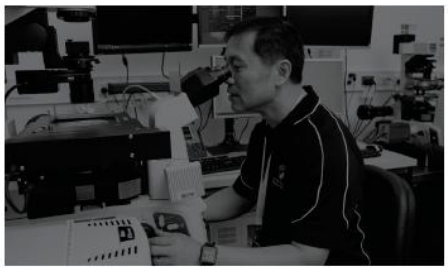
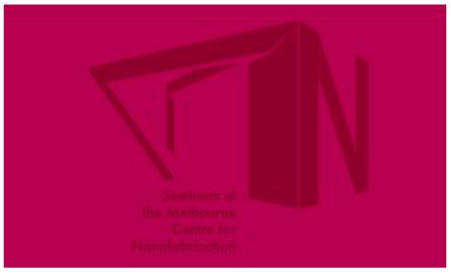


Toward Autonomous Science: Nanotechnology and the Rise of Self-Learning Machines

Osvaldo N. Oliveira Jr.
Director, the São Carlos Institute of Physics
The University of São Paulo, Brazil

10:00am, 31/07/2025
Melbourne Centre for Nanofabrication
151 Wellington Road, Clayton, 3168
Zoom link: click here
Meeting ID: 874 0886 6047 and passcode: 971252



MCN Melbourne Centre for Nanofabrication

ANFF VICTORIA

Toward Autonomous Science: Nanotechnology and the Rise of Self-Learning Machines

Osvaldo N. Oliveira Jr.
The University of São Paulo, Brazil
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Abstract: This lecture explores the dynamic interplay between artificial intelligence (AI) and nanotechnology, highlighting how each drives the other forward. While AI accelerates material discovery, sensing, and diagnostics, nanotechnology enables the development of advanced hardware such as neuromorphic and quantum systems. Together, they are paving the way for the 5th paradigm of science, where machines autonomously generate knowledge, design experiments, and interpret data with minimal human input. Case studies in biosensing and image analysis illustrate these trends. The lecture will also address the societal implications of this shift toward machine-led scientific discovery.

About the speaker:

Osvaldo N. Oliveira Jr. is Director of the São Carlos Institute of Physics at the University of São Paulo, Brazil; President of the International Union of Materials Research Societies (IUMRS) for 2023–2024; a member of the Brazilian Academy of Sciences; and Executive Editor of ACS Applied Materials & Interfaces. He is a physicist with a BSc and MSc from the University of São Paulo and a PhD from the University of Wales, Bangor (1990). In recent years, Prof. Oliveira has pioneered interdisciplinary approaches, merging methods from statistical physics and computer science for text analysis, and applying information visualization and machine learning to enhance sensing and biosensing performance.