

## Special Issue

# Exploring the Horizon of Practical Utility in Near-Term Quantum Computing

### Message from the Guest Editors

Over the past few decades, the field of quantum computing and quantum information processing has witnessed significant strides in fundamental theory and hardware development. These advancements have not only facilitated groundbreaking showcases of quantum computational advantages in scientific experiments like boson sampling and cross-entropy benchmarks but have also spurred the exploration of quantum applications poised to provide practical value in near-term quantum devices. This Special Issue focuses on the roadmap, as well as the boundary, of the pursuit of applications with practical advantages on near-term quantum computers. Papers and review articles are invited to address the following topics:

- Algorithms/applications that are suitable for near-term devices include variational algorithms and quantum machine learning;
- Error mitigation techniques;
- Optimization techniques for variational quantum algorithms;
- Classical simulation of quantum algorithms;
- Hardware-inspired design of algorithm/applications;
- Limitations of quantum algorithms for solving classical problems;
- Limitations of near-term quantum devices.

### Guest Editors

Dr. Daiwei Zhu

IonQ Inc, 4505 Campus Dr, CollegePark, MD 20740, USA, Joint Quantum Institute, University of Maryland, College Park, MD 20742, USA

Dr. Jason Iaconis

IonQ Inc, 4505 Campus Dr, CollegePark, MD 20740, USA

Dr. Torin F. Stetina

IonQ Inc, 4505 Campus Dr, CollegePark, MD 20740, USA

### Deadline for manuscript submissions

20 August 2025



## Entropy

an Open Access Journal  
by MDPI

Impact Factor 2.0  
CiteScore 5.2  
Indexed in PubMed



[mdpi.com/si/183926](https://mdpi.com/si/183926)

*Entropy*  
Editorial Office  
MDPI, Grosspeteranlage 5  
4052 Basel, Switzerland  
Tel: +41 61 683 77 34  
[entropy@mdpi.com](mailto:entropy@mdpi.com)

[mdpi.com/journal/  
entropy](https://mdpi.com/journal/entropy)





# Entropy

---

an Open Access Journal  
by MDPI

---

Impact Factor 2.0  
CiteScore 5.2  
Indexed in PubMed



[mdpi.com/journal/  
entropy](https://mdpi.com/journal/entropy)



## About the Journal

### Message from the Editor-in-Chief

The concept of entropy is traditionally a quantity in physics that has to do with temperature. However, it is now clear that entropy is deeply related to information theory and the process of inference. As such, entropic techniques have found broad application in the sciences.

*Entropy* is an online open access journal providing an advanced forum for the development and/or application of entropic and information-theoretic studies in a wide variety of applications. *Entropy* is inviting innovative and insightful contributions. Please consider *Entropy* as an exceptional home for your manuscript.

---

### Editor-in-Chief

Prof. Dr. Kevin H. Knuth

Department of Physics, University at Albany, 1400 Washington Avenue,  
Albany, NY 12222, USA

---

### Author Benefits

#### Open Access:

free for readers, with article processing charges (APC) paid by authors or their institutions.

#### High Visibility:

indexed within Scopus, SCIE (Web of Science), Inspec, PubMed, PMC, Astrophysics Data System, and other databases.

#### Journal Rank:

JCR - Q2 (Physics, Multidisciplinary) / CiteScore - Q1 (Mathematical Physics)