



USRA Q2B Applied NISQ Computing Award

1.0 BACKGROUND

This award is aimed at highlighting recent papers in the field of Applied Noisy Intermediate Scale Quantum computing (ANISQC). The award is specifically focused on papers impacting the field of near-term quantum computing, exclusively algorithms and experiments that advance the field of applied quantum computing in existing hardware, or theoretical/engineering advances tightly connected to experimental realization in the near term. A digest of pre-prints of papers in this area is maintained at <https://riacs.usra.edu/quantum/nisqc-nl> and it is indicative of the theme of the papers that we expect as submissions (i.e. works describing experiments or algorithms in optimization, machine learning, quantum or classical simulation).

The award is connected to the Practical Quantum Computing conference Q2B 2021 (<https://q2b.qcware.com/>) which will occur at the Santa Clara Convention Center in California, USA on December 7-9 2021, presented by QC-Ware. The collaboration between USRA and QC-Ware is sponsored by the US Air Force Research Laboratory (AFRL).

2.0 OVERVIEW

The Universities Space Research Association (USRA) is pleased to invite submissions that highlight the work from papers (pre-print or published) since Jan 1, 2021, that are focused on ANISQC experiments or algorithms that can be applied to advance the state-of-the-art in optimization, machine learning, quantum or classical simulation. **One paper will be awarded an invitation for a leading author to present their paper at Q2B 2021 as well as a selection between a prize of up to \$5000 credit on AWS Braket or \$2,000 credit on QC Ware's Forge platform, based on the awardees' preference. QC-Ware will also sponsor the conference participation tickets as well as a travel allowance of \$500 for domestic flights and \$1000 for international flights.**

Each submitted paper will be reviewed by a panel of researchers in quantum computing arranged by USRA.

The call is open for submission whose leading author is a student or a qualified researchers affiliated to accredited universities and not-for-profit organizations internationally from countries that do not fall under U.S. export control restrictions (PROPOSERS). The computer time will be provided free of charge. No financial support is offered for the completion of the project.

For detailed information and application instructions, visit the USRA Quantum Information Technology website at <https://riacs.usra.edu/quantum/ANISQCAward> (WEBSITE).

3.0 SUBMISSION REQUIREMENTS

The submission will consist of a research paper that is posted on the ArXiv and/or on an open-access peer-reviewed academic journal during the eligibility period (Jan 1, 2021-October 31, 2021), plus a brief synopsis/cover letter (max 2 pages, 12pt font, figures allowed) describing the potential impact of the work to a key problem in future applications of quantum computers in one applied commercial sector.

The synopsis will be submitted together with the link to a research paper through a web form on the WEBSITE and will be shared only with reviewers and sponsors. Note that the synopsis can include content that overlaps with the content of the paper. A good synopsis will need to mention one or more key problems in a commercial sector such as finance, pharmaceuticals, materials research or industrial operations. Moreover, it should describe how the methods described in the paper could be applied to this problem. If the paper does not discuss a specific implementation, the synopsis should indicate key features and resource requirements that a NISQ computer would require to use this method in practice in one or more of the current architectures. If the paper already covers the aspects above, the text in the corresponding sections can be referenced.



Ownership of Data

Ownership of all data, materials and documentation originated and prepared for USRA pursuant to this document shall belong exclusively to the proposer. PROPOSER grants to USRA the right to disseminate and reproduce the research paper, as well as the presentations that are produced as a result of the possible award, in totality or in part without limitations. The cover letter/synopsis will not be disseminated outside the ANISQC Award committee and its sponsors, but it should not contain any trade secrets or proprietary information that the PROPOSER considers confidential.

Deadline for Submission

Papers should be submitted starting immediately for full consideration. **In case of ties from the evaluation the earliest submitted proposal will be selected.** The call for proposals will remain open through **November 22, 2021**. Proposal must be submitted online at <https://riacs.usra.edu/quantum/ANISQCAward>. Scientific Questions about this RFP can be directed to the USRA Associate Director for Quantum Computing, Dr. Davide Venturelli (dventurelli@usra.edu).

4.0 EVALUATION AND AWARD CRITERIA

Proposals submitted in response to this Call will be evaluated in a competitive review coordinated by USRA. The peer review panel, including its chair, will be recruited from USRA and QC-Ware staff, plus the academic, government or commercial research community that sponsors or collaborates with the 2021 edition of Q2B.

The following factors will be used in evaluating proposals for the ANISQC award

1. The overall scientific merit of the research paper (75% of the score).
2. The relevance of the scientific objective for advancing the knowledge on quantum computing for practical applications on one of the ANISQC domain area (finance, pharmaceuticals, materials and industry) as described in the paper as well as in the synopsis (25% of the score).

4.0 ELIGIBILITY

Submission of papers from leading authors including researchers from international academic institutions and non-profits unaffiliated with program sponsors from countries that do not fall under U.S. export control restrictions are eligible to participate. Papers with co-authors from USRA, QC-Ware or AWS are ineligible. A leading author is an author that has performed the major contribution to the paper (a paper can have more than a leading author). It is typically among the first authors of the paper or a Principal Investigator of a research project.

5.0 SPECIFIC PROPOSAL CONSIDERATION Education and Public Outreach (E&PO)

USRA reserves the option to promote briefly the project objectives and investigators on related websites and during E&PO initiatives, as well as inviting the project representatives to selected events. Upon completion of the research project and publication of the results, selected projects may be contacted by USRA to collaborate in designing an E&PO program meant to diffuse the results of the investigation.

6.0 AWARD



USRA may cancel this award or reject proposals at any time and is not required to furnish a statement of the reason why a particular proposal was not deemed to be the most advantageous.

Generally, intellectual property developed through research using the quantum computer will be retained by those conducting the research, subject to each individual's employer's intellectual property policies.

7.0 REPORTING AND DELIVERY REQUIREMENTS

Awardees will be required to present their research paper at Q2B 2021 (<https://q2b.qcware.com/>), a conference hosted in person on December 7-9, 2021, in Santa Clara, California. Any author of the winning paper could be enlisted to represent the winning submission. Should the awardee not be available for the live presentation, USRA might decide to assign to the PROPOSER a honorable mention and select a different winner.