# YUNSHAN EMILY WANG

# Assistant Professor

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# Professional Preparation

University of Notre Dame Chemical and Biomolecular Engineering Ph.D., 2015

Peking University (China) Electrical Engineering and Computer Science B.S., 2009

**Appointments**

2018- Assistant Professor, Department of Chemical Engineering University of Utah

2018- Adjunct Assistant Professor,

Department of Electrical and Computer Engineering

University of Utah

2017-2018 Research Assistant Professor, Department of Electrical and Computer Engineering, University of Utah

2015-2017 NSF MRSEC Postdoctoral Fellow

University of Utah

2009-2015 Graduate Research Assistant, Department of Chemical and Biomolecular Engineering,

University of Notre Dame

# Journal Publications (students supervised by Dr. Wang is underlined)

25 - Lee JY, Mohammadi M, and **Wang Y**, *Detecting and differentiating neurotransmitters using Ultraviolet plasmonic engineered native fluorescence.* RSC Advances, **13**, 32582 (2023)

24 - Cheng X, Rodriguez M, **Wang Y**, *Resonance mechanisms of coupled-particle plasmonic nano-antennas to maximize UV fluorescence enhancement of biological molecule.* Physica Scripta **98 (11)**, 115911, (2023)

23- Cooke, J., Ranga, P., Jesenovec, J., Bhattacharyya, A., Cheng, X., **Wang, Y.**, McCloy, J.S., Krishnamoorthy, S., Scarpulla, M.A. and Sensale-Rodriguez, B., *Photoluminescence microscopy as a noninvasive characterization method for defects in gallium oxide and aluminum gallium oxide epitaxial films.* Optical Materials Express, ***12*(11)**, pp.4341-4353, (2022)

22- Cheng X, **Wang Y**, *Enhanced ultraviolet absorption in graphene by aluminum and magnesium hole-arrays,* Scientific Reports, **11**, 8516 (2021)

21- Gopalan P, **Wang Y**, Sensale-Rodriguez B, *Terahertz characterization of two-dimensional low-conductive layers enabled by metal gratings*, Scientific Reports, **11**, 2833, (2021)

20- Lee JY, Cheng X and **Wang Y**, *Ultraviolet plasmonic enhancement of the native fluorescence of tryptophan on aluminum nano-hole arrays*, Journal of Physics D: Applied Physics, **54** 135107 (2021)

19- Cheng X, Lotubai E, Rodriguez M, **Wang Y**, *UV fluorescence enhancement by aluminum and magnesium equilateral bowtie nanoantennas,* OSA Continuum, 3, 3300-3313 (2020)

18- Moreira C, **Wang Y**, Blair S, Chadwick E, Lee JY, Oliveira L, Lima A, Cruz R, *Approaches for deep-ultraviolet surface plasmon resonance sensors*, Optics Letters, 45, 4642-4645 (2020).

17- Moreira C, **Wang Y**, Blair S, Carvalho I, Cruz R, *Aluminum-Based Deep-Ultraviolet Surface Plasmon Resonance Sensor*, Plasmonics, (2020).

16- Cooke J, Ghadbeigi L, Sun R, Bhattacharyya A, **Wang Y**, Scarpulla M, Krishnamoorthy S, and Sensale-Rodriguez B, *Synthesis and Characterization of Large-Area Nanometer-thin β-Ga2O3 Films from Oxide Printing of Liquid Metal Gallium*, Physica Status Solidi A: Applications and Materials Science, 217 (2020).

15- **Wang Y**, Dickens PT, Varley JB, Ni X, Lotubai E, Sprawls S, Liu F, Lordi V, Krishnamoorthy S, Blair S, Lynn KG, Scarpulla M and Sensale-Rodriguez, B, *Incident wavelength and polarization dependence of spectral shifts in β-Ga2O3 UV photoluminescence*, Scientific Report, 8, (2018)

14- Mao J, **Wang Y**, Appusamy K, Guruswamy S and Blair S, *Effect of Ga Implantation and Hole Geometry on Light Transmission through Nanohole Arrays in Al and Mg*. The Journal of Physical Chemistry C 122 , 10535-10544 (2018).

13- Zhang T, **Wang Y**, Appusamy S, Huang B, Wang J, Liu F, Blair S, Guruswamy S and Nahata *A. Gallium Platinum Alloys – A New Material System for UV Plasmonics*. Optical Material Express, 7, 2880, (2017). (Editor’s highlight)

12- **Wang Y**, Peterson E, Appusamy S, Harris J, Guruswamy S and Blair S, *Magnesium as a Novel UV Plasmonic Material for Fluorescence Decay Rate Engineering in Free Solution.* The Journal of Physical Chemistry C, 121, 11650 (2017).

11- Egatz-Gomez A, Wang C, Klacsmann F, Pan Z, Marczak S, **Wang Y**, Sun G, Senapati S, Chang HC, *Future microfluidic and nanofluidic modular platforms for nucleic acid liquid biopsy in precision medicine.* Biomicrofluidics, 10, 032902 (2016).

10- Yan Y, **Wang Y**, Senapati S, Schiffbauer J, Yossifon G, and Chang HC, *Robust ion current oscillations under a steady electric field: An ion channel analog.* Phys. Rev. E, 94, 022613 (2016).

9- Jiao X, **Wang Y** and Blair S, *UV fluorescence enhancement by Al and Mg nanoapertures*. J. Phys. D: Appl. Phys., 48 184007 (2015).

8- **Wang Y**, Chang TC, Stoddart P and Chang HC, *Diffraction-limited Ultrasensitive Molecular Nano-Arrays With Singular Nano-Cone Scattering*. Biomicrofluidics, 8, 021101 (2014).

7- Liu S, Yan Y, **Wang Y**, Senapati S and Chang HC, *Plasmonic hotspots of dynamically assembled nanoparticles in nanopipettes: femtomolar molecular (miRNA) sensing*. Biomicrofluidics, 7, 061102 (2013).

6- **Wang Y**, Cheng X, Chang HC, *Celebrating Singularities: Mathematics and Chemical Engineering.* AIChE J, 59 1830 (2013) (Cover Featured)

5- **Wang Y**, Plouraboue F and Chang HC, *Broadband converging plasmon resonance at a conical nanotip*. Opt Express, 21 6609-6617 (2013)

4- **Wang Y**, Tan M.K, Go D.B and Chang HC, *Electrospray Cone-Jet Breakup and Droplet Production for Electrolyte Solutions.* Europhys. Lett. 99, 64003 (2012) (Editor’s highlight).

3- Xie F, **Wang Y**, Wang W, Li Z, Yossifon G, and Chang HC, *Preparation of Rhombus-Shaped Micro/Nanofluidic Channels with Dimensions Ranging from Hundred Nanometers to Several Micrometers*, J. Nanosci. Nanotechnol. 10 7277 (2011).

2- Xie F, **Wang Y**, Wang W, Wu W, Li Z, Yossifon G, and Chang HC, *An experimental study on the side-opening filling process at the interface between microchannels with different widths*, Key Engineering Materials, 483, 293 (2011).

1- Chen Z, **Wang Y**, Wang W, and Li Z, *Nanofluidic Electrokinetics in Nanoparticle Crystal*, Appl. Phys. Lett. 95, 102105 (2009).

**Invited talk**

1-Wang Y, UV plasmonics for biosensing, SPIE Optics and Photonics, 2019

**Conference Presentations**

23 - Mohammadi M and Wang Y, Improve Sensitivity and Selectivity of Neurotransmitter Sensing through UV Plasmonics Enhanced Native Fluorescence, AIChE, 2023 (Oral)

22- Skliar M and Wang Y, Dielectrophoretic Label-Free Assessment of Critical Quality Attributes of Therapeutic Extracellular Vesicles Biomanufactured for Regenerative Medicine, AIChE, 2023 (Oral)

21 Wang Y, Enabling Label Free Biosensing With Ultra Violet Plasmonics Engineered Native Fluorescence, SciX 2023 (Invited talk)

20- Lee, J-Y, Wang Y, In-Situ Monitoring with a Surface Plasmonic Enhanced Native Fluorescence in the Ultraviolet Spectral Region, AIChE, 2021 (Oral)

19 -Cooke J, Ghadbeigi L, Sun R, Bhattacharyya A, Wang Y, Scarpulla M, Krishnamoorthy S, Sensale-Rodriguez B, Large-area nanometer-thin β-Ga2O3 films synthesized via oxide printing of liquid metal gallium, SPIE Optics and Photonics 2020 (Oral)

18-Cheng X, Rodriguez M, Wang Y, Native fluorescence enhancement using an Aluminum bowtie nano-antenna, SPIE Optics and Photonics 2020 (Oral)

17-Lee J-Y, Wang Y, Fluorescence decay rate engineering using aluminum nanohole arrays, SPIE Optics and Photonics 2020 (Oral)

16-Lee J-Y, Wang Y, Aluminum Thin Film Enhanced Native Fluorescence for Biosensors in the UV Spectral Region, AIChE 2019 (Poster)

15-Cheng X, Wang Y, UV Surface Plasmon Resonance Modification by Graphene Pi Plasmon Resonance, AIChE 2019 (Oral)

14-Chen X, Wang Y, UV surface plasmon resonance modification by graphene Pi plasmon resonance, SPIE Optics and Photonics, 2019

13-Wang Y, UV fluorescence decay rate engineering by aluminum and magnesium bowtie antennas, SPP9, the 9th International Conference on Surface Plasmon Photonics, 2019 (Poster presentation)

12-Wang Y, Label free Biosensing enabled by UV plasmonic enhanced fluorescence, SPIE Photonics West, 2019 (Oral presentation)

11-Wang Y, Label free Biosensing enabled by UV plasmonic enhanced fluorescence. Targeted Nucleic Acid Detection and Delivery, 2018 (Oral Presentation).

10-Wang Y, Modification of UV Surface Plasmon Resonances in Aluminum Hole-Arrays with Graphene, CLEO, 2017 (Poster Presnetation).

9- Wang Y, UV fluorescence enhancement and lifetime modification by Al and Mg nanoaperture. NFO, 2016 (Oral presentation).

8- Wang Y, UV fluorescence enhancement and lifetime modification by Al and Mg nanoaperture. Optics and Photonics, 2016 (Oral presentation).

7- Wang Y, UV fluorescence lifetime modification by Al and Mg nanoaperture. SPP7, 2015 (Oral presentation).

6- Wang Y, Plasmonic nucleic acid sensing by target-induced nanoparticle self-assembly onto optical fiber cone arrays, 246th American Chemical Society National Meeting, 2013 (Oral presentation).

5- Wang Y, Nano-Cone Optical Fiber Array Sensors for MiRNA Profiling, SPIE Optics+Photonics, 2013 (Oral presentation).

4- Wang Y, Nucleic Acid Sensing by Target-Induced Nanoparticle Aggregation with Optical Fiber Cone Arrays AIChE Annual Meeting, 2012 (Oral presentation).

3- Wang Y, Emission and Charging of Nanoaerosol Plumes from a Taylor Cone-Jet, The Division of Fluid Dynamics of the American Physical Society, 2011(Oral presentation).

2- Wang Y, A Hybrid Nanoscale Biosensing Platform Based On Dielectrophoresis and Surface Plasmonics, AIChE Annual Meeting, 2011(Oral presentation).

1- Wang Y, Surface Plasmon Polaritons: Geometric Resonance at Singularities, APS March Meeting, 2011 (Oral presentation).

**Patent**

S Liu, S Senapati, Y Wang, Y Yan, HC Chang, “Method and apparatus for a nanopipette biosensor” (US Patent 9,856,518, 2018).

**Teaching and Mentor Experiences**

*Instructor*, University of Utah, Fall 2019-2023

Ch En 3853 - Chemical Engineering Thermodynamics, junior required course, class size (60+)

*Instructor*, University of Utah, Spring 2023

Ch En 5810 - Nanoscience, senior undergraduate and graduate level course, class size (20+)

*Instructor*, University of Utah, Spring 2019- 2021

Ch En 2800 - Fundamental of process engineering, sophomore required course, class size (50+)

*Guest Instructor*, University of Utah

Applied Electromagnetics – Spring 2017; Nanophotonics – Fall 2016; Microwave Engineering - Fall 2016, Fall 2018

*Graduate Student Instructor*, University of Notre Dame

Received ‘Outstanding Graduate Student Teachers Award’ from University of Notre Dame

Mathematics II - Spring 2013; Electrokinetics - Fall 2013

*Teaching Assistant*, University of Notre Dame, 2009-2012

Mathematics II - Spring 2009-2012; Biomedical Engineering Transport Phenomena - Fall 2009

*Mentor*

Ph.D. student:

* Mohammad Mohammadi, Ph.D. candidate of Chemical Engineering, University of Utah

Alumni

* Xueling Cheng, Ph.D. of Electrical and Computer Engineering, University of Utah, Currently Yield Enhancement Engineer at Micron Inc
* Ji-Young Lee, Ph.D. of Chemical Engineering, University of Utah,

Currently a postdoc fellow at Northeastern University

## Service and Outreach Activities

**External Service**

1. Reviewer of manuscripts for: Biomicrofluidics (American Institute of Physics), SPIE optical engineering, Scientific report, IEEE Transactions on Nanotechnology, Sensors and Actuators A: PHYSICAL
2. Proposal review for: NIH ISD study section, 2021, NSF CBET Nanoscale interactions, 2021, NSF CBET Nanoscale interactions, 2020, NSF ECCS 2019, ACS Petroleum Research Fund 2019.
3. Section co-chair, Chemical Engineers in Medicine Topical Conference - Diagnostics, Treatments and Theranostics. AIChE, 2019
4. Program committee, UV and Higher Energy Photonics: From Materials to Applications 2021, SPIE Optics and Photonics, 2019-present

**Internal Service**

1. Member of Faculty Search Committee, 2023-present
2. Chair of department safety committee, 2019- present
3. Member of Undergraduate Committee, 2019-present
4. Committee member of department qualify exam
5. Committee member of PhD thesis proposal, Tae Hwan Lim

**Outreach Activities**

1. Science fair mentor, Escalante Elementary School, Salt Lake City, UT, 2015
2. President, SPIE Student Chapter at Notre Dame, 2013

## Honors

## Outstanding Graduate Student teacher Award (University of Notre Dame) 2013

## Fellowship, Center for Environmental Science and Technology - (University of Notre Dame), 2011

## Fonder Scholarship for top 5% of the Microelectronics class – (Peking University) 2007

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