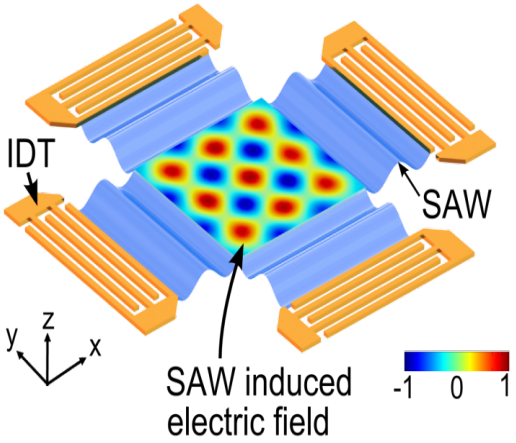
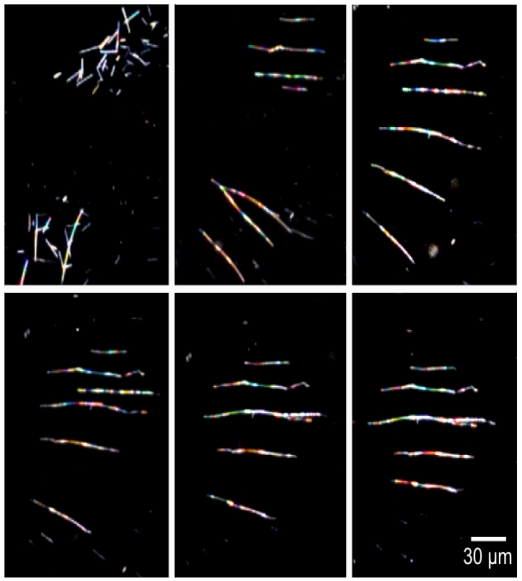
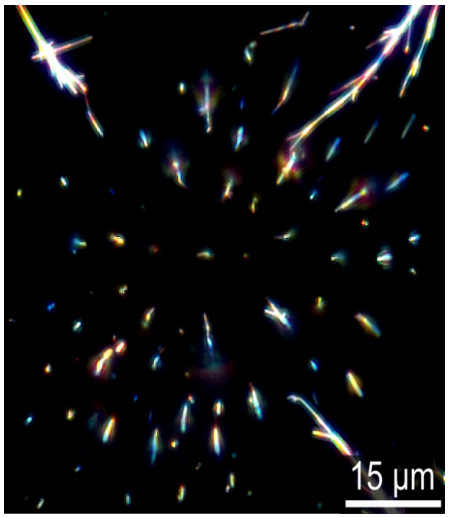
Tunable Nanowire Patterning with Acoustic Tweezers

Penn State MRSEC DMR-0820404: Y. Chen, X. Ding, S.-C. S. Lin, S. Yang, P.-H. Huang, N. Nama, Y. Zhao, A. A. Nawaz, F. Guo, W. Wang, Y. Gu, T. E. Mallouk, and T. J. Huang
(*ACS Nano*, Vol. 7, pp. 3306-3314, 2013)







Patterning of nanowires in a controllable, tunable manner is important for the fabrication of functional nanodevices. MRSEC researchers have used standing surface acoustic waves (SSAW) to construct large-scale nanowire arrays with well-controlled patterning geometry and spacing within 5 seconds. By controlling the distribution of a SSAW field, metallic nanowires can be assembled into different patterns. This technique possesses several advantages over alternative patterning approaches, including high versatility, tunability, and efficiency, making it promising for a variety of device applications.