

# ETOP QUANTUM SYMPOSIUM (May 16, 2023)

## PROGRAM

### QUANTUM EDUCATION I: INVITED SPEAKERS SESSION (morning session 8:30 a.m. -10:30 a.m.).

Chair – **Svetlana G. Lukishova**, University of Rochester

**1. 8:30 a.m. – 9 a.m.**

#48. “Quantum optics laboratories with motorized components”, **Enrique (Kiko) J. Galvez**, N. S. DiBrita, Colgate Univ (United States).

**2. 9 a.m. – 9:30 a.m.**

#134. “Polarization and entanglement of photons as basis for explaining quantum physics”, **Alexander I. Lvovsky**, Univ. of Oxford (United Kingdom).

**3. 9:30 a.m. - 10 a.m.**

#53. “Quantum optics experiments in undergraduate labs”, **Heather Lewandowski**, University of Colorado (United States).

**4. 10 a.m. – 10:30 a.m.**

#56. “Quantum education - how to teach a subject that nobody fully understands?”, **Mo Hasanovic**, Indian River State College (United States).

### QUANTUM EDUCATION II: CURRICULUM DEVELOPMENT (early afternoon session, 1p.m.-2:45 p.m.),

Chair – **Bahaa Saleh**, University of Central Florida

**1. 1 p.m. – 1:15 p.m.**

#19. “Sustainable education in the age of the second quantum revolution: fifteen years of the University of Rochester NSF supported efforts”, **Svetlana G. Lukishova**, N. Bigelow, University of Rochester (United States).

**2. 1:15 p.m. – 1:30 p.m.**

#24. “Online lab course using photons”, Y. Pathak, Institute of Applied Physics, Abbe Center of Photonics, Friedrich Schiller University Jena (Germany) and Digital Teaching Lab, Max Planck School of Photonics (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering IOF (Germany); **Rudrakant Sollapur**, J. Ziebell, Institute of Applied Physics, Abbe Center of Photonics, Friedrich Schiller University Jena (Germany); R. Geiß, Fraunhofer Institute for Applied Optics and Precision Engineering IOF (Germany); T. Kaiser, F. Setzpfandt, A. Tünnermann, T. Pertsch, Institute of Applied Physics, Abbe Center of Photonics, Friedrich Schiller University Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering IOF (Germany).

**3. 1:30 p.m. – 1:45 p.m.**

#25. “Experimental elective course for Master students”, **Rudrakant Sollapur**, Friedrich Schiller University Jena (Germany); F. Eilenberger, Fraunhofer-Institute for Applied Optics and Precision Engineering IOF (Germany); T. Pertsch, F. Setzpfandt, Friedrich Schiller University Jena (Germany) and Fraunhofer-Institute for Applied Optics and Precision Engineering IOF (Germany).

**4. 1:45 p.m. – 2 p.m.**

#32. “Development of a multi-perspective approach to quantum education through analog experiments”, **Stefan Aehle**, Working Group Teaching Methodology in Physics and Astronomy, Friedrich-Schiller-University Jena (Germany); P. Scheiger, Working Group Teaching Methodology in Physics and Astronomy, Friedrich-Schiller-University Jena (Germany) and Physics Education

Research, 5th Institute of Physics, University of Stuttgart (Germany); T. Reinsch, Physics Education Research, 5th Institute of Physics, University of Stuttgart (Germany).

**5. 2 p.m. – 2:15 p.m.**

#121. “Quantum education as a cornerstone of curriculum and workforce development: perspectives and Insights into current initiatives at the Virginia Tech Department of Electrical and Computer Engineering”, V. Chekuri, M. Fuhrer, I. Wildemann, C. Wu, Virginia Tech Innovation Campus (United States); B. Sarabi, W. Scales, L. F. Lester, Virginia Tech Dept. of Electrical & Computer Engineering (United States); V. Kovanis, Virginia Tech Innovation Campus (United States); **Ravi Raghunathan**, Virginia Polytechnic Institute and State Univ (United States).

**6. 2:15 p.m. – 2:30 p.m.**

# 129. “Quantum Engineering degree programs for the future national QIS workforce”, **Thomas A. Searles**, Univ. of Illinois at Chicago (United States).

**7. 2:30 p.m. – 2:45 p.m.**

#69. “Should we trade off higher-level mathematics for abstraction to improve student understanding of quantum mechanics?”, **James K. Freericks**, Georgetown Univ (United States).

**QUANTUM EDUCATION III: APPROACHES AND TOOLS (late afternoon 3:15 p.m. – 4:45 p.m.)**

**Chair – Matthew T. Posner**, Optonique

**1. 3:15 p.m. – 3:30 p.m.**

#27. “Measuring Wigner functions of quantum states of light in the undergraduate lab”, **J. Álvarez**, Universidad de los Andes (Colombia) and University of Oxford (United Kingdom); A. Martinez, Alejandra Valencia, Universidad de los Andes (Colombia).

**2. 3:30 p.m. – 3:45 p.m.**

#43. “Activating teaching with analog experiments to distinguish entanglement and hidden parameters”, **Philipp Scheiger**, S. Aehle, Friedrich Schiller University Jena, Research Group Teaching Methodology in Physics and Astronomy (Germany); T. Reinsch, University of Stuttgart, Physics Didactics Research (Germany).

**3. 3:45 p.m. – 4 p.m.**

#83. “Quantum mechanics in a quicker, more intuitive, and accessible way”, **Edward F. Deveney**, S. Serna, E. Demirbas, Bridgewater State Univ (United States).

**4. 4 p.m. – 4:15 p.m.**

#78. “Qureka! Box: An educational tool for hands-on Quantum Computing”, **Araceli Venegas-Gomez**, Qureka Ltd. (United Kingdom); J. Christen Gracia, Universidad de Monterrey (Mexico) and QURECA SPAIN S.L. (Spain); R. Kienhoefer, M. Prokop, QURECA SPAIN S.L. (Spain); M. Kaur, Qureka Ltd. (United Kingdom).

**5. 4:15 p.m. – 4:30 p.m.**

#9. “Teaching quantum to high school students”, **Donn M. Silberman**, Optics Institute of Southern California (United States).

**6. 4:30 p.m. – 4:45 p.m.**

#47. “Educating decision makers on resource allocations for quantum technologies”, **Russell Manfield**, A. White, M. Harvey, University of Queensland (Australia).

**QUANTUM EDUCATION IV: DISCUSSION (late afternoon, 4:45 p.m. -5:30 p.m.)**

**Moderators – Svetlana G. Lukishova**, University of Rochester **and Matthew T. Posner**, Optonique

**QUANTUM EDUCATION V: POSTER SESSION (reception time, 6:30 p.m. -8:30 p.m.)**

1. #33. "Introduction to modern quantum technologies via astronomy", **Tobias Reinsch**, P. Scheiger, University of Stuttgart (Germany); S. Aehle, University of Jena (Germany); L. Maczewsky, University of Rostock (Germany); H. Cartarius, University of Jena (Germany); R. Nawrodt, University of Stuttgart (Germany).
2. *In addition to oral with the same content:* #19. "Sustainable education in the age of the second quantum revolution: fifteen years of the University of Rochester NSF supported efforts", **Svetlana G. Lukishova**, N. Bigelow, University of Rochester (United States).
3. *In addition to oral with the same content:* #27. "Measuring Wigner functions of quantum states of light in the undergraduate lab", J. Álvarez, Universidad de los Andes (Colombia) and University of Oxford (United Kingdom); A. Martinez, **Alejandra Valencia**, Universidad de los Andes (Colombia).
4. .... Other posters of similar oral talks.