# Fast FIB-milled Electron-transparent Microchips for in situ TEM Investigations

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**Fast FIB-milled Electron-transparent Microchips for in situ TEM Investigations**

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In this work we present a fast approach to 50 nm resolution structures defined in a generic TEM-chip template in few minutes. While creating complex electrical and NEMS circuits for a specific insitu TEM experiment can be a cumbersome process, microchips with 100 nm thin flakes of single crystalline silicon and silicon nitride membrane templates suspended from the edge, can be patterned in less than 15 minutes using focused ion beam milling. This approach allows a FIB-SEM user to create free-form NEMS structures for nanoresonators, actuators, heaters, resistors or other structures for insitu TEM devices or materials research using the same template. We demonstrate insitu environmental TEM analysis of Au film migration on silicon during resistive heating of a microbridge, and show how the conductance of focused ion beam milled single crystalline silicon nanowires can be adjusted insitu over two decades using a high current to recrystallise the structure.