"Artificial Intelligence for Thermal Systems: the Good, the Bad, the Hybrid"

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Artificial Intelligence (AI) has disrupted several industries and for very good reasons. AI algorithms, combined with large computational power and scalability of the cloud are capable of finding non-obvious correlations in a large amount of data, predict future trends and help optimise various types of operations.

Several success stories of AI applications in our daily lives range from facial recognition to language translators and digital assistants. In science and business, AI has helped multiple industries including medicine (e.g. medical records mining, assistance to doctors in diagnosis and surgery, better drug development in minimal time), marketing (e.g. predicting customer behaviour) and is making strides with autonomous vehicles and even general AI, a human-like artificial intelligence capable of understanding and learning any intellectual task that a human brain can.

What about Thermal Systems? In this seminar, aimed at heat transfer engineers that are seeking to better understand the potential of Artificial Intelligence, we will discuss the basis of algorithms, explain the differences between Artificial Intelligence, Machine Learning and Deep Learning and examine the benefits and limitations of these technologies over traditional deterministic (physics based) models when applied to various thermal systems. We will also discuss how more advanced approaches such as Physics-informed AI and Hybrid-AI which combine the power and scalability of AI with deterministic models are currently being used to overcome the traditional limitations of AI methods.

Finally, we will use real-world examples that range from microscale phenomena (e.g. Pulsating Heat Pipes) to industrial applications (e.g. Heat Exchanger Networks) to illustrate the current capabilities of the methods, their limitations and their true potential to revolutionise the heat transfer sector.

The presentation will start at **12 noon** (for one hour).

Free Webinar Registration Link: HERE

Dr. Francesco Coletti is the CEO of Hexxcell Ltd., a London based technology company providing predictive analytics and prescriptive maintenance solutions for industrial heat transfer systems to major international oil&gas and petrochemical companies.

Francesco has a track-record of developing industrial digital solutions from ideation to deployment in the field, with particular focus on hybrid AI-deterministic models for monitoring, optimization and predictive maintenance of process and energy systems. Prior to Hexxcell, Francesco worked as a Development Specialist at Praxair Technology Center (now Linde) in Buffalo, NY, where he focused on mathematical optimization of cryogenic multi-stream heat exchangers and air separation units

He has co-edited a monograph dedicated to Crude Oil Fouling, published over 70 journal articles and conference proceedings and is the Executive Editor of Heat Exchanger Design Handbook. Since 2015 is one of the two elected representatives for the UK serving on the Scientific Committee of the International Heat Transfer Conferences, the top global conference in the field held every four years. He was elected to the UK National Heat Transfer Committee in 2014, and subsequently appointed as its Secretary in 2016. Since 2019 is a Director of the AIChE Fuels&Petrochemical Division. Francesco is also a part-time Associate Professor at Brunel University London where he contributed to the launch of a new Chemical Engineering Department and was visiting academic at Imperial College London (2016-2017).

He holds a Laurea degree in Chemical Engineering from Padova University, Italy, an MSc in Process Systems Engineering and a PhD in Chemical Engineering from Imperial College London, UK. He was awarded the Newitt Prize for best Computational PhD thesis in Chemical Engineering and the Townend prize for excellence in research in the area of fuel production.

Call for experts to assist with EN ISO heat transfer standards

We all use various standards, codes and good practice guides and it is important for these to be safe and best practice. For years many of the most used API heat transfer standards were cobranded (technically the same) as their equivalent EN ISO, e.g., API 660 and BS EN ISO 16812, or API 530 with BS EN ISO 13704.

API have revised API 663 (hairpin heat exchangers) and API 667 (plate and frame heat exchangers) and this is a request for experts to assist in ensuring the EN ISO's are technically in step with best practice. The plan is to revise the EN ISO's by referencing the technical content of the latest revision of their formally cobranded API standard. The EN ISO will also include alternate non-US references where these are technically suitable. For any ISO revision we require experts from at least 5 countries to participate. This is a call for experts to assist. It does not require a lot of hours, but it does help us ensure organisations around the world are not using out of date EN ISO standards.

If you wish to know more, please contact Colin Weil colin.weil@sky.com

Future events

- ❖ 24th November 2022, Webinar - Dave Walker, HyNet Project Manager, Progressive Energy will talk about a low carbon and hydrogen energy project in the North West.
- ❖ 20th December 2022, Christmas Buffet & President's Night – Prince Alfred, 112 Queensway, London W2 3RR;
- ❖ 31st March 2023, 57th HTS Annual Dinner - Grand Connaught Rooms, 61-65 Great Queen St, London WC2B 5DA.

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