

## Artificial Intelligence for Clinical Trial Design

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### **Abstract:**

Artificial intelligence (AI) technologies have advanced to a level of maturity that allows them to be employed under real-life conditions to assist human decision-makers. AI has the potential to transform key steps of clinical trial design from study preparation to execution towards improving trial success rates, thus lowering the pharma R&D burden. Suboptimal patient cohort selection and recruiting techniques, paired with the inability to monitor patients effectively during trials, are two of the main causes for high trial failure rates: only one of 10 compounds entering a clinical trial reaches the market. This session will explain in layman's terms some of the foundations of AI methodology, such as Machine Learning and Deep Learning, highlighting how recent advances can be applied at specific stages of the clinical trial design process to improve cohort composition, patient recruitment, medication compliance and patient retention. A special focus will be given to describing how patients in neurology trials could be monitored more efficiently through Digital Disease Diaries, which use wearable devices, machine learning at the edge and cloud technology to automatically detect and log disease episodes and patient adherence to trial protocols. Like all technical revolutions, this comes with challenges and risks, both technical and regulatory. In particular, we will discuss scalability, data encryption and patient privacy.

### **Biography:**

Since joining IBM Research in 2008, Stefan has worked in the fields of biotech, nanotech and healthcare analytics at IBM Albany Nanotech, and the IBM T.J. Watson Research Center in New York. In 2015 he founded the Brain-Inspired Computing Research Program of IBM Research Australia. As its Technical Lead and Manager and since 2020 as Senior Technical Staff Member, he has grown it into IBM's Epilepsy Research Program spearheading a global effort to develop AI technology for diagnosing, managing and treating epilepsy. Stefan's team works closely with leading medical institutions around the world and with IBM's 12 global research labs. As Inductee to the IBM Academy of Technology, IBM Master Inventor holding 57 issued patents, Member of the New York Academy of Sciences, IEEE Senior Member, Senior Editor of the IEEE Transactions on Nanobioscience and Adjunct Professor at the University of Technology Sydney Stefan wears a variety of corporate, academic and societal hats. Navigating this ecosystem has made him a specialist for initiating, conducting and commercializing science in complex collaborative environments spanning industry, academia and government. Stefan received the B.Sc., Diploma, and Ph.D. degrees in Electrical Engineering and Computer Science with majors in Biomedical Engineering and Nanotechnology from the Technical University of Munich (TUM) and an Honours Master's Degree in Technology Management from the Center for Digital Technology and Management (CDTM).

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