The terahertz frequency range (1-10 THz) has long remained undeveloped, mainly due to the lack of compact, coherent radiation sources. Transitions between subbands in semiconductor quantum wells were suggested as a method to generate long wavelength radiation at customizable frequencies. However, because of difficulties in achieving population inversion between narrowly separated subbands and mode confinement at long wavelengths, THz lasers based on intersubband transitions were developed only very recently. We have developed THz quantum-cascade lasers based on resonant-phonon-assisted depopulation and using metal-metal waveguides for mode confinement. Figure 1 illustrates the schematics of both features are illustrated. Using the combination of these two unique features, we have developed many THz QCLs with record performance, including a maximum pulsed operating temperature at 164 K (see Figure 2), a maximum power of ~250 mW, and the longest wavelength (~161 µm) QCL to date without the assistance of magnetic fields.