Education:

Ph.D. in Mechanical Engineering with designated emphasis in Nanoscale Science and Engineering (Minor: Electrical Engineering and Bioengineering), **University of California, Berkeley**, 2013

M.S. in Mechanical Science and Engineering, **University of Illinois, Urbana-Champaign**, 2008

B.S. in Mechanical and Aerospace Engineering, **Seoul National University**, 2007

Biography:

Junsuk Rho is currently an assistant professor with a joint appointment in the Departments of Mechanical Engineering and Chemical Engineering at Pohang University of Science and Technology (POSTECH), Republic of Korea. Before joining POSTECH, he received a degree his B.S. (2007) and M.S. (2008) in Mechanical Engineering at Seoul National University, Korea and the University of Illinois, Urbana-Champaign, respectively. After getting Ph.D. (2013) in Mechanical Engineering and Nanoscale Science & Engineering from the University of California Berkeley, he had worked as a postdoctoral fellow in Materials Sciences Division at Lawrence Berkeley National Laboratory and *Ugo Fano* Fellow in Nanoscience and Technology Division at Argonne National Laboratory. His research is focused on developing novel nanophotonic materials and devices based on fundamental physics and experimental studies of deep sub-wavelength light-matter interaction. Dr. Rho has published approximately 40 high impact peer-reviewed journal papers including Science, Nature Photonics and Nature Communications. He has received honorable awards including Samsung Scholarship (2008-2013), the Optical Society of America (OSA) Milton/Chang Award, the International Society for Optics and Photonics (SPIE) Scholarship (2011 & 2012), Materials Research Society (MRS) student award (2012), U.S. DOE Argonne Named Fellowship (2013-2016), Edmund Optics educational award (2015), the Optical Society of Korea young investigator award (2016), SPIE Rising Researcher Award (2017) and Korea MSIP Minister's Commendation (2017).

Title:

Metamaterials and metadevices for extreme control and manipulation of light

Abstract:

Metamaterials, artificially structured nanomaterials, have enabled unprecedented phenomena such as invisibility cloaking and negative refraction. In this talk, I will discuss our efforts in achieving the unique optical property overcoming diffraction limit to achieve several extraordinary nanodevices demonstration. First, I will present super-resolution imaging device called "hyperlens", which is the first experimental demonstration of near-to far-field imaging at visible light with resolution beyond the diffraction limit in two lateral dimensions. Second, I will show another unique application of metamaterials for miniaturizing optical cavity, a key component to make lasers, into the nanoscale for the first time. Third, I will show the recent achievements of chirality-assisted photo-induced switching of reconfigurable negative index metamaterial device and large scale negative index metasurface with anomalous spin-hall effect. Finally, I will show how those proof-of-concepts in scientific level can be applied to real engineering applicationsas a solution in current nanoscience and nanotechnology. It will include the examples of high-resolution and high-throughput flying head nanolithography, super-resolution real time bioimaging applications and scalable manufacturing methods for future nanosciencne where metamaterials becomes metadevices. I believe our efforts in sub-wavelength metamaterials and scalable manufacturing methods will lead extreme light control and manipulation with development of metamaterials and metadevices, and further advanced nanophotonics, nanomaterials and nanomanufacturing.