF GENES

Premeltons are examples of emergent structures (i.e. structural solitons) that arise spontaneously in DNA due to the presence of nonlinear excitations in its structure. They are of two kinds: B-B (or A-A) premeltons form at specific DNA-regions to nucleate site-specific DNA melting. These are stationary and being globally non-topological, undergo breather motions that allow drugs and dyes to intercalate into DNA. B-A (or A-B) premeltons, on the other hand are mobile and being globally topological, act as phase-boundaries transforming B- into A-DNA during the structural phase-transition. They are not expected to undergo breather-motions. A key feature of both types of premeltons is the presence of an intermediate structural-form in their central regions (proposed as being a transition-state intermediate in DNA-melting and in the B- to A-transition), which differs from either A- or B-DNA called beta-DNA, this is both metastable and hyperflexible–and contains an alternating sugar-puckering pattern along the polymer-backbone combined with the partial-unstacking (in its lower energy-forms) of every other base-pair. Beta-DNA is connected to either B- or to A-DNA on either side by boundaries possessing a gradation of nonlinear structural-change, these being called the kink and the anti-kink regions. The presence of premeltons in DNA leads to a unifying theory to understand much of DNA physical-chemistry and molecular-biology. In particular, premeltons are predicted to define the 5′ and 3′ ends of genes in naked-DNA and DNA in active-chromatin, this having important implications for understanding physical aspects of the initiation, elongation and termination of RNA-synthesis during transcription. For these and other reasons, the model will be of broader interest to the general audience working in these areas. The model explains a wide variety of data and carries within it a number of experimental predictions all readily testable as will be described in his talk.

20 YEARS OF EXCELLENCE IN INTERNATIONAL MEETINGS
alliedacademies.com



Marc A Rosen, J Ind Environ Chem 2019, Volume 3
DOI: 10.4066/2591-7331-C2-010

## Marc A Rosen

Ontario Tech University, Canada

## BIOGRAPHY

Marc A Rosen is a Professor at the Ontario Tech University in Oshawa, Canada, where he served as Founding Dean of the Faculty of Engineering and Applied Science. He was President of the Engineering Institute of Canada. He is a Registered Professional Engineer in Ontario and serves as Editor-in-Chief of several journals and Director of Oshawa Power and Utilities Corporation. With over 60 research grants and contracts and 600 publications, he is an active teacher and researcher in sustainable energy, environmental impact and energy technology (including renewable energy and efficiency improvement). Much of his research has been carried out for industry and he has written numerous books. He has worked for such organizations as Imatra Power Company in Finland, Argonne National Laboratory near Chicago and the Institute for Hydrogen Systems near Toronto. He has received numerous awards and honors.

marc.rosen@uoit.ca

## USING HYDROGEN ENERGY TO ENHANCE THE PROSPECTS OF RENEWABLE ENERGY

The prospects for renewable energy are enhanced through the use of hydrogen energy, i.e. using hydrogen as an energy carrier. As easily accessible fossil fuel supplies become scarcer and environmental concerns increase, hydrogen is likely to become an increasingly important chemical energy carrier. As the world's energy sources become less fossil fuel-based, hydrogen and electricity are expected to be the two dominant energy carriers for the provision of end-use services, in a hydrogen economy. Thus, hydrogen energy systems allow greater use of renewable energy resources. There are many commercial processes for producing hydrogen from fossil fuel and non-fossil fuel sources (including renewables). Technologies for the storage and distribution of hydrogen exist. Technologies are developing for utilizing hydrogen as an energy carrier, especially in transportation. The technologies needed for hydrogen energy systems are undergoing much research and development. In this presentation, the role of hydrogen as an energy carrier and hydrogen energy systems and their economics are described.