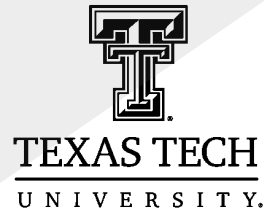


Workshop on Quantum information & quantum computation 2020

10:00 am – 1:30 pm
August 10th

Virtual
meeting
via Zoom



Texas Tech University | A&S | Engineering
CHEM | CS | ECE | IMSE | MATH | NTC | PHAS
Lubbock, TX 79409

<https://indico.ads.ttu.edu/conferenceDisplay.py?confId=1516>

Agenda

❖ WELCOME SESSION

10:00 am – 10:05 am Welcome Remarks
Getting Started (Sung-Won Lee; PHAS)

10:05 am – 10:20 am Opening Keynote: Building quantum computing community at Texas Tech - An inevitable journey
(Rattikorn Hewett; CS)

❖ SESSION I – QUANTUM ALGORITHMS

10:20 am – 10:35 am Quantum algorithms for mathematical optimization
(Ismael Regis de Farias Jr.; IMSE)

10:35 am – 10:50 am Efficient evaluation of exponential and Gaussian functions on a quantum computer
(Bill Poirier; CHEM)

10:50 am – 11:05 am Quantum computing of quantum chemistry
(Jorge Morales; CHEM)

▪ **11:05 am – 11:20 am VIRTUAL COFFEE BREAK**

❖ SESSION II – QUANTUM MATERIALS AND REALIZATION

11:20 am – 11:35 am Measurements of the onset of macroscopic matter wave coherence in liquid helium, and other topics in quantum sensing and quantum-limited measurements
(Robert Duncan; PHAS)

11:35 am – 11:50 am Many-body systems and quantum information
(Wade DeGottardi; PHAS)

11:50 am – 12:05 pm Anomalous quantum oscillations in a spin-3/2 topological semimetal
(Hyunsoo Kim; PHAS)

12:05 pm – 12:15 pm On-chip quantum information processing based on a rare-earth spin qubit in active nanostructures
(Myoung-Hwan Kim; PHAS)

12:15 pm – 12:25 pm Quantum light emitters (single photon sources)
(Ioannis Chatzakakis; PHAS)

12:25 pm – 1:10 pm Round-table discussion on moving forward
All participants are encouraged to attend the discussion

1:10 pm – 1:15 pm Closing Remarks
Summary (Ioannis Chatzakakis & Myoung-Hwan Kim)

TTU QC Timeline

2018.10	Under the National Initiative and NSF Funding (e.g. QCIS-FF), two departments (CS & PHAS) independently planned intensive investment in the QC/QI areas. On 10/27, RH emailed to SWL; 1st team formed with RH/SWL/IDF/BP!
2018.11	QC Initiative meeting held; discussed on a variety of topics (TTU capability on QC, strategic research subareas, strategic hire, & QC curriculum design, etc.)
2018.11~ 2019.2	4 PIs* submitted QCIS-FF proposal to NSF (the first TTU QC proposal) * Drs. Hewett (CS), Lee (PHAS), De-Farias (IMSE), Poirier (CHEM)
2018.12~ 2019.5	PHAS recruited 2 new faculty in the experimental condensed matter physics, focusing on QC/QI. ==> Drs. M.H.Kim (EX) & Chatzakis (EX)
2019.2	QCIS seminar series launch (season 1)
2019.2	Meeting with VPR; Development of Quantum Computing @ TTU
2019.3	2019 Bucy Distinguished Lecture: Dr. Marlan Scully (TAMU/Princeton/Baylor; NAS; former TTU adjunct prof.) [note] Host by Dr. Duncan
2019.4	BP has been awarded Welch grant entitled “ <i>New Methodologies for Accurate Quantum Calculations of the Dynamics of Atomic Nuclei</i> ” This grant has an explicit QC component. It’s the first QC grant received at TTU
2019.5	4 PIs* submitted QLCI CG to NSF; “ <i>QLCI-CG: Towards a Common Challenge Theme for Quantum Computing in the South Plains</i> ” (note: Rice-UT Austin team, NSF QLCI CG grant; 7/25)
2019 Summer	RH visited to QCI U Waterloo

TTU QC Timeline

2019.9	PHAS: 2 CMP (QC) faculty joined
2019.9	QCIS seminar series (season 2); invited outside speakers (support from MATH/CS/IMSE/ECE/PHAS/etc.)
2019.9	College of Engineering started QC/QS initiative (Rajesh - Assistant Dean for Strategic Initiatives)
2019.10	Texas Quantum Institution meeting (MH & BP have been invited)
2019.11	<p>Meeting with VPR; Development of Quantum Computing @ TTU</p> <p>"From: "Heppert, Joseph" <Joseph.Heppert@ttu.edu> Date: Monday, December 2, 2019 at 11:27 AM To: Rattikorn Hewett <rattikorn.hewett@ttu.edu>, "Lee, Sungwon" <Sungwon.Lee@ttu.edu> Subject: Quantum Computing Initiative</p> <p>Rattikorn and Sungwon, I wanted to follow up the presentation on the quantum computing initiative last week. I think remarkable process has been made, I want to be encouraging of the growth of this area, and I am willing to help champion this with your deans and the upper administration, but refining some research themes and making progress on proposal activity will really help us convince them to invest in this area.</p> <p>Best, Joe Heppert</p>
2020.2	QCIS seminar series (season 3); ~100% outside speakers (support from MATH/CS/IMSE/ECE/PHAS/etc.)
2019.12~ 2020.3	PHAS recruited 3 more faculty in the experimental condensed matter physics, focusing on QC/QI/QM ==> Drs. DeGottardi (TH), Hodovanets (EX), & H.S. Kim (EX); now 10 faculty CMP members in the PHAS
2019-20	Various activities; several proposals (including 1.1M DOD DURIP*), publications, research lab setup (PHAS), collaborations, * Acquisition of an Electron Beam Lithography System
TODAY	1 st Mini-workshop

