

# ***The 11th International Petra School of Physics (PSP11)***

## ***“AI in the Natural Sciences”***

**AMMAN, IRBID, PETRA, JORDAN**

**October 14-17, 2025**

### **Scientific Program (Tentative)**

**First Day: Tuesday Oct. 14, 2025 (The University of Jordan)**

Time	Activity
9:00-10:00	Registration
10:00-10:45	<b>Opening Ceremony</b>
10:45-11:15	Coffee Break
Session Chair	Professor Humam B. Ghassib (The University of Jordan)
11:15-12:15	<b>AI IN QUANTUM COMPUTING</b> <i>Concepts and Progress of Artificial Intelligence and Machine Learning and Applications to the Sciences</i> Barry C. Sanders
12:15-14:00	Lunch
Session Chair	Professor Sami Mahmood (The University of Jordan)
14:00-15:00	<b>AI IN MATERIALS SCIENCE</b> <i>Data-Centric Materials Science and the Search for Materials Genes Governing Properties and Functions</i> Matthias Scheffler
15:00-15:20	Coffee Break
Session Chair	Professor Abdel-Fatah Lehlooh (Yarmouk University)
15:20-16:20	<b>AI IN COMPUTATIONAL BIOPHYSICS</b> <i>Maximum Entropy Modeling: Uncovering Structure in Complex Data</i> Beatriz Seoane
16:20-17:20	<b>AI IN MATERIALS SCIENCE</b> <i>Introduction to Graph Neural Networks (GNNs) in Materials Science</i> Bernd Ensing

## Second Day: Wednesday Oct. 15, 2025 (The University of Jordan)

Time	Activity
Session Chair	Professor Riyad S. Manasrah (The University of Jordan)
9:00-10:00	<p>AI IN MATERIALS SCIENCE</p> <p><i>Beyond Big Data: Information-Rich Databases and the Active Learning Paradigm</i></p> <p>Matthias Scheffler</p>
10:00-11:00	<p>AI IN COMPUTATIONAL BIOPHYSICS</p> <p><i>The Role of Big Data in Computational Biophysics and ML Tools for Molecular Dynamics Simulations</i></p> <p>Edina Rosta</p>
11:00-11:30	Coffee Break
11:30-12:30	<p>AI IN MATERIALS SCIENCE</p> <p><i>New tools to enhance sampling and discover mechanisms of slow molecular transitions</i></p> <p>Bernd Ensing</p>
12:30-14:00	Lunch
Session Chair	Professor Ahmad S. Masadeh, Professor Khaled G. Bodoor (The University of Jordan)
14:00-15:00	<p>AI IN QUANTUM COMPUTING</p> <p><i>Tensor Networks for Quantum Sciences</i></p> <p>Edwin Stoudenmire</p>
15:00-15:30	Coffee Break
15:30-16:30	<p>AI IN COMPUTATIONAL BIOPHYSICS</p> <p><i>Beyond Pairwise Interactions: The Power of Energy-Based Generative Models</i></p> <p>Beatriz Seoane</p>
16:30-17:00	<p>AI IN QUANTUM COMPUTING</p> <p><i>Powering XAFS with AI Model: Physics-Informed Neural Networks for Fast and Accurate Local Atomic Structure Prediction</i></p> <p>Latif U. Khan (SESAME)</p>

### Third Day: Thursday Oct. 16,2025 (Yarmouk University, Irbid)

Time	Activity
Session Chair	Prof. Anas M. Ababneh, Dr. Manal Al-Ali (Yarmouk University)
9:00-10:00	<p>AI IN QUANTUM COMPUTING</p> <p><i>Quantum Data Science and the Future of Quantum Computing</i></p> <p>Barry C. Sanders</p>
10:00-10:30	Coffee break
Session Chair	Prof. Abdullah Al-Sharif, Dr. Riad Ababneh (Yarmouk University)
10:30-11:30	<p>AI IN QUANTUM COMPUTING</p> <p><i>Tensor Networks, Machine Learning, and Functions</i></p> <p>Edwin Stoudenmire</p>
11:30-12:30	<p>AI IN COMPUTATIONAL BIOPHYSICS</p> <p><i>Enhanced sampling simulations of biomolecular systems</i></p> <p>Edina Rosta</p>
12:30-14:00	Lunch
Session Chair	Professor Nehad M. Tashtoush (Yarmouk University)
14:00-15:00	<b>Closing Session</b>
15:00-20:30	Trip to Jerash & Dinner

### Fourth Day: Friday Oct. 17, 2025

Time	Activity
8:00	Departure to Petra City
11:00-18:00	Petra Tour & Dinner
18:00	Departure to Amman