UNIVERSITY OF HOUSTON
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Center for Integrated Bio and Nano Systems
SPEAKER SERIES
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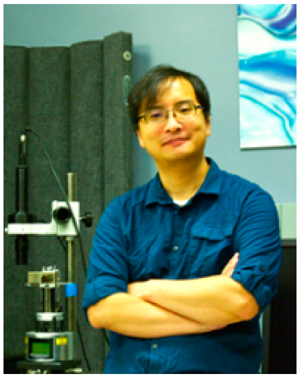
PRESENTS

# Tethering and Patterning Plasmonic Nanoparticles for Microfluidic Applications



**Prof. Naihao Chiang**
Inaugural Drs. Yao and Song Endowed Professor
Department of Chemistry
University of Houston

**10 am, Friday, September 3**
**CBB 108 (in person) or online Zoom**

https://uofh.zoom.us/j/845619943?pwd=QlZvYUV6M2dxNDkvNWxBd3F2YzdJZz09
**Meeting ID: 845 619 943, Passcode: 016104**

## LECTURE ABSTRACT

Plasmonics, which utilized the intensified optical field near noble metal nanostructures, has been applied in sensors, cargo delivery platforms, substrates for light-responsive cell retrieval, and materials for combined cancer cell hyperthermia/chemotherapies. Despite these significant developments, integrating plasmonic nanostructures into microfluidics still faces challenges accessing different substrate geometries, such as tubing and curved features, which are of broad research interest for developing substrates that uniquely interact with light, microfluidic platforms, and plasmonic scaffolds for biological studies.

In the first part of this seminar, I will provide background on the fundamental physical concepts underlying plasmonics, emphasizing localized surface plasmon resonance, surface-enhanced Raman scattering (SERS), and plasmonic-enhanced photothermal effects in biomedical applications.

In the second part of this seminar, I will focus on integrating plasmonic nanoparticles onto solid substrates. First, a soft-lithographic nanoparticle patterning scheme will be described. Then, I will discuss our recent progress on an in-situ growth method inside microfluidic channels. We have demonstrated high plasmonic amplification of the optical fields and utilized it for single-cell ablation and detachment. Ultimately, our plasmonic microfluidic platform has potential applications in biological and chemical sensing, hyperthermia-mediated drug delivery, and microfluidic soft-release of grafted cells with single-cell specificity.

## SPEAKER BIOSKETCH

Dr. Naihao Chiang is an Assistant Professor and the inaugural Drs. Yao and Song Endowed Professor of Chemistry in the Department of Chemistry at UH. He is starting his lab this Fall. He received his BS degrees in chemistry, physics, and economics/mathematics from the University of Southern California and a Ph.D. degree in applied physics from Northwestern University. His Ph.D. research at Northwestern, under the supervision of Profs. Richard P. Van Duyne and Tamar Seideman, focused on characterizing nanoscale materials and surface chemistries down to the single-molecule level with ultrahigh vacuum tip-enhanced Raman Spectroscopy. During his postdoctoral training in the Paul S. Weiss research groups at UCLA, he spearheaded several different research projects that have physical/biophysical and materials aspects. A few examples of his work include the use of custom-built laser-assisted scanning tunneling microscope to examine photoinduced carriers in molecular monolayers; developing microfluidic devices for gene-editing and plasmonic-induced cell releasing, and utilizing soft-lithography to pattern plasmonic nanoparticles directly. At UH, his group focuses on plasmonic induce chemical and physical phenomena and leverages these to pursue interdisciplinary projects with the aids of custom-built laser coupled scanning probe microscopes.

**List of awards:**

NIH NIBIB K99/R00 Pathway to Independence Award, APS Division of Chemical Physics Young Investigator Travel Award, AVS Dorothy M. and Earl S. Hoffman Travel Grant, and Award for an Outstanding Poster Presentation at Gordon Research Conference on Vibrational Spectroscopy.

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