1116-03-1039   **Mark Furtney*** (`mfurtney@alum.mit.edu`). *Talking Quantum: Prattle –> Chatter –> Ask –> Solve.*

This talk describes some of the trials, tribulations, triumphs, and features involved in the early development of a language for communication with the only commercially-available Quantum Computing System (from D-Wave Systems). ToQ (pronounced "To Q") is a simple, C-like language which translates user programs into a series of Quantum Machine Instructions for execution on a D-Wave System, and delivers the results back to the user.

By many measures, Quantum Computing is still in its "Pre Vacuum Tube Era." And so it is with quantum computing language development. ToQ is still in its infancy, and has escaped neither controversy, nor false paths, nor criticism, but it has also received very positive feedback from early users - mostly because they are able to focus on their problem domains and not worry about the quantum details of the run-time system. In particular, users have noticed that often, building a ToQ program is in fact the solution. ToQ programming requires a fundamentally different way of thinking.

The evolution of the language and its features will be described, along with its strengths, weaknesses, successes, warts, and paths for future development. The audience may be challenged with a few simple problems, and ToQ solutions will be discussed. (Received September 16, 2015)