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Speaker:

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Title:

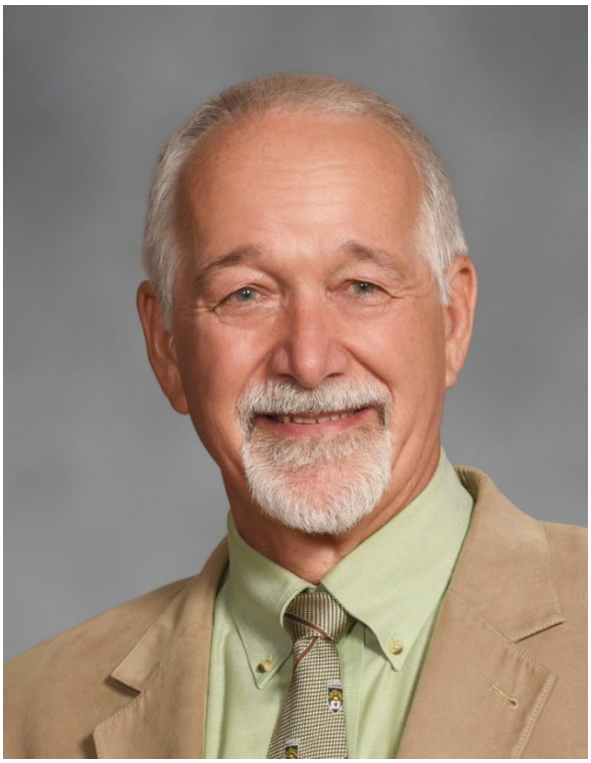
The Quantum Computing Revolution: Optimization Challenges, Trends, and Perspectives

Abstract:

The Quantum Computing (QC) revolution is spreading fast and has the potential of disrupting all industries. It is widely expected that QC can revolutionize the way we perform and think about computation and optimization, and QC will be the backbone of thrilling new technologies and products. Governments and private investors are already investing billions of dollars annually to accelerate developments in QC technologies and to explore a myriad of potential applications.

The focus of this presentation will be on the impact of Quantum Computing on optimization sciences, the potential of making optimized decisions faster and better, let it be engineering design, systems performance, supply chain, or finance. Specifically, in the mathematical optimization area, Quantum Computing has the potential to speed up problem solving tremendously and solve very large-scale problems that are not solvable to date. Just to mention, almost all results and claims about “Quantum Supremacy” are about solving optimization problems.

The presentation introduces concepts of Quantum Computing, reviews state-of-the-art of QC hardware, algorithms, and software in the era of NISQ (Noisy Intermediate Scale Quantum). Projected trends of QC hardware development with challenges ahead are discussed. Computing, algorithmic, and software stack developments, along with actual and potential applications of QC Optimization, and related areas will be discussed.



SHORT BIO

Dr. Terlaky is a George N. and Soteria Kledaras ’87 Endowed Chair Professor Department of Industrial and Systems Engineering, Lehigh University, and Director of the Quantum Computing Optimization Laboratory.

Dr. Terlaky has published four books, edited over ten books and journal special issues and published over 200 research papers. Topics include theoretical and algorithmic foundations of operations research, computational optimization, nuclear reactor core reloading optimization, oil refinery and VLSI design optimization, robust radiation therapy treatment optimization, inmate assignment optimization, quantum computing.

His research interest includes high performance optimization methods, optimization modeling, optimization problems in engineering sciences and service systems, and quantum computing optimization.

Dr. Terlaky is Editor-in-Chief of the Journal of Optimization Theory and Applications. He has served as associate editor of ten journals and has served as conference chair, conference organizer, and distinguished invited speaker at conferences all over the world. He was general Chair of the INFORMS 2015 Annual Meeting, a former Chair of INFORMS’ Optimization Society, Chair of the ICCOPT Steering Committee of the Mathematical Optimization Society, Chair of the SIAM AG Optimization, and Vice President of INFORMS. He received the MITACS Mentorship Award; Award of Merit of the Canadian Operational Society, Egerváry Award of the Hungarian Operations Research Society, H.G. Wagner Prize of INFOMRS, Outstanding Innovation in Service Science Engineering Award of IISE. He is Fellow of INFORMS, SIAM, IFORS, The Fields Institute, and elected Fellow of the Canadian Academy of Engineering.