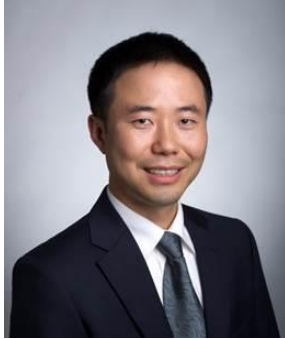


Plasmonics and Metasurfaces for Extreme Manipulation of Light

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Yongmin Liu, Assistant Professor
Department of Mechanical and Industrial Engineering,
Department of Electrical and Computer Engineering
Northeastern University, Boston, USA

Email: y.liu@neu.edu Group Website: <http://www.northeastern.edu/liulab>



Plasmonics has become a very important branch in nano optics, focusing on the new physical phenomena and unique applications of surface plasmons occurring in metallic nanostructures. Plasmonics allows us to concentrate, guide, and manipulate light at the deep subwavelength scale, promising enhanced light-matter interaction, next-generation optical circuits, sub-diffraction-limited imaging, and ultrasensitive biomedical detection [1]. Furthermore, the assembly of metallic nanostructures can be used to construct optical metamaterials and metasurfaces with exotic properties and functionalities, including anomalous refraction/reflection, strong chirality and invisibility cloak [2-4].

In this talk, I will present some of our work in the fascinating field of plasmonics and optical metasurfaces. First, I will discuss reconfigurable plasmonic lenses operating in microfluidic environment, which can dynamically diverge, collimate and focus surface plasmons [5]. Second, I will present a new concept of circular dichroism metamirrors, which enables selective, near-perfect reflection of designated circularly polarized light without reversing its handedness, yet complete absorption of the other polarization state [6]. This metamirror can be considered as the optical analogy of beetle *Chrysin gloriosa* in nature, while exhibits nearly maximal efficiency. Finally, I will discuss hyperbolic metasurfaces that are able to strongly modify the dispersion, and thus the propagation characteristic of surface plasmons in an unprecedented manner [7]. Such metasurfaces also support an entirely new type of helicity-dependent surface waves, which are selectively excited by left or right circularly polarized light [8, 9]. This manifests the optical spin-Hall effect on a 2D platform and the potential for quantum optical information processing.

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Biography: Dr. Yongmin Liu received his B.S. and M.S. degrees in Physics at Nanjing University (Nanjing, China) in 2000 and 2003, respectively. He obtained his Ph.D. from the University of California, Berkeley in 2009, under the supervision of Prof. Xiang Zhang. Subsequently, he stayed at UC Berkeley as a postdoctoral fellow for three years, and joined the faculty of Northeastern University at Boston in fall 2012 with a joint appointment in the Department of Mechanical & Industrial Engineering and the Department of Electrical & Computer Engineering. Dr. Liu's research interests include nano optics, nanoscale materials and engineering, nano devices, plasmonics, metamaterials, biophotonics, nano optomechanics, and nonlinear and quantum optics of metallic nanostructures. He has authored and co-authored over 40 journal papers including *Science*, *Nature*, *Nature Nanotechnology*, *Nature Communications*, *Physical Review Letters* and *Nano Letters*. He currently serves as an editorial board member for *Scientific Reports* and *EPJ Applied Metamaterials*.