

**Philosopher in Residence Fellowship Program**

**Focus Group: Quantum Logic and the Second Quantum Revolution**

# Seminar Series

## Quantumness: from Logic to Engineering and back

The burgeoning research into quantum information and computation marks a significant milestone that can be dubbed “the second quantum revolution”. The first quantum revolution of the 20th century deeply changed the fundamental concepts of physics and our understanding of the physical world. The second quantum revolution of the 21st century is leading to dramatic technological changes in our society and shaping new conceptual and logical paradigms. Munich Quantum Valley serves as an exemplary case, bringing together fundamental research and practical application.

Organized by Prof. Roberto Giuntini (Philosopher in Residence) and his hosts:  
**Prof. Hans-Joachim Bungartz, Prof. Stefania Centrone, Prof. Klaus Mainzer**  
 For further information, please contact: roberto.giuntini@tum.de

<b>December 6th 2023</b>	IAS Faculty Club (fourth floor) <b>First Quantum Afternoon</b> <b>Prof. Michael Molls</b> (Director of TUM-IAS) Opening speech <b>Prof. Klaus Mainzer</b> (TUM) Introduction to the Focus Group and to the Seminars <b>Prof. Giuseppe Sergioli</b> (University of Cagliari), <b>Prof. Roberto Giuntini</b> (TUM-IAS, University of Cagliari) Quantum State Discrimination for Supervised Classification <b>Prof. Christian Mendl</b> (TUM) Aspects of Quantum Simulation by Digital Quantum Computer	15:00 – 15:45 15:45 – 16:00 16:00 – 16:45 16:45 – 17:30 17:30 – 18:15	<b>Prof. Robert Wille</b> (TUM) Design Automation for Quantum Computing Coffee break <b>Dr. Fabienne Marco</b> (TUM) Pathways to quantum entanglement: Responsible Research and innovation strategies <b>Prof. Maria Luisa Dalla Chiara</b> (University of Florence) Logics from quantum information and possible applications <b>Prof. Klaus Mainzer</b> (TUM) From the Quantum World to Quantum AI
<b>March 15th 2024</b>	IAS Room 0.004 (ground floor) <b>Prof. Marco Giunti</b> (University of Cagliari) Computing systems: mathematical entities or physical objects?	11:30 –12:45	
<b>April 10th 2024</b>	IAS Room 1.021 (first floor) <b>Prof. Tobias Vogl</b> (TUM) Implementing a single photon quantum logic at room temperature	15:00 –16:00	
<b>April 17th 2024</b>	IAS Faculty Club (fourth floor) <b>Applications of integrated High Performance Quantum Computing</b> <b>Dr. Luigi Iapichino</b> (Leibniz Supercomputing Centre – LRZ)) Initial services and applications in the Quantum-accelerated Supercomputing Ecosystem <b>Dr. Marco De Pascale</b> (Leibniz Supercomputing Centre – LRZ)) Comparison of HPC performance of simulators on representative QC use cases	15:00 –15:45 15:45 –16:30	
<b>May 16th 2024</b>	IAS Auditorium (ground floor) <b>Second Quantum Afternoon</b> <b>Prof. Michael Molls</b> (TUM-IAS) Opening speech I <b>Prof. Hans Bungartz</b> (TUM) Opening speech II <b>Prof. Urs Gasser</b> (TUM) Opening speech III	14:15 –14:30 14:30 –14:45 14:45 – 15:00	
			<b>May 21st 2024</b> IAS Room 0.004 (ground floor) <b>Quantum Logic as a Logic</b> <b>Prof. Roberto Giuntini</b> (TUM-IAS, University of Cagliari) From sharp to unsharp Logic (I) <b>Prof. Francesco Paoli</b> (University of Cagliari) From sharp to unsharp Logic (II)
			<b>June 5th 2024</b> IAS Room 0.004 (ground floor) <b>Foundations of Artificial Intelligence</b> <b>Prof. Fabio Roli</b> (University of Genua and Cagliari) From known knowns to unknown unknowns in AI: Historical and technical issues
			<b>June 7th 2024</b> IAS Room 0.004 (ground floor) <b>Quantum Monadology</b> <b>Prof. Stefania Centrone</b> (TUM) Monadology and Quantum Monadology <b>Prof. Klaus Mainzer</b> (TUM) Monads, brains, and Quantum Computing
			<b>July 3rd 2024</b> IAS Room 0.004 (ground floor) <b>Dr. Federico Holik</b> (University of La Plata) Geometrical aspects of resources distribution in quantum random circuits
			<b>July 9th 2024</b> IAS Room 0.004 (ground floor) <b>Prof. Majid Khadiv</b> (TUM) Intelligent humanoid robots and potential ethical issues

**Venue:**

Institute for Advanced Study  
Lichtenbergstraße 2a  
Garching bei München

The seminar series is funded  
and sponsored by

