

# An Open-Source General Compiler for Quantum Computers

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*Abstract.* Quantum computers are constantly improving in their size, computing power, and reliability. In order to fully harness the power of a general quantum computer, however, compilers and design tools must be developed that optimize specifications and map them to a realization on a specific architecture. In this talk, an overview of Southern Methodist University's efforts to develop an open-source general quantum compiler will be given. This tool, estimated to be publicly released next year, aims to target the IBM and Rigetti quantum machines as well as custom architectures and technologies specified by users. The goal of the SMU compiler is to make quantum compilation and optimization to multiple platforms accessible and customizable for researchers. Since architectural constraints of quantum devices are considered by the compiler, originally technology-independent algorithms can be realized into a high-quality technology-dependent form that consist of operations that are compatible with a specific technology platform's operation library. Once transformed by the compiler, once incompatible, high-level algorithms can be executed on a real quantum machines. During this session, current experimental results as well as a road map for future development will be discussed.