

Carbon nanotube x-ray: from scientific curiosity to patient imaging and commercial production

Otto Zhou

University of North Carolina at Chapel Hill
zhou@email.unc.edu

X-ray radiation is widely used in many aspects of our lives including medicine, security, and industrial inspection. The way x-ray is generated however has not changed significantly since it was discovered over one hundred years ago. Utilizing the unique properties of the carbon nanotubes we developed a novel spatially distributed field emission x-ray source array technology[1]. After 10 years of intensive R&D efforts, the technology has been successfully translated from a scientific curiosity to commercial production. Its applications in medical imaging, radiation therapy[2], and homeland security[3] are being investigated, including for early detection of breast cancer[4] and lung cancer[5]. Some are in *in-vivo* patient imaging trials [6]. In this talk we will introduce the CNT x-ray technology and its applications.

1. Otto Zhou and Xiomara Calderon-Colon, in "*Carbon Nanotube and Related Field Emitters: Fundamentals and Applications*", Y. Saito, Editor. 2010, Wiley.
2. Lei Zhang, et al., *Expert Rev. Anticancer Therapy* 2014. **14**(12): p. 1412.
3. Brian Gonzales, et al., *IEEE Access*, 2014. **2**: p. 971.
4. Andrew W Tucker, et al., *Acad Radiol*, 2014. **21**(12): p. 1547.
5. Jing Shan, et al., *Physics in Medicine and Biology*, 2015. **60**(81).
6. <http://clinicaltrials.gov/ct2/show/NCT01773850?term=NCT01773850&rank=1>.