Prof. Cheng-Wei Qiu received his B.Eng. and Ph. D. degree in 2003 and 2007, respectively. He was a Postdoctoral Fellow at Physics Department in MIT till the end of 2009. Since December 2009, he joined NUS as an Assistant Professor and was promoted to Associate Professor with tenure in Jan 2017. From 1st Jan 2018, he was promoted to Dean's Chair Professor in Faculty of Engineering, NUS. He was the recipient of the SUMMA Graduate Fellowship in Advanced Electromagnetics in 2005, IEEE AP-S Graduate Research Award in 2006, URSI Young Scientist Award in 2008, NUS Young Investigator Award in 2011, MIT TR35@Singapore Award in 2012, Young Scientist Award by Singapore National Academy of Science in 2013, Faculty Young Research Award in NUS 2013, SPIE Rising Researcher Award in 2017, and Young Engineering Research Award 2018 in NUS, Engineering Researcher Award 2021 in NUS. His research is known for the structured light for beam manipulation and nanoparticle manipulation. He has been serving as Associate Editor for various journals such as PhotoniX, Photonics Research, and Editor-in-Chief for eLight. He also serves in Editorial Advisory Board for Laser and Photonics Reviews, Advanced Optical Materials, and ACS Photonics. He has published over 300 peer-reviewed journal papers. He was Highly Cited Researchers 2019 by Web of Science.

Talk: Synthetic interfacial optics with metasurfaces and 2D monolayers

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Metasurfaces and 2D materials have been developing as two important candidates in the interfacial engineering, providing a plethora of new possibilities in novel optoelectronic functions and applications. The synergies between those two domains hold great promises in manipulating light-matter interaction. In this tutorial talk, I will review and report some of the most recent developments in this field of interfacial engineering, via the artificially constructed hybridized structures of ultrathin thickness compared to the wavelength. In particular, the low-dimension and high-frequency scaling may promise a lot more applications. The atomic thickness of 2D monolayers provides many interesting physical

properties, but limits the sufficient interaction with the light. Hence, nano-patterned metasurfaces are deployed with 2D monolayers to modulate and structure novel light behavior. The following advanced functional optical devices, developed by our group, will be discussed: 3D meta-hologram, high-pixelated nanoprinting, dynamic OAM generation, and more interestingly, the 2D-material meta-lens of <1nm thickness, significantly enhanced SHG, PL, and tunable structural colors, by the coordinated hybridization between those two parties. Our work paves a roadmap to design sophisticated and advanced optical devices, with low dimension, miniaturization, randomness, and scaled-up capability.