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**Rapid Serial Prototyping and Analysis of Nanomagnet-Tipped Attonewton-Sensitivity Cantilevers for Magnetic Resonance Force Microscopy**[1] JOHN MAROHN, ERIC MOORE, JONILYN LONGENECKER, Cornell Univ., Ithaca, NY 14853 — Magnetic resonance force microscopy offers exciting possibilities for imaging protons and electrons in native and spin-labeled biomolecules. The central component of a magnetic resonance force microscope experiment is a custom-fabricated attonewton-sensitivity cantilever with an overhanging magnetic-nanorod tip. We have recently developed a method for making precision tips which involves 1) fabricating overhanging magnetic tips on shortened mock cantilevers, 2) using focused ion beam milling and deposition (FIB/FID) to cut the mock cantilever (and attached tip) free from the substrate, and then 3) attaching the released structure to a full-length high-sensitivity cantilever. The resulting magnets have been characterized by cantilever magnetometry, high-resolution transmission electron microscopy (HR-TEM), and nanometer-resolution electron energy loss spectroscopy (EELS). This approach to fabrication and analysis is allowing us to optimize tips for proposed single-electron-spin imaging experiments in a very short time. Rapid access to such high-quality tips will significantly advance our ability to image individual biomolecules and macromolecular complexes.

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