

## Defect engineering in 2D materials

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2D materials have unique structural mechanics [*Nano Letters* **15** (2015) 1302] that makes their defects and phase transformations dramatically different from those of 3D materials. I will focus on light-structure [*Nano Letters* **18** (2018) 7794] and electron-structure [*Science Advances* **5** (2019) eaav2252] interactions in this talk, with a range of behaviors such as ferroelasticity [*Nature Comm* **7** (2016) 10843], ferroelectricity and electronic topology change [*Science* **346** (2014) 1344] in one to few-layer transition metal dichalcogenides. Design of ultrafast responsive 2D materials [*Nano Letters* **18** (2018) 7794] and engineering single-atom dynamics with electron beam irradiation [*Science Advances* **5** (2019) eaav2252] are demonstrated.