Quantum @ Stevens

Yuping Huang
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Center for Quantum Science and Engineering

CQSE is a vibrant hub for interdisciplinary students, scholars, and faculty, where innovative quantum engineering research, development, and education are inspired and facilitated through coordinated collaboration and interaction with governmental and industrial sectors to bring quantum solutions to all corners of society.
CQSE focuses on developing and industrializing advanced quantum technologies that will create impact in multiple areas of society, by:

• Catalyzing high synergy in interdisciplinary research

• Promoting applications of quantum technologies in big data analytics, defense, healthcare, material science, environment, communications, and artificial intelligence

• Building a quantum-smart campus at Stevens for developing and showcasing next-generation information techniques

• Educating qualified quantum workforce and industrial leaders.
28 Faculty: PHY, ME, CS, ECE, CEMS, BE, Finance

Director: Yuping Huang

Quantum Computing & Control
- Ting Yu (lead), S. Malinovskaya
- Yi Guo
- Rupak Chatterjee
- Igor Pikovski
- Yuping Huang
- Xiaofeng Qian

Quantum Materials
- S. Strauf (Lead), E. H. Yang
- Yuping Huang
- Stephanie Lee
- Xian Zhang
- Yong Shi

Quantum Big Data Analytics
- R. Chatterjee (Lead)
- Ricardo Collado,
- Zhenyu Cui,
- Ting Yu
- Chunlei Qu

Quantum Comm. & Cryptography
- Shucheng Yu (Lead)
- Hui Wang
- Yuping Huang
- Ting Yu
- Antonio Nicolosi
- Hongbin Li

Quantum Sensing & Imaging
- Henry Du (Lead)
- S. Malinovskaya (co-L)
- Hongjun Wang
- Yuping Huang
- Robert Chang
- Knut Stamnes
- Nick Parziale

Quantum Education & Industrial Relations
- Ed Whittaker (Lead)
- Rainer Martini
- George Calhoun

Quantum R&D and Education Center
Quantum Campus at Stevens
quantum network, quantum corner, quantum sensing, quantum internet of things...

QUANTUM CORNER
The Quantum Corner in Williams Library features a quantum receiver hosted in a transparent enclosure, a messaging terminal based on quantum technology and educational materials on quantum physics and technology. This open quantum platform gives the public hands-on access to quantum technology, and inspires students to join the quantum workforce.

QUANTUM CHIPS
A central part of our interdisciplinary effort is to develop low-loss, high-efficiency, functional quantum chips capable of complex quantum functionalities. Thus far, we have developed a lithium niobate nanophotonic platform for quantum frequency conversion, all-optical switching, entanglement generation, photon modulation, and their integration. We have also developed single-photon sources from defects in 2D materials, which could form the basis for the future scalable quantum technology on chip.

Programmable Quantum Random Number Generation and Simulation
Stevens has developed a quantum random number generator that is post-processing free and can directly produce arbitrary, user-defined chaotic statistics. It has been applied to big data simulation to demonstrate significant advantage. To promote broader impact, we have also developed a "Quantum Decision" App for iPhone and Android that gives the public free access to quantum technology; download with the QR code to the right.
Integrated Quantum Nanophotonics

...where all of our R&D efforts are steered toward

- Leading-edge FPGA expertise
- Fastest TDC microelectronics
- In-house expertises/soft engineers

- Unique, pioneering nanophotonics
- All-in-one quantum chips
- Large nanofab team

Boxed and on a battery!