



**Association for
Computing Machinery**

Advancing Computing as a Science & Profession

NEWS RELEASE

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ACM PUBLISHES INAUGURAL ISSUE OF TRANSACTIONS ON QUANTUM COMPUTING

***New Publication in One of Technology's Most Groundbreaking Fields
Will Have Global Reach/Interdisciplinary Focus***

New York, NY, December 14, 2020 – ACM, the Association for Computing Machinery, today announced the inaugural issue of [ACM Transactions on Quantum Computing \(TQC\)](#), a new peer-reviewed journal with a focus on the theory and practice of quantum computing. *TQC* publishes high-impact, original research papers and select surveys on topics in quantum computing and quantum information science.

Though quantum computing, an interdisciplinary field that draws on contributions from computer science, physics, mathematics, and other disciplines, has been around since the 1980s, recent advances have propelled it to become one of the most highly anticipated innovations. Some of the largest technology companies are in a race to produce the first quantum computer, and governments around the world have invested billions in developing this burgeoning field.

It is expected that quantum computers, though not yet a fully realized technology, will be both disruptive and transformative, providing solutions to problems that were previously thought too complex. Many scientists also believe that quantum computing has the potential to usher in valuable advances in a number of areas including pharmaceuticals, materials science, artificial intelligence, and transportation, among many others.

“Quantum computing is at a tipping point,” said *TQC* Co-Editor-in-Chief Travis S. Humble of the Oak Ridge National Laboratory. “A worldwide effort is underway to address not only the engineering challenges of developing a quantum computer, but the potential software applications as well. Presently most of the research in the field has been published in physics journals. We envision *TQC* as the first computing-centric journal that will take a broad approach to quantum information science and become the flagship journal of this promising new field.”

“Quantum computing is very different from other areas of computing, as it traverses many disciplines,” added *TQC* Co Editor-in-Chief Mingsheng Ying of the University of Technology Sydney. “So we will be taking new approaches to encourage a diverse range of submissions to this journal. We envision *TQC* as the home for the most important new research in quantum information science. Significantly, we plan on publishing work by established thought leaders, and we hope the journal will encourage the younger generation to enter this exciting new field.”

Topics covered in *TQC* include, but are not limited to: models of quantum computing, quantum algorithms and complexity, quantum computing architecture, principles and methods of fault-tolerant quantum computation, design automation for quantum computing, quantum programming languages and systems, distributed quantum computing, quantum networking, quantum security and privacy, and applications (e.g., in machine learning and AI).

[The inaugural issue of *TQC*](#) presents a collection of five outstanding research papers that capture the breadth and sophistication of quantum computing research including (partial list): a novel technique for decomposition of a large class of quantum circuits that can achieve a significant improvement of depth over the best-known qubit only techniques; an efficient procedure for characterizing Pauli channels, which are an important noise model in many practical quantum computing architectures; and new quantum machine learning algorithms for training and evaluating feedforward neural networks that can be quadratically faster in the size of the network than their classical counterparts.

In addition to Co-EICs Ying and Humble, the *TQC* editorial team includes Fred Chong, University of Chicago; Richard Jozsa, University of Cambridge; and Peter Shor, Massachusetts Institute of Technology, who will serve as members of *TQC*'s Advisory Board. The editorial team also includes 16 Associate Editors representing various countries including Australia, Canada, China, France, Germany, Japan, Latvia, Switzerland, the United Kingdom and the United States.

About ACM

[ACM, the Association for Computing Machinery](#) is the world's largest educational and scientific computing society, uniting computing educators, researchers and professionals to inspire dialogue, share resources and address the field's challenges. ACM strengthens the computing profession's collective voice through strong leadership, promotion of the highest standards, and recognition of technical excellence. ACM supports the professional growth of its members by providing opportunities for life-long learning, career development, and professional networking.

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