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Investigating Multi-scale Properties with in situ and Multi-dimensional Characterizations

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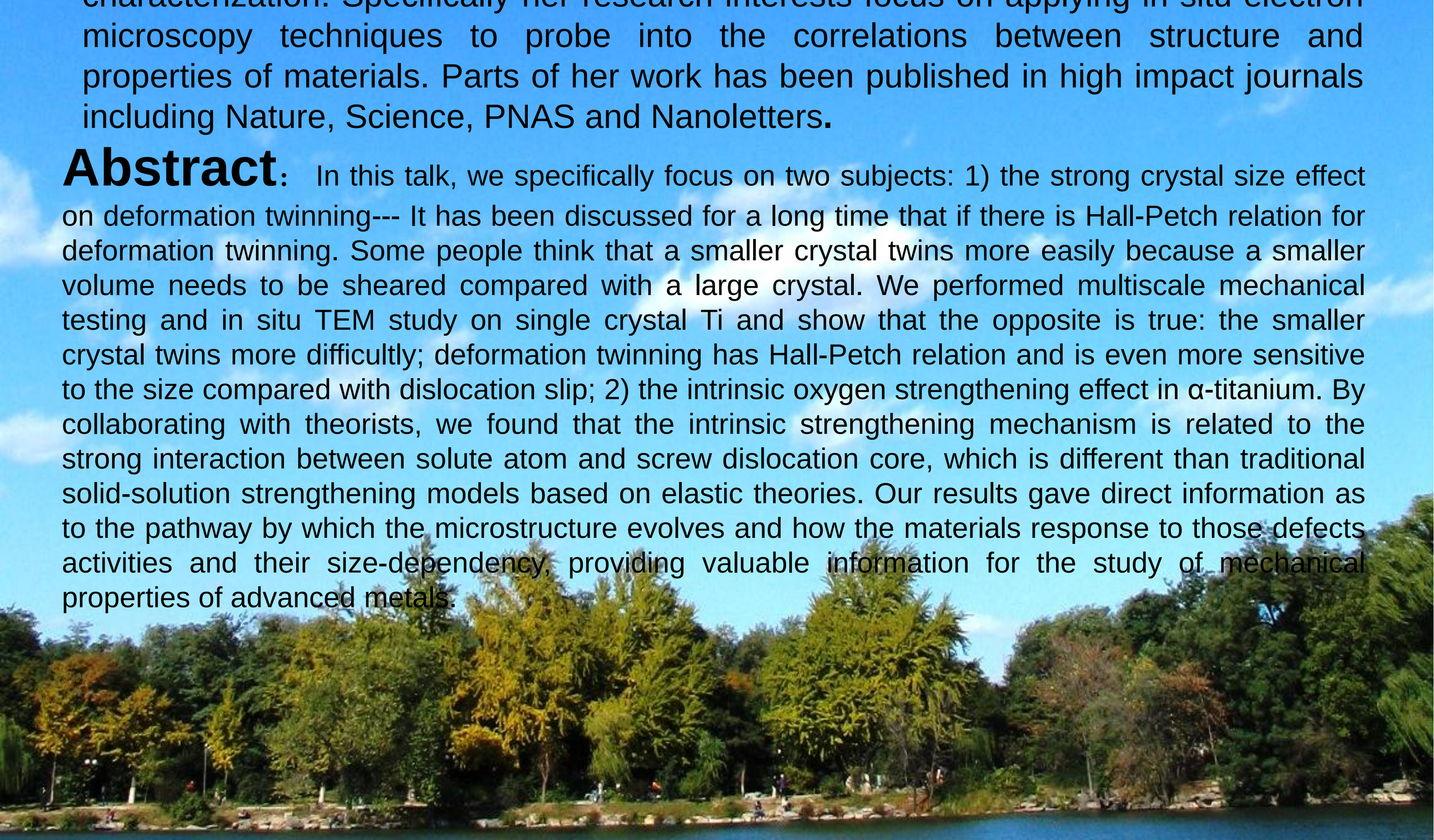
时间：10月22日（星期四）15:00—16:30

地点：北京大学物理大楼中212教室

余倩Yu earned her PhD degree in materials science and engineering from University of California at Berkeley in 2012. She was a postdoctoral researcher at National Center for Electron Microscopy at Lawrence Berkeley National Lab and UC Berkeley from 2012 to 2014. She joined the faculty of the Center for Electron Microscopy at Zhejiang University in 2014, where she is also a professor in the Department of Materials Science and Engineering. Yu is interested in materials characterization. Specifically her research interests focus on applying in situ electron microscopy techniques to probe into the correlations between structure and properties of materials. Parts of her work has been published in high impact journals including Nature, Science, PNAS and Nanoletters**.**

Abstract: In this talk, we specifically focus on two subjects: 1) the strong crystal size effect on deformation twinning--- It has been discussed for a long time that if there is Hall-Petch relation for deformation twinning. Some people think that a smaller crystal twins more easily because a smaller volume needs to be sheared compared with a large crystal. We performed multiscale mechanical testing and in situ TEM study on single crystal Ti and show that the opposite is true: the smaller crystal twins more difficultly; deformation twinning has Hall-Petch relation and is even more sensitive to the size compared with dislocation slip; 2) the intrinsic oxygen strengthening effect in α-titanium. By collaborating with theorists, we found that the intrinsic strengthening mechanism is related to the strong interaction between solute atom and screw dislocation core, which is different than traditional solid-solution strengthening models based on elastic theories. Our results gave direct information as to the pathway by which the microstructure evolves and how the materials response to those defects activities and their size-dependency, providing valuable information for the study of mechanical properties of advanced metals.



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Photoed by Xiaodong Hu