Curriculum Vitae

Shaopeng Wang

Associate Professor

School of Biological and Health System Engineering, Ira A. Fulton Schools of Engineering
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Highlight

- 100+ peer reviewed journal publications, Google scholar h-index 49, total citation 8500+.
- 5 issued patents, 20+ patent applications.
- 8 active extramural research grants (including three R01s). Total acquired extramural research funding ~$20M.
- Graduate Faculty for PhD programs (endorsed to chair) of Biological Design, Biomedical Engineering, Electrical Engineering, Physics, Chemistry and Biochemistry.
- Mentored/co-mentored 14 postdocs, 29 PhD, 13 Master students, and 20 undergraduate students.
- Taught 1 graduate course (BME 598) and 3 undergraduate courses (BME 340, 423 and ASU101).
- Editorial board member of *Biosensors, ACS sensors*, and *Med-X.*
- Reviewer for NIH and several other funding agencies and 70+ journals.

Education and Training

- B. S. in Biological Sciences & Biotechnology, Advisor: Prof. Sen-fang Sui, Tsinghua University, Beijing, China, 1985.09-1990.07
- M. S. in Biophysics, Advisor: Prof. Sen-fang Sui, Tsinghua University, Beijing, China, 1990.09-1993.03
- Ph. D. in Physical Chemistry, Advisor: Prof. Roger M. Leblanc, University of Miami, Miami, Florida, 1994.09-1999.07
- Postdoctoral training in Physics, Advisor: Prof. Nongjian Tao, Florida International University, 1999.09-2001.07
- Completed Research-Based Instructional Strategies in Engineering (RISE) Instructional Workshop hosted by Ira A. Fulton Schools of Engineering Learning and Teaching Hub, Arizona State University, 2021.09 – 2022.04.

Research Interests

- Develop novel biosensors and bioinstrumentations for biomedical research, drug development and disease diagnosis
- Label-free optical and electrochemical sensing for chemical and biological targets
- Current focus:
  - Plasmonic and optical functional imaging for molecular interactions, neuron cell activities, single proteins, virus, bacteria, and live cells
  - Charge-based detection of small molecules and single proteins
  - Imaging-based rapid bacteria identification and antibiotic susceptibility test
  - Digital immunoassay for rapid and precise detection of blood biomarkers

Professional Experiences

1993.04 – 1994.07 Research Assistant, Tsinghua University, Department of Biological Science and Technology, Beijing, China

- Conducted research in membrane biophysics using Langmuir monolayer as a model system, in Prof. Sen-Fang Sui's lab.

1994.09 – 1999.07 Graduate Teaching and Research Assistant, University of Miami, Department of Chemistry, Miami, FL

- Teaching assistant for general chemistry and organic chemistry classes and labs for 4 years.
- Conducted research on Langmuir monolayer and Langmuir-Blodgett films for sensor development and material characterization.

1999.09 – 2001.07 Postdoctoral Research Associate, Florida International University, Department of Physics, Miami, FL

- Conducted research and development on multi-wavelength surface plasmon resonance spectroscopy.
- Conducted research on chemical sensor and biosensors based on optical and nanotechnology.

2001.09 –2008.11 Senior Scientist, Principal Investigator, ICx Nomadics Inc. (now FLIR), Stillwater, OK

- Conducted research and development on several nanoparticle related projects for LED, sensing, fluorescence labeling, and therapeutic applications, and had hands-on experiences on nanoparticle synthesis, surface modification, conjugation and characterization.
- Conducted research and development on surface plasmon resonance spectroscopy-based sensors, amplified fluorescence polymer based sensors, and cell based sensors, and had hands-on experiences on optical instrument design and implementation.
- Conducted research and development on several tissue-engineering projects that used inverted colloidal crystal as tissue scaffold for different applications, and had hands-on experiences on mammal cell culture and characterization.
- Responsible for grant proposal development, project management and reporting, instrument and methodology development and implementation, and mentoring of junior researchers.

2008.12-2015.06 Associate Research Professor, Biodesign Center for Bioelectronics and Biosensors, Arizona State University, Tempe, AZ

- Conducted research and development on optical biosensors for biomedical applications
- Responsible for proposal and manuscript writing, project management and reporting, instrument and methodology development, mentoring of multiple graduate students and postdocs.

2015.07-2021.06 Research Professor, Biodesign Center for Bioelectronics and Biosensors, Arizona State University, Tempe, AZ

- Conduct research and development on optical biosensors for biomedical applications
- Responsible for proposal and manuscript writing, project management and reporting, instrument and methodology development, and mentoring and managing a lab with 10~15 graduate students, postdocs and visiting scholars.

2021.07-present Associate Professor, School of Biological and Health System Engineering (SBHSE), Ira A. Fulton Schools of Engineering, and Biodesign Center for Bioelectronics and Biosensors, Arizona State University, Tempe, AZ

- Conduct research and development on optical biosensors for biomedical applications
- Responsible for proposal and manuscript writing, project management and reporting, instrument and methodology development, and mentoring and managing a lab with 10~15 graduate students, postdocs and visiting scholars.
- Teach undergraduate and graduate level courses at SBHSE

Professional services

Professional Membership

- 1995- American Chemical Society
- 1995- Beta Chapter of Alpha Epsilon Lambda
- 2003-2004 Tissue engineering Society International
- 2004-2005 Association for Laboratory Automation
- 2009- The Electrochemical Society
- 2012- American Physical Society

Editorial and Conference Service

- 2019.5 - Editorial Board Member of *Biosensors*: https://www.mdpi.com/journal/biosensors/editors
- 2023.01 - Editorial Advisory Board Member of *ACS Sensors* *(https://pubs.acs.org/page/ascefj/editors.html)*.
- 2023.01 - Editorial Board Member of *Med-X* (https://www.springer.com/journal/44258/editors).
- 2020.09-2021.03 Guest Editor for the *ACS Sensors* Special Issue: Commemorating NJ Tao, 2021, *6* (2).
- 2021-2022 Guest Editor for Focus Issue on Biosensors and Nanoscale Measurements: In Honor of Nongjian Tao and Stuart Lindsay, the Journal of The Electrochemical Society. https://www.electrochem.org/ecs-blog/focus-issue-on-biosensors-and-nanoscale-measurements
- 2022.08- 2023.05 Organization committee member for 3rd International Electronic Conference on Biosensors: https://sciforum.net/event/IECB2023

Journal Referee (total 76 journals)

ACS Applied Materials & Interfaces, ACS Biomaterials Science & Engineering, **ACS nano**, ACS Omega, ACS Photonics, **ACS Sensors**, **Advanced Functional Materials**, Advanced Healthcare Materials, Advanced Optical Materials, **Advanced Materials**, **Advanced Science**, Advances in Colloid and Interface Science, Analytical and Bioanalytical Chemistry, **Analytical Chemistry**, Analytical Methods, Applied and Environmental Microbiology, Applied Spectroscopy, Applied Surface Science, Arabian Journal of Chemistry, Bioactive Materials, Biomacromolecules, Biomedical Optics Express, Biomedicine & Pharmacotherapy, Biosensors, **Biosensors and Bioelectronics**, Cancer Nanotechnology, **Chemical Society Reviews**, Chemistry - an European Journal, Clinical and Translational Medicine, Colloids and Surfaces B, Computer Methods and Programs in Biomedicine, Current Opinion in Chemical Biology, Environmental Science and Technology, Fibers, IEEE access, International Journal of Molecular Sciences, Journal of Applied Physics, Journal of Biomedical Nanotechnology, Journal of Innovative Optical Health Sciences, Journal of Nano Medicine, Journal of Nanoscience and Nanotechnology, Journal of Physical Chemistry, Journal of Proteome Research, **Journal of the American Chemical Society**, Journal of Translational Engineering in Health and Medicine, Lab on a Chip, Langmuir, Macromolecules, Materials, Materials Today Advances, Microchemical Journal, Microsystems & Nanoengineering, Molecular Pharmaceutics, **Nano Letters**, Nanomaterials, Nanophotonics, Nanoscale Horizons, **Nature Biotechnology**, **Nature Communication**, **Nature Method**, **Nature Nanotechnology**, **Nature Photonics**, PLoS One, Research, Review of Scientific Instrument, RSC Advances, **Science Advances**, Scientific Report, Sensor Letters, Sensors, Sensors & Actuators B, **Small**, Small Methods, Talanta, **The Proceedings of the National Academy of Sciences**, Trends in Analytical Chemistry

Grant Reviewer

- ACS-Petroleum Research Fund
- U.S. Civilian Research and Development Foundation
- Dutch Research Council
- India Alliance Fellowship Application
- National Institute of Health ad hoc member of study sections:
  - 2009.06 NIH Stage I reviewer for NIH ARRA-Challenge grant program (ZRG1 BST-M (58))
  - 2012.02.21-23 ZRG1 BST-T (90) review panel, Bioengineering Sciences and Technologies, Academic Research Enhancement Award Grants (R15)
  - 2014.03.27 NCI/IMAT review panel, Early-Stage Innovative Technology Development for Cancer Research (R21)
  - 2016.03.08 National Cancer Institute Special Emphasis Panel (ZCA1-TCRB-6 (M3)) for Innovative Molecular Analysis Technologies for Cancer Research (RFA-CA-15-002, R21)
  - 2017.02.07-08 NIH CSR Enabling Bioanalytical and Imaging Technologies (EBIT) study section (R01 and R21)
  - 2018.10 NIH CSR Enabling Bioanalytical and Imaging Technologies (EBIT) study section (R01 and R21)
  - 2019.03.29 NIH/NIBIB ZEB1 OSR-E(M2) review panel: Mentored Career Development (K) and Conference (R13) Award Application

- 2019.10.10-11 NIH CSR Enabling Bioanalytical and Imaging Technologies (EBIT) study section (R01, R21, R03)
- 2020.06.18-19 NIH CSR Enabling Bioanalytical and Imaging Technologies (EBIT) study section (R01, R21, R03)
- 2020.11.23-24 NIH CSR NIGMS Special Emphasis Panel Review (2021-01 ZRG1 CB-D (55)) of MIRA Applications (R35)
- 2021.06.16-17 NIH/NCI Special Emphasis Panel grant review meeting 2021/10 ZCA1 TCRB-J (O1) R Innovative Molecular and Cellular Analysis Technologies (IMAT)
- 2022.08.22-24 NIH/NIAID Special Emphasis Panel, ZAI1 FDS-M (C2) NIAID 2022 DMID Omnibus BAA (HHS-NIH-NIAID-BAA2022-1)
- 2022.11.03-04 National Cancer Institute Special Emphasis Panel (ZCA1 TCRB-Q (J1) for Innovative Molecular and Cellular Analysis Technologies (RFA-CA-22-001, R61)

University Service

- 2011.01 - Biodesign Personnel Committee, ASU
- 2015.05 – 2018.05 Faculty Advisor, Sun Devils Badminton Club, ASU
- 2019.04 Wojcik Scholarship Review Committee, Biodesign, ASU
- 2020.01-2020.03 Member of Faculty Search Committee: Digital health (all ranks) faculty joint appointment between Biodesign Center for Bioelectronics and Biosensors and the Ira A. Fulton Schools of Engineering
- 2022.08- Ira A. Fulton Schools of Engineering Academic Standards Committee
- 2022.08- School of Biological and Health Systems Engineering Barrett Faculty Honors Advisor

Consulting Service

- 2016.01-2017.09 Luna Innovations Incorporated, Roanok, VA 24011

Community Service

- 2016.05 Grand Award Judge for Biomedical Engineering, 2016 Intel international Science and Engineering Fair (ISEF), Phoenix, Arizona
- 2022.02.01 Participated in SBHSE's BME information session for prospective high school students.

Honors and Awards

- 1983 Second place in Jilin Province at China national high school mathematic competition
- 1984 Third place in Jilin Province at China national high school mathematic competition
- 1984 Six place in Jilin Province at China national high school physics competition
- 1985 Admitted to Tsinghua University with the exempt of the National Entrance Examination of Universities
- 1987 Software Computational Simulation of Biochemistry Metabolism Pathway was awarded in Student Scientific and Technology Competition, Tsinghua University
- 1987 Student Scientific and Technology Competition Award, Tsinghua University
- 1990 Experimental Technique Award, Tsinghua University
- 1991 Guanghua Scholarship, Tsinghua University
- 1993 Laboratory Construction Award, Tsinghua University
- 1993 Mr. Hua Luogeng Memorial Fellowship, Tsinghua University
- 1993 Travel Fellowship, 11th International Biophysics Congress
- 1996 Best Student Presentation Award, Colloid and Surface Chemistry Division's Poster Session, 211th American Chemistry Society National Meeting, New Orleans
- 1997 Max and Peggy Kriloff Graduate Student Travel Scholarship, University of Miami
- 1998 First prize of Physical Science in the Third Annual UM Graduate Student Research & Creativity Forum, University of Miami

- 1998 Outstanding Graduate Student Award, Department of Chemistry, University of Miami
- 1998 Excellence Graduate Research Award, Department of Chemistry, University of Miami
- 1999 Excellence in Graduate Academic Achievement and Research Creativity, Department of Chemistry, College of Arts and Sciences, University of Miami
- 1999 Elected to Who's Who Among Students in American Universities & Colleges, University of Miami
- 2021 Nominated to full membership in Sigma Xi
- 2022 ASU SUN Award for participation in SBHSE's first BME information session for prospective students.

Research Support

Active Research Support

NIH NIGMS R01GM140193, 09/01/2022-08/31/2026

Title: Optical imaging of size, charge, mobility and binding of single proteins
Description: A detection technology based on evanescent field scattering of protein oscillators will be developed to detect and identify proteins, and to analyze protein-protein interactions. The success of the project will lead to a powerful tool to study molecular scale processes in living organisms, to screen drugs and to detect biomarkers, particularly from low volume samples, such as single cells and exosomes.
Role: PI

Biosensing Instrument Inc. Big 143986 (VIA NIH NIGMS R42GM143986), 08/15/2021 - 02/14/2024

Title: Critical angle reflection imaging for label-free quantification of molecular interactions

Description: To develop critical angle reflection imaging (CARi) technology for in-situ measurement of binding kinetics of membrane proteins on the cell surface with single cell resolution.

Role: PI

Mayo Clinic Arizona Cardiovascular Research Grant Award, FP00115547, 08/01/2021 – 01/31/2023

Title: Title: Development and Validation of a Rapid, Point-of-Care Digital Immunoassay for High Sensitivity Cardiac Troponin Detection

Description: To develop a point of care digital immunoassay for detection of cardiac troponin with high sensitivity and precision.

Role: Co-investigator (PI: Yang)

NSF 2122901, 09/01/2021 – 08/31/2024

Title: PFI-RP: Partnership for Innovation - Avoiding Kidney Injuries with Evidence-Based Smart Technology

Description: To develop a new sensing system to enable urine real-time, point of care (POC), multi-parametric measurements for: 1- monitoring patients at risk for Acute Kidney Injury (AKI) and 2- building AKI prediction models to revolutionize the current practice of nephrology.

Role: Co-PI (PI: Forzani)

Biosensing Instrument Inc. Big 139535 (VIA NIH NIGMS R44GM139535), 05/18/2021 - 03/31/2023

Title: Development of a charge-sensitive optical detection system for high-throughput study of small molecule binding kinetics

Description: To develop a commercial microplate compatible prototype instrument using optical fiber probes for high-throughput study of small molecule binding kinetics with charge sensitive detection.

Role: PI

NIH NCI IMAT R33CA235294, 03/01/2020 - 02/28/2023

Title: A Virion-Display Oscillator Array and Detection Platform for Quantification of Transmembrane Protein Binding Kinetics
Description: This project develops a virion oscillator microarray technology to measure molecular binding to GPCRs. The success of this project will lead to a long-sought tool to determine cancer-related cellular signaling processes, screen drugs targeting membrane proteins, and validate new therapies for cancer and other diseases.
Role: PI

NIH NIGMS 2R01GM107165, 09/01/2018-08/31/2023

Title: Quantitative label-free imaging of electrical activities in cells
Description: To develop a label-free imaging technology for studying electrical activities in cells with high spatial and temporal resolutions. This unique capability will provide new insights into the roles of electrical activities in many biological processes, including brain and cardiac functions, wound healing and tissue development, and will lead to a new method for screening drugs targeting these processes.
Role: PI

NIH NIAID 1R01AI138993-01 07/25/2018 - 06/30/2023

Title: Point-of-care antimicrobial susceptibility testing based on simultaneous tracking of multi-phenotypic features of single bacterial cells
Description: To develop a culture-independent technology for point-of-care diagnosis of antimicrobial-resistant bacteria in urinary tract infections within 3 hours, by imaging urine samples directly with an innovative large-image-volume imaging technique and analyzing the data with a machine-learning model. Successful development of the technology will enable precise antibiotic prescriptions and accurate treatment of the patient on the same day of visit.
Role: PI

Completed

NIH NIGMS 1R01GM124335-01 07/01/2017 - 04/30/2022

Title: Measuring small molecule interactions with membrane proteins on single cells via detecting nanometer scale membrane deformations
Description: to develop a label-free optical-imaging method to quantify binding kinetics of small molecules to membrane proteins via measuring binding induced nanometer scale cellular membrane deformation.
Role: PI

Genentech Inc. AGR 11/05/18, 10/30/2018 – 10/29/2021

Title: Direct quantification of binding kinetics between phage and mRNA displayed peptide
Description: To develop charge sensitive optical detection (CSOD) technology for measurement of phage displayed peptides binding to protein targets.
Role: PI

Biosensing Instrument Inc., BIG126720 (VIA NIH NIGMS R44GM126720), 5/1/2018 - 10/31/2021

Title: Nano-Oscillator Arrays for Sensitive Plasmonic Detection of Molecular Interaction

Description: The success of this project will lead to a new technology to address the unmet need for quantifying small molecule binding kinetics and biochemical reactions kinetics.

Role: PI

Biosensing Instrument Inc. (Via NIH NIGMS 1R44GM114951-01), 4/1/2015-3/31/2021

Title: An Integrated Microarray Printing and Detection System

Description: To develop an integrated microarray printing and detection system (IMPDS) that enables high-throughput analysis of protein interactions kinetics in microarray or whole-cell based formats.

Role: PI

NIH NCI IMAT R33CA202834 08/01/2016 - 07/31/2020

Title: Charge sensitive optical detection for high-throughput study of small molecules
Description: develops a microplate compatible, charge sensitive detection method using optical fiber probes for high-throughput study of small molecule binding kinetics.
Role: Co-Investigator (PI: NJ Tao)

NIH NIGMS 1R01GM107165, 07/01/2014-06/30/2018

Title: Quantitative label-free imaging of membrane protein interaction kinetics on cells
Description: A new imaging technique will be developed for studying the binding kinetics of membrane proteins in their native cellular environment.
Role: PI

Moore Foundation, 04/12/2013-07/31/2016

Title: Label-free imaging and tracking of single protein-protein interactions
Description: To develop a capability to image the morphology, chemical reactions and charge distributions of a living system with molecular scale spatial and temporal resolution.

Role: Co-Investigator (PI: NJ Tao)

Biosensing Instrument Inc. (Via NIH NIGMS 1R44GM106579), 04/01/2013-03/31/2017

Title: Electrochemically-Enhanced Plasmonic Imaging for Quantitative Proteomics

Description: To develop an electrochemically-enhanced plasmonic imaging (ECEPI) system that enables high-throughput analysis of protein interactions with small molecules and characterization of post-translational modifications in microarray or whole-cell based formats.

Role: Co-Investigator (PI: NJ Tao)

NIH NCI R21CA173205 09/01/2012 - 08/31/2015

Title: Charge sensitive optical detection for high-throughput study of small molecules

Description: develops an optical method to measure electrical conductance, making it possible to map ion channel opening and closing activities noninvasively with high spatial and temporal resolution.

Role: Co-Investigator (PI: NJ Tao)

NSF #1151005 (12010088) 02/01/2012 – 01/31/2016

Title: IDBR: Plasmonic-based electrochemical impedance microscopy for studying molecular binding and cellular processes

Description: This project focuses on developing a plasmonic-based electrochemical impedance microscope (P-EIM).

Role: Co-Investigator (PI: NJ Tao)

W. M. Keck Foundation, 07/01/2011-06/30/2016

Title: A Self-Assembled Nanomechanical System (NMES) for Molecular Detections

Description: To develop a nanoparticle based mechanical resonator with optical/electronics detections for molecular detections.

Role: Co-Investigator (PI: NJ Tao)

Amgen 2012577119 11/13/12 – 05/12/15

Title: Evaluate P-EIM technology for membrane protein binding affinities measurement

Description: The goal of the project is to establish P-EIM as a new platform for determining interaction kinetics between drug candidates and membrane protein targets, where the membrane proteins are either in native cellular environment or isolated and stabilized with nanodisc.

Role: PI

NIH R21 1R21DA033839-01 04/01/2012 - 03/31/2015

Title: Plasmonic Mapping of Ion Channel Activities in Single Cells

Description: develops an optical method to measure electrical conductance, making it possible to map ion channel opening and closing activities noninvasively with high spatial and temporal resolution.

Role: Co-Investigator (PI: NJ Tao)

Piper Bridge Award (Virginia Piper Foundation), 07/01/2014-06/30/2015

Title: Measure Protein Interaction at Scale

Description: Measure protein interaction kinetics using Electrochemically Enhanced Surface Plasmon Resonance Imaging (EC-SPRi) and Nucleic Acid-Programmable Protein Array (NAPPA)

Role: Co-Investigator (PI: Mitch Magee)

NIH R21 RR026235 (R21GM103396) 05/15/2010-02/28/2013

Title: A Multi-functional Optical Impedance Microscope for Live Cell Imaging

Description: To develop a new label-free microscopy that can capture sub-micron resolution impedance images of live cells optically, and can obtain surface plasmon resonance, optical and fluorescence microscopy images simultaneously.

Role: PI

Contract # W81XWH-05-C-0128 (DOD), 05/20/05 – 11/30/09

Title: 3D Scaffold and Stem Cell-Based Bioengineered Skin for Treatment of Cutaneous Vesicant Injury

Description: Develop 3D scaffold and stem cell-based bioengineered skin for treatment of cutaneous vesicant injury.

Role: Substitute PI, (Original PI: Wei Chen)

Contract # W81XWH-05-C-0101 (DOD), 02/01/05 – 03/03/08

Title: Nanoparticle Self-Lighting Photodynamic Therapy for Ovarian Cancer Treatment

Description: Design and fabricate nanoparticle self-lighting photodynamic therapy for ovarian cancer treatment

Role: Substitute PI (Original PI: Wei Chen)

Contract # W81XWH-06-C-0038 (DOD), 12/01/05 – 12/30/06

Title: Rapid Cell-based Toxicity Sensor Using Integrated Micro Ring-resonators as Signal Transducer

Description: Develop a rapid cell-based toxicity sensor using integrated microring resonators as signal transducer.

Role: PI

Contract # W81XWH-04-C-0139 (DARPA), 10/01/05 – 5/31/06

Title: Accelerated Vaccine Creation and Testing

Description: Develop artificial human immune system for accelerated vaccine creation and testing, including development of 3D tissue construct and in-situ optical sensing technology to monitor tissue growth.

Role: Technical lead

Contract # 6302 and #6443 (OCAST), 07/01/03 – 9/30/05

Title: AR 03(2)-068, Development of Artificial Tissue Constructs

Description: This project aims toward the design of a rigid, porous ex vivo cell scaffold that mimics the structure of bone marrow by using nanomaterials. This scaffold will be used to support stem cell expansion and differentiation.

Role: PI

Contract # DE-FG02-04ER84022 (DOE), 07/13/04 – 04/12/05

Title: Surface Plasmon Resonance Sensor for Radionuclides

Description: Develop a portable sensor based on surface plasmon resonance spectroscopy and anodic stripping voltammetry to detect radionuclides and other analytes of interest for environmental monitoring, industrial chemical detection, biomedical, and homeland security applications.

Role: PI

Contract # DAMD17-02-1-0702 (DARPA), 10/01/02 – 3/31/04

Title: 3D Tissue Constructs by Sequential Layering for Ex-vivo Immune System

Description: Develop inverted colloidal scaffolds for 3D cell and tissue culture for the construction of artificial human immune system.

Role on Project: Technical lead

Contract # DMI-0214696 (NSF), 07/01/2002 – 12/31/2002

Title: Trace Metal Ion Sensor based on High Resolution Surface Plasmon Resonance and Anodic Stripping Voltammetry

Description: Develop a highly sensitive sensor based on surface plasmon resonance spectroscopy and anodic stripping voltammetry to detect trace metal ions of interest for environmental monitoring, industrial chemical detection, biomedical, and homeland security applications.

Role: PI

Publications

H-index 49, total citation 8500+.
Google Scholar: http://scholar.google.com/citations?user=lMFxDUsAAAAJ&hl=en
My NCBI Bibliography: https://www.ncbi.nlm.nih.gov/myncbi/browse/collection/40547370
*Corresponding Author

Journal articles

1. Pengfei Zhang, Xinyu Zhou, and Shaopeng Wang*, Plasmonic Scattering Microscopy for Label-Free Imaging of Molecular Binding Kinetics: From Single Molecules to Single Cells, *Chemistry Method*, invited review, 2023, in press, DOI: 10.1002/cmtd.202200066.

2. Xinyu Zhou, Rui Wang, Zijian Wan, Pengfei Zhang*, and **Shaopeng Wang***, Multiplexed Protein Detection and Parallel Binding Kinetics Analysis with Label-Free Digital Single-Molecule Counting, Analytical Chemistry, 2023, 95, 2, 1541–1548, DOI: 10.1021/acs.analchem.2c04582.

3. Xiaoyan Zhou, Guangzhog Ma, Zijian Wan and **Shaopeng Wang***, Label-free multi-metric measurement of molecular binding kinetics by electrical modulation of a flexible biolayer, *ACS Sensors*, 2022, 7, 11, 3461–3469. **Awarded as ACS Editor's Choice article.**

4. Pengfei Zhang, Lei Zhou, Rui Wang, Xinyu Zhou, Jiapei Jiang, Zijian Wan, and **Shaopeng Wang***, Single Protein Detection and Imaging with Evanescent Scattering Microscopy, *Bio-protocol*, 2022, 12(20): e4530. DOI: 10.21769/BioProtoc.4530. (invited).

5. Rui Wang, Jiapei Jiang, Xinyu Zhou, Zijian Wan, Pengfei Zhang*, **Shaopeng Wang***, Rapid Regulation of Local Temperature and Transient Receptor Potential Vanilloid 1 Ion Channels with Wide-Field Plasmonic Thermal Microscopy, *Analytical Chemistry*, 2022, *94*, 14503–14508. https://doi.org/10.1021/acs.analchem.2c03111. Preprint: bioRxiv, https://doi.org/10.1101/2022.06.28.497933

6. Pengfei Zhang, Jiapei Jiang, Xinyu Zhou, Jayeeta Kolay, Rui Wang, Zijian Wan, and **Shaopeng Wang***, Label-free imaging and biomarker analysis of exosomes with plasmonic scattering microscopy, ***Chemical Science***, 2022, **13**, 12760-12768, DOI: 10.1039/D2SC05191E.

7. Zijian Wan, Guangzhong Ma, Pengfei Zhang, and **Shaopeng Wang***, Single-Protein Identification by Simultaneous Size and Charge Imaging Using Evanescent Scattering Microscopy, *ACS Sensors*, 2022, 7, 9, 2625–2633, DOI:10.1021/acssensors.2c01008. NIHMSID: 1835074. PMID: 36000947

8. Guangzhong Ma, Pengfei Zhang, Xinyu Zhou, Zijian Wan, and **Shaopeng Wang***, Label-Free Single-Molecule Pulldown for the Detection of Released Cellular Protein Complexes, ***ACS Cent. Sci.*** 2022, 8, 9, 1272–1281, https://doi.org/10.1021/acscentsci.2c00602

9. Fenni Zhang, Manni Mo, Jiapei Jiang, Xinyu Zhou, Michelle McBride, Yunze Yang, Kenta S. Reilly, Thomas E. Grys*, Shelley E. Haydel*, Nongjian Tao, and **Shaopeng Wang***, Rapid Detection of Urinary Tract Infection in 10 Minutes by Tracking Multiple Phenotypic Features in a 30-Second Large Volume Scattering Video of Urine Microscopy, *ACS Sensors*, 2022, 7, 8, 2262–2272, https://doi.org/10.1021/acssensors.2c00788 PMCID: 9465977

10. Pengfei Zhang, Xinyu Zhou, Jiapei Jiang, Jayeeta Kolay, Rui Wang, Guangzhong Ma, Zijian Wan, **Shaopeng Wang***, In Situ Analysis of Membrane-Protein Binding Kinetics and Cell–Surface Adhesion Using Plasmonic Scattering Microscopy, ***Angewandte Chemie International Ed.***, 2022;61(42):e202209469, https://doi.org/10.1002/anie.202209469

11. Pengfei Zhang, Rui Wang, Zijian Wan, Xinyu Zhou, Guangzhong Ma, Jayeeta Kolay, Jiapei Jiang, and **Shaopeng Wang***, Label-Free Imaging of Single Proteins and Binding Kinetics Using Total Internal Reflection-Based Evanescent Scattering Microscopy, *Anal. Chem.* 2022, 94, 30, 10781–10787, https://doi.org/10.1021/acs.analchem.2c01510. Supported by NIH grants R01GM107165. NIHMSID: 1835129. Preprint: bioRxiv 2022.02.04.479201; doi: https://doi.org/10.1101/2022.02.04.479201

12. Bo Yao, Yunze Yang, Nanxi Yu, Nongjian Tao, Di Wang*, **Shaopeng Wang*,** Fenni Zhang*, Label-free quantification of molecular interaction in live red blood cells by tracking nanometer scale membrane fluctuations, ***Small***, 2022, June 19, https://doi.org/10.1002/smll.202201623. Supported by NIH grants R01GM124335.

13. Runli Liang, Yingnan Zhang, Guangzhong Ma and **Shaopeng Wang***, Charge-Sensitive Optical Detection of Binding Kinetics between Phage-Displayed Peptide Ligands and Protein Targets, *Biosensors* 2022, 12(6), 394. https://doi.org/10.3390/bios12060394. Supported by NIH grants R33CA202834, R44GM139535, and Genentech Inc. grant CLL-016354.

14. Yunlei Zhao, Guangzhong Ma, and **Shaopeng Wang***, Magnetic Nanoparticle Tracking for One-Step Protein Separation and Binding Kinetics Analysis, *J. Electrochem. Soc.* 2022, *169*, 057509, https://doi.org/10.1149/1945-7111/ac6bc5

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135. S. Sui, H. Wu, and **S. Wang**, Langmuir-Blodgett FilmBalance, *Experimental Technique and Management*《实验技术与管理》, 1991, *8*(5), 28-31.
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Book chapters

1. **S. Wang*,** G. Ma, R. Liang, N. Tao (2022) Charge Sensitive Optical Detection for Measurement of Small-Molecule Binding Kinetics. In: Ossandon M.R., Baker H., Rasooly A. (eds) *Biomedical Engineering Technologies. Methods in Molecular Biology*, vol 2393, 315-328. Humana, New York, NY. https://doi.org/10.1007/978-1-0716-1803-5_17
2. **S. Wang** and N. A. Kotov, book chapter: Nanoparticle Labeled Antibodies and Antigens, *Dekker Encyclopedia of Nanoscience and Nanotechnology*, Editors: James A. Schwarz, Cristian I. Contescu and Karol Putyera, Marcel Dekker, Inc., New York, 2004, Vol 1, No. 1, 1647-1653 (ISBN: 0-8247-5055-1, 0-8247-5046-2).

3. W. Chen, A.G. Joly, and **S. Wang**, book chapter: Luminescence of Semiconductor Nanoparticles, *Encyclopedia of Nanoscience and Nanotechnology*, American Scientific Publishers, Los Angeles, 2004, Vol. 4, 689-718 (ISBN: 1-58883-001-2).
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Conference Proceedings

1. A. Ramachandran, S. Ja, J. Clarke, E. Flood, G. Frye-Mason, D. Goad, B. Little, L. Wald, **S. Wang**, E. T. Knobbe, Optical Microring Resonators in Trace chemical and Biosensing Applications, *The 9th CBW Protection Symposium* – May 22-27, 2007, Svenska Mässan/The Swedish Exhibition and Congress Centre, Gothenburg.
2. Y. Liu, **S. Wang**, N. A. Kotov, C. Cumming, J. E. Nichols, J. Cortiella, and M. Motamedi, Preparation of Ordered 3D cell Scaffolds with LBL Surface Modification, *Polymeric Materials Science and Engineering*, 2004, *90*, 433-434.
3. **S. Wang**, Y. Liu, N. A. Kotov, A. Mamendov, S. Westcott, C. Cumming, J. E. Nichols, J. Cortiella, and M. Motamedi, 3D Cell Growth on LBL Coated, Bone marrow Mimicking Scaffolds, *Polymeric Materials Science and Engineering*, 2004, *90*, 789.

Invited talks

1. **S. Wang**, "Label-free Functional Optical Imaging of Molecular and Cellular Activities", Invited seminar presentation, Department of Biomedical Engineering and Chemical Engineering, University of Texas at San Antonio and University of Texas Health Science Center at San Antonio, Feb 10th, 2023.
2. **S. Wang**, "Label-free Functional Optical Imaging of Molecular and Cellular Activities", Invited virtual seminar presentation, Frontier in Biomedical Engineering, BME Global Summer Workshop., Zhejiang University, July 20th, 2022.
3. **S. Wang**, "Optical Imaging of Single-protein Size, Charge, Mobility and Binding", Invited virtual seminar presentation, Lonza Biologics Inc., July 12th, 2022.
4. **S. Wang**, "Label-free Functional Optical Imaging of Molecular and Cellular Activities", Invited seminar presentation, Department of Pharmacology and Molecular Sciences, School of Medicine, Johns Hopkins University, January 5th, 2022.
5. **S. Wang**, "Multi-functional Optical Microscopy for Biomedical Applications", Invited seminar presentation, School of Biological and Health System Engineering, Arizona State University, January 28th, 2021.
6. **S. Wang**, "Multi-functional Surface Plasmon Resonance Imaging, Applications in Chemistry and Biology", Invited seminar presentation, Department of Chemistry, University of Miami, September 25, 2020.
7. **S. Wang**, "Are neurons bilingual?", invited talk, Faculty Chalk Talk, Biodesign Institute, Arizona State University, Tempe, AZ, Oct 29, 2018.
8. **S. Wang**, "Label-free Quantification of Small Molecule Binding Kinetics", invited talk, Sino-ASU Biodesign Symposium, Arizona State University, Tempe, AZ, Jul 23, 2018.
9. **S. Wang**, "Imaging-Based Detection Technologies for Biomedical Applications", invited talk, Advancing Biophysics, Biosensors and Biomimetics, A symposium to honor Dr. Stuart Lindsay, Arizona State University, Tempe, AZ, Oct 14, 2016.
10. **S. Wang** and NJ Tao, "Detecting Small Molecule-Membrane Protein Binding Kinetics", Keynote Speech on Sensors, 229th Electrochemistry Society (ECS) meeting, San Diego, CA, May 31, 2016.
11. **S. Wang**, "Imaging-based tracking of single bacterial cells toward culture-free antimicrobial susceptibility test", invited talk, FUSION 2016: Biodesign Scientific Retreat, Carefree, Arizona, April 1st, 2016. https://biodesign.asu.edu/fusion-2016
12. **S. Wang**, "Plasmonic Imaging of Chemical and Biological Targets", invited talk, Institute of Chemistry, Chinese Academy of Sciences, Beijing, China, Dec 23, 2014.
13. **S. Wang**, "Development of an Ultra-Fast and Ultra-Sensitive Plasmonic Imaging System", invited talk, Moore Imaging Conference, Gordon and Betty Moore Foundation, Sausalito, California, Dec 4-6, 2014.

14. **S. Wang**, C. MacGriff, X. Shan, W. Wang and NJ Tao, "IDBR: Plasmonic-based Electrochemical Impedance Microscopy for Studying Molecular Binding and Cellular Processes", invited talk, NSF IDBR PI workshop, Arlington, VA, May 1-2, 2014.
15. W. Wang, **S. Wang**, and N. Tao, Electrochemical Impedance Microscopy: A Label-free Technique for Monitoring Individual Cells and Intracellular Processes, *American Physics Society 2012 March Meeting*, Invited Oral Session: High Content Biophysical Data for Dynamic Studies in Cancer, Boston, Massachusetts, Feb. 29, 2012.
16. N. J. Tao and **S. Wang**, Plasmonic-based Electrochemical Impedance Microscopy (P-EIM) for Label-free Cell Based Assay and Small Molecule Detections, invited talk by Dr. Han Xu, Amgen Inc., Thousand Oaks, CA, Nov. 09, 2011.
17. **S. Wang**, Novel Applications of Objective-based Surface Plasmon Resonance Microscopy, invited talk by Dr. Honda Wang, presented at Changchun institute of Applied Chemistry, Chinese Academy of Sciences, Changchun, China, April 29, 2011.
18. N.J. Tao, K. Foley, **S. Wang**, X. Shan, Surface Impedance Microscopy for Biomedical Applications, oral presentation, *The 215th Electrochemical Society Meeting*, San Francisco, California, May 27, 2009
19. **S. Wang**, Development of Optical Sensors for Chemical and Biological Targets, invited oral presentation, *2006 Florida Award Symposium, Florida Annual Meeting and Exposition*, Orlando, Florida, May 12, 2006.

Conference Presentations

1. **S. Wang**, "A Virion-Display Oscillator Array and Detection Platform for Quantification of Transmembrane Protein Binding Kinetics", invited oral presentation, 23th Annual Innovative Molecular Analysis Technologies Principal Investigators Meeting, National Cancer Institute, National Institute of Health, Nov 30 – Dec 2, 2022, at University of Kansas, Lawrence, Kansas, USA.
2. Z. Wan, G. Ma, E. Johansen, P. Desai, H. Zhu, **S. Wang*,** "A Virion-Display Oscillator Array and Detection Platform for Quantification of Transmembrane Protein Binding Kinetics", Poster presentation, 22th Annual Innovative Molecular Analysis Technologies Principal Investigators Meeting, Dec 8-10, 2021, online.
3. **S. Wang**, "Measure Single Protein Size and Binding Kinetics with Plasmonic Scattering Microscopy", Invited online oral presentation, Symposium on the Frontiers of Surface Plasmon Resonance Imaging Technology and Applications", Oct 29-30, 2021, Nanjing, China.
4. P. Zhang, G. Ma, Z. Wan, N. Tao, **S. Wang***, Invited oral presentation #M02-1643, "Measure Single Protein Size and Binding Kinetics with Plasmonic Scattering Imaging", Symposium: M02: Biosensors and Nanoscale Measurements: A Symposium in Honor of Professors Nongjian Tao and Stuart Lindsay, 240th ECS Online Meeting (October 10-14, 2021)
5. Z. Wan, G. Ma, E. Johansen, P. Desai, H. Zhu, **S. Wang*,** "A Virion-Display Oscillator Array and Detection Platform for Quantification of Transmembrane Protein Binding Kinetics", Poster presentation, 21th Annual Innovative Molecular Analysis Technologies Principal Investigators Meeting, Dec 2-4, 2020, online.
6. R. Liang, G. Ma, **S. Wang** and N. Tao, "Charge Sensitive Optical Detection for High-throughput Study of Small Molecule Binding Kinetics", 20th Annual Innovative Molecular Analysis Technologies Principal Investigators Meeting, Nov 22-23, 2019, Cedars-Sinai Medical Center, Los Angeles, CA.
7. N. Tao, **S. Wang**, "Charge Sensitive Optical Detection of Small Molecules", 2018 NCI IMAT PI meeting, 19th Annual Innovative Molecular Analysis Technologies Principal Investigators Meeting, Rockville, MD, Nov 28-30, 2018.
8. M. Mo, W. Jing, H. Yu, F. Zhang, **S. Wang**, and N. Tao, "Image-based Rapid Antibiotic Susceptibility Test", Poster Presentation, 256th ACS National Meeting & Exposition, Boston, Massachusetts, Aug 19-23, 2018.
9. F. Zhang, W. Jing, A. Hunt, Y. Yang, **S. Wang**, and Nongjian Tao, "Label-Free Quantification of Small Molecule Interactions with Membrane Proteins in Single Cells by Mechanical Amplification", poster presentation, BPS18, 62nd Annual Meeting of Biophysical Society, San Francisco, California, February 17-21, 2018.
10. R. Liang, G. Ma, A. Hoyt, **S. Wang**, N. Tao, "Charge Sensitive Optical Detection of Small Molecules", 2017 NCI IMAT PI meeting, 18th Annual Innovative Molecular Analysis Technologies Principal Investigators Meeting, Rockville, MD, Dec 6-8, 2017.

11. N. Tao, **S. Wang**, "Charge Sensitive Optical Detection for High Throughtput Study of Small Molecules", 2016 NCI IMAT PI meeting, 17th Annual Innovative Molecular Analysis Technologies Principal Investigators Meeting, Bethesda, Maryland, Dec 1-2, 2016.
12. G. Ma, Y. Guan, Y. Chen, **S. Wang**, N. Tao, "Charge Sensitive Optical Detection for High-throughput Study of Small Molecules", 2015 NCI IMAT PI meeting, 16th Annual Innovative Molecular Analysis Technologies Principal Investigators Meeting, Bethesda, Maryland, Nov 12-13, 2015.
13. S. Shen, K. Syal, N. Tao, **S. Wang**, "Automatic, High-throughput Motion Classification of Surface-attached E. Coli Cells Using Bright Field Microscopy Data", Western Regional Meeting 2015, 45th Western Regional Meeting of the American Chemical Society, San Macros, CA, Nov 6-8, 2015.
14. X. Shan, W. Wang, **S. Wang**, K. Foley, and N. Tao, Plasmonic-based Imaging of Local Electrochemical Current and Interfacial Impedance (#2695, oral), *The 220th Electrochemical Society Meeting*, Boston, Massachusetts, October 12, 2011. (J6 - Sensors Based on Fluorescence, SERS, SPR, and Photo Electrochemistry)
15. **S. Wang,** X. Shan, U. Patel, X. Huang, J. Lu, and N. Tao, Label-free Detection of Single H1N1 Influenza Virus by Surface Plasmon Resonance Microscopy, poster, *Arizona BioIndustry Association's BIOFEST 2010,* Scottsdale, Arizona October 27, 2010,.
16. Y. Zhang, W. Chen, **S. Wang**, Y. Liu and C. Pope, Reactive Oxygen Species Mediated Phototoxicity of Zinc Oxide Nanoparticle Conjugates in Human Ovarian cancer Cells. *Annual Meeting of the South Central Chapter, Society of Toxicology, National Center for Toxicological Research*, Jefferson, AR, Sept 18, 2008.
17. Y. Zhang, Y. Liu, **S. Wang**, W. Chen, J. Liu, C. Pope. Phototoxicity of Nanoparticle Conjugates in Ovarian Cancer Cell, *Annual Meeting, Oklahoma Experimental Program to Stimulate Competitive Research (EPSCoR)*, Oklahoma City, OK, March 7, 2008.
18. Y. Zhang, Y. Liu, **S. Wang**, W. Chen, J. Liu, C. Pope. Self-lighting Photodynamic Therapy of Nanoparticle Conjugates in Vitro and Ovarian Tumor Model Development in vivo, *Annual Meeting, Phi Zeta Research Society*, Oklahoma State University, Stillwater, OK, March 16, 2008.
19. **S. Wang**, Y. Liu, S. Westcott, and W. Chen, Luminescence Nanoparticles: Potentials for In-vivo Application, *The 7th Annual UT Southwestern In-Vivo Cancer Cellular and Molecular Imaging Symposium Vascular Imaging and Therapeutic Targeting in Cancer*, Dallas, Texas, Oct 16-17, 2007.
20. **S. Wang**, Sensing Toxic and Bio-hazard Using Optical, Electrochemical and Nanotechnology Combined Approaches, *227th American Chemical Society National Meeting: Division of Industrial and Engineering Chemistry*, Anaheim, CA, March 28-April 1, 2004.
20. **S. Wang**, Y. Liu, N. A. Kotov, A. Mamendov, S. Westcott, C. Cumming, J. E. Nichols, J. Cortiella, and M. Motamedi, 3D Cell Growth on LBL Coated, Bone Marrow Mimicking Scaffolds, *227th American Chemical Society National Meeting: Physical Chemistry Division*, Anaheim, CA, March 28-April 1, 2004.
21. Y. Liu, **S. Wang**, N. A. Kotov, C. Cumming, J. E. Nichols, J. Cortiella, and M. Motamedi, Preparation of Ordered 3D cell Scaffolds with LBL Surface Modification, *227th American Chemical Society National Meeting: Physical Chemistry Division*, Anaheim, CA, March 28-April 1, 2004.
22. Y. Liu, **S. Wang**, N. A. Kotov, A. Mamedov, and C. Cumming. Abstracts, *59th Southwest Regional Meeting of the American Chemical Society*, Oklahoma City, OK, October 25-28, 2003.
23. **S Wang**, N. Mamedova, and N. A. Kotov, Antigen/Antibody Immunocomplex from CdTe Nanoparticle Bioconjugates, *224th American Chemical Society National Meeting: Physical Chemistry Division*, Boston, MA, August 2002.
24. **S Wang**, N. Mamedova, W. Chen, and N. A. Kotov, Layer-by-Layer Assembled Films from Nanoparticle-Labeled Antibodies and Antigens, *223th American Chemical Society National Meeting: Colloid and Surface Chemistry Division*, Orlando, FL, April 2002.
25. **S. Wang**, S. Boussaad, S. Wong, and N. J. Tao, Probing Electronic Properties of Adsorbed Molecules with Surface Plasmon Resonance Spectroscopy, *84th CSC Conference and Exhibition*, Montreal, CA, May 2001.
26. **S. Wang**, S. Boussaad, S. Wong, and N. J. Tao, Applications of High Resolution Surface Plasmon Resonance Spectroscopy, *220th American Chemical Society National Meeting: Colloid and Surface Chemistry Division*, Washington, DC, August 2000.

27. **S. Wang**, R. Lunn, M. P. Krafft, and R. M. Leblanc, One and a Half Layer? Study of Mixed Langmuir Monolayer of 10,12-Pentacosa-diynoic Acid and Semi-fluorinated Tetracosane, *216th American Chemical Society National Meeting: Colloid and Surface Chemistry Division*, Boston, August 1998.
28. **S. Wang**, S. Vidon, and R. M. Leblanc, Dual Polymerizations in a Mixed Langmuir Monolayer of Diacetylene Derivatives and Octadecyltrimethoxysilane, *215th American Chemical Society National Meeting: Colloid and Surface Chemistry Division*, Dallas, March 1998.
29. **S. Wang**, R. M. Leblanc, F. Arias, and L. Echegoyen, Study of Langmuir Monolayers of Crown-ether C60 Derivatives and their Interaction with Different Subphase Ions, *LB8: The Eighth International Conference on Organized Molecular Films*, Asilomar, CA, August 1997.
30. **S. Wang**, R. M. Leblanc, J. Ramirez, and P.G. Wang, Molecular Recognition Studies of Poly-Glyco-diacetylene monolayers and Concanavalin A, *70th Colloid and Surface Science Symposium of American Chemical Society*, Postsdam, NY, June 1996.
31. **S. Wang**, Y. Li, L. Shao, J. Ramirez, P. G. Wang, and R. M .Leblanc, Study of Poly Glyco-diacetylene Monolayers and its Interaction with Concanavalin A, *The Fourth World Congress on Biosensors*, Bangkok, Thailand, May 1996.
32. **S. Wang**, R. M. Leblanc, J. Ramirez, and P.G. Wang, Surface and optical properties of poly-glyco-diacetylene monolayers, *211th American Chemistry Society National Meeting: Colloid and Surface Chemistry Division*, New Orleans, LA, March 1996.
33. **S. Wang**, C. Wen, and S. Sui, Influence of Flexibility of Membrane Bound Model Receptor on Avidin Specific Binding, *11th International Biophysics Congress*, Budapest, Hungary, July 1993.
34. S. Sui, **S. Wang**, H. Qing, C. Wen, and Z. Liu, Specific and Nonspecific Binding of Avidin to Biotin Containing Lipid Layer, *The 6th International Conference on Langmuir-Blodgett Films*, Canada, July 1993.
35. S. Sui, H. Wu, **S. Wang**, H. Qin, and W. Xie, Lipid/Protein Interaction Studied with Supported Planar Mono-(Bi-)Layers, *10th Changchun Summer Chemistry Conference on the Topic of Functional Organized System*, Changchun, China, Aug 1991.
36. S. Sui and **S. Wang**, Interaction of Phospholipid Vesicles with Lipid Monolayer, *The 5th International Conference on Langmuir-Blodgett Films*, Paris, France, Aug 1991.
37. S. Sui and **S. Wang**, Domain Structure and Phase Behavior of Cholesterol Containing Phospholipid Monolayers Studied by Film Balance and Scanning Electron Microscopy, *The 1990 China-Japan Bilateral Symposium on Langmuir-Blodgett Films*, Beijing, China, Nov. 4- 8, 1990.

Patents

1. N.J Tao, **S. Wang**, Integrated Microarray Printing and Detection System for Molecular Binding Analysis, US Patent 10,823,728, Issue date: 11/03/2020.
2. N.J. Tao, H. Yu, X. Shan, **S. Wang**, Plasmonic Imaging and Detection of Single DNA Molecules, US patent #10,408,757. Issue date: 09/10/2019.
3. **S. Wang**, A. Ramachandran, E. T. Knobbe, F. G. Johnson, B. E. Little, and D. W. Goad, Integrated Optical Resonator Device for Measuring Chemical and Biological Analyte Concentrations, US Patent 7796262 B1, issue date: 09/14/2010.
4. W. Chen, S. Westcott, J. Zhang, and **S. Wang**, Energy-Transfer Nanocomposite Materials and Methods of Making the Same, US patent 7538329, issue date: 05/26/2009.
5. N. A. Kotov and **S. Wang**, 3D Tissue Constructs on the Basis of Colloidal Crystals Surface Modified by Sequential Layering, US patent 7,534,610, issue date: 05/19/2009.

Patent applications

1. **S. Wang**, G. Ma, X. Zhou, Methods and related aspects for determining binding kinetics of ligands, provisional US patent application, 63/388,034, 07/11/2022.
2. **S. Wang**, R. Wang, P. Zhang, Rapid regulation of local temperature with wide-field plasmonic thermal microscopy, provisional US patent application, 63/354,890, 06/23/2022.
3. **S. Wang**, P. Zhang, Methods and related aspects for analyzing exosomes, provisional US patent application, 63/352,929, 06/16/2022.

4. **S. Wang**, G. Ma, Methods and related aspects for detecting unlabeled biomolecules, provisional US patent application, 63/345,962, 06/03/2022.
5. **S. Wang**, Z. Wan, H. Zhu, Virion oscillator microarrays, methods, and related aspects for determining binding kinetics of ligands, provisional US patent application, 63/321,465, 03/18/2022.
6. **S. Wang**, Y. Zhao, G. Ma, Methods and related aspects for molecular tracking and analysis, provisional US patent application, 63/319,208, 03/11/2022.
7. **S. Wang**, F. Zhang, Label-free Quantification of Cell Surface Membrane Protein Binding Kinetics in Biological Systems, provisional US patent application, 63/315,155, 03/01/2022.
8. **S. Wang**, P. Zhang, Methods, Systems, and Computer Readable Media for Single-Objective Evanescent Scattering Microscopy for Imaging Single Proteins and Binding Kinetics, provisional US patent application, 63/306473, 02/03/2022.
9. **S. Wang**, G. Ma, Methods and related aspects of tracking molecular interactions, provisional US patent application, 63/289,195, 12/14/2021. Supported by NIH grants: R33CA235294 and R44GM126720
10. **S. Wang**, F. Zhang, Methods and related aspects of rapid microbial detection using intrinsic feature tracking, provisional US patent application, 63/280,406, 11/17/2021.
11. N. Stephanopoulos, Y. Xu, **S. Wang**, H. Yan, High sensitivity DNA linked immunosorbent signal amplification assay (DLSA) for detection of infectious SARS-Cov-2 virus and variants, provisional US patent application, 63/257,838, 10/20/2021.
12. **S. Wang**, P. Zhang, Evanescent scattering imaging of single molecules, provisional US patent application, 63/249,388, 09/28/2021.
13. **S. Wang**, R. Liang, Charge-sensitive optical detection of binding kinetics between phage displayed peptide ligands and protein targets, provisional US patent application, 63/261,005, 09/08/2021.
14. **S. Wang**, F. Zhang, Rapid antimicrobial susceptibility testing by video-based object scattering intensity detection, provisional US patent application, 63/144,207, 02/01/2021
15. **S. Wang**, P Zhang, Single molecule imaging, provisional US patent application, 63/137,611, 01/14/2021
16. **S. Wang**, G. Ma, R. Liang, Critical angle reflection imaging for quantification of molecular interactions, provisional US patent application 63/122.687, 12/08/2020.
17. N.J. Tao, **S. Wang**, R Liang, Small molecule detection in normal ionic strength buffers, provisional US patent application 63/051,667, 07/14/2020.
18. N.J. Tao, F. Zhang, **S. Wang**, Digital antimicrobial susceptibility testing, provisional US patent application 63/043,713, 06/24/2020.
19. N.J Tao, **S. Wang**, P. Zhang, Single molecule imaging, provisional US patent application 62/975,473, 02/12/2020
20. N.J Tao, **S. Wang**, H Yu, Antibiotic susceptibility testing with large-volume light scattering imaging and deep learning video microscopy, provisional US patent application 62/482,099, 04/05/2017. Patent application publication Number: WO/2018/187548, Publication Date: 11.10.2018, International Application No.: PCT/US2018/026223, International Filing Date: 05.04.2018. US Patent Application 16/500,370, US20210130868A1, publication date: 2021-05-06
21. NJ Tao, **S. Wang**, Integrated Microarray Printing and Detection System for Molecular Binding Analysis, US Patent Application 15/204738, 07/07/2016; provisional US patent application 62/190109, 07/08/2015.
22. N.J. Tao, H. Yu, X. Shan, **S. Wang**, Plasmonic Imaging and Detection of Single DNA Molecules, International Application No. PCT/US2015/010018, 01/02/2015; US patent application No.15/038629, 05/23/2016; provisional US patent application 61/923477, 01/03/2014.
23. **S. Wang**, A. Ramachandran, E. T. Knobbe, F. G. Johnson, B. E. Little, and D. W. Goad, Integrated optical Resonator Device for Measuring Chemical and Biological Analyte Concentrations, provisional US patent application 11/809,867, 05/31/2007.
24. W. Chen, S. Westcott, J. Zhang, and **S. Wang**, Energy-Transfer Nanocomposite Materials and Methods of Making the Same, filed 10/28/2005, US Patent Application No. 11/262,470. Continuation: Application 2010/176343 A1, published 7/20/2010.
25. N. A. Kotov and **S. Wang**, 3D Tissue Constructs on the Basis of Colloidal Crystals Surface Modified by Sequential Layering, U.S. patent application Ser. No. 10/460,059.

26. W. Chen, **S. Wang**, and S. Westcott, Nanoparticle Thermometry and Pressure Sensors, United States Patent Application #2007/0189359 A1.
27. **S. Wang**, B. Strecker, C. Cumming, N. A. Kotov, and S. L. Westcott, High-throughput 3D Cell Culture Robot and Methods of Making Same, filed 2/7/2005, US Patent Application Serial No. 11/052,637.
28. **S. Wang**, N. A. Kotov, and J. Zhang, Three Dimensional Micro-Environments and Methods of Making and Using Same, U. S. patent application #2007/0003595A1, 2007.
29. **S. Wang**, P. Ja, A. Ramachandran, B. Strecker, Monitor living cells by optical resonator, filed 7/12/2007, U.S. patent application.

Mentoring and Supervision Experiences

- Graduate faculty advisor (endorsed to chair) for Biological Design, Electrical Engineering, Biomedical Engineering, Physic, Chemistry and Biochemistry Ph.D. programs.

Current Research Staff (total: 2)

1. Dr. Yang Xu, Assistant Research Professor, (Female, 2022.10.01 - present) 50/50 shared with Prof. Hao Yan.
2. Timothy (Haibin) Liang, research technician, (2021.07 - present); Master student of Computer Science (MCS), Ira A. Fulton Schools of Engineering, ASU.

Current Postdocs (total: 2)

1. Dr. Jayeeta Kolay (Female, 2021.08 - present)
2. Dr. Xingwen Chen (2022.08 - present) 50/50 shared postdoc with Prof. Xiao Wang

Current Ph.D. Students: Primary Thesis Advisor (total: 10)

1. Zijian Wan (ECE), 2018 fall – present, expected to graduate Summer 2023, ***Chair***
2. Chao Chen (BME), 2018 fall – present, expected to graduate Fall 2023, ***Chair***
3. Jiapei Jiang (BME), 2019 fall – present, expected to graduate Fall 2023, ***Chair***
4. Nanxi Yu (Female, Chemistry) 2019 fall – present, expected to graduate Fall 2023, ***Co-Chair, primary advisor***
5. Xinyu Zhou (BME), 2019 fall – present, expected to graduate Spring 2024, ***Chair***
6. Ryan Porter (ECE), 2019 fall – present, ***Chair***
7. Andy Chieng (Chemistry), 2020 fall – present, ***Co-Chair, primary advisor***
8. Xiaoyan Zhou (ECE), 2021 fall – present, ***Chair***
9. Mohammad Javad Haji Najafi (ECE) 2022 summer – present, ***Chair***
10. Brandyn Braswell (Biological Design), 2023 spring – present, ***Chair***

Current Ph.D. Students: Thesis Committee Member (total: 4)

1. Vi Nguyen (Female, BME), Advisor: Prof. Jennifer Blain Christen
2. Joshua Eger (BME), Advisor: Prof. Jennifer Blain Christen
3. Sanjana Mukherjee (PHY), Advisor: Prof. Quan Qing
4. Joshua Rousseau (BME), Advisor: Prof. Mark Wong

Current Master Students with Thesis Advisor Role (total: 1)

1. Praveena Elanghovan (BME), Class of 2023

Current Master Students: Thesis or Applied Project Committee Member (total: 2)

1. Sanket Patel (CHE), Class of 2023. Master Applied Project. Advisor: Prof. Erica Forzani.
2. Landon Denham (CHE), Class of 2023. Master Thesis. Advisor: Prof. Erica Forzani.

Current Undergraduate Students (total: 12)

1. Christina Aridi, Alyssa LaBine, Aayush Shah, McKenna Strambi (2022-2023 BME Capstone team #5), Project title: "Addressing Racial Bias in Pulse Oximetry", ***Faculty Mentor***
2. Mariah McNally, Tea McCormack, Jessica Camacho, Alexandra Liaos, Margie Vollkommer (2022-2023 BME Capstone team #19), Project title: "at-home NST machine", ***Faculty Mentor***
3. Aayushi Parikh (Biochemistry), undergraduate student worker, 2022.08 – present.
4. Amanda Tsui, BME undergraduate student researcher, 2022.11- present.

5. Asher Hendricks (CHE), Honors thesis, 2022.09 – 2023.05, **secondary advisor** (primary advisor Prof. Erica Forzani).

Previous Research Staffs (total: 6)

1. Dr. Wei Wang, Assistant Research Professor, (2013.01 – 2013.12); Current position: Professor, School of Chemistry and Chemical Engineering, Nanjing University
2. Dr. Hui Yu, Assistant Research Scientist (2012-2017); Current position: Associate Professor, School of Biomedical Engineering, Shanghai Jiao Tong University
3. Dr. Xiaonan Shan, Assistant Research Professor (2014-2016); Current position: Assistant Professor, Dept. of Electrical & Computer Engineering, University of Houston
4. Dr. Yuheng Chen, Assistant Research Scientist (2016-2017); Current position: Researcher, NEC Laboratories America, Inc.
5. Dr. Wenwen Jing, Female, Assistant Research Scientist (Female, 2018-2020); Current position: Assistant Professor, Fudan University Medical School.
6. Dr. Fenni Zhang, Female, Assistant Research Professor (Female, 2020.06 – 2021.02); Current position: Assistant Professor, Dept. of Biomedical Engineering, Zhejiang University, China.

Previous Postdocs (total: 12)

1. Dr. Wei Wang (2009.11 – 2012.12); Current position: Professor, School of Chemistry and Chemical Engineering, Nanjing University, China
2. Dr. Xianwei Liu (2012-2016); Current position: Professor, Department of Chemistry, University of Science and Technology of China, China
3. Dr. Xiaonan Shan (2011-2014); Current position: Assistant Professor, Department of Electrical & Computer Engineering, University of Houston
4. Dr. Yixian Wang (Female, 2013-2016); Current position: Associate Professor, Department of Chemistry & Biochemistry, California State University at Los Angles
5. Dr. Wei Dong (2015-2016); Current position: Researcher, Hamamatsu, Japan
6. Dr. Yunze Yang (2016-2019); Current position: Research Fellow, Mayo Clinic Arizona
7. Dr. Wenwen Jing (Female, 2016.05 - 2020.06); Current position: Assistant Professor, Fudan University Medical School, China.
8. Dr. Tianyu Xue (2018.10-2019.12); Current position: Professor, Department of material physics and chemistry, Yanshan University, China.
9. Dr. Fenni Zhang (Female, 2018.09 – 2020.05); Current position: Assistant Professor, Department of Biomedical Engineering, Zhejiang University, China.
10. Dr. Rui Wang (2020. 03 – 2021.06); Current position: Professor, Department of Biomedical Engineering, Southeast University, China
11. Dr. Guangzhong Ma (2019.10 – 2022.08); Current position: Assistant Professor, Department of Chemistry, Zhejiang University, China
12. Dr. Pengfei Zhang (2018.10 – 2022.09); Current position: Faculty, Beijing National Laboratory for Molecular Sciences.

Graduated Ph.D. Students Co-chaired (total: 2)

1. Guangzhong Ma (Chemistry, 2013-2019), ***Co-Chair*** (Chair: Prof. NJ Tao); Current position: Assistant Professor at Dept. of Chemistry, Zhejiang University.
2. Runli Liang (Female, ECE, 2016-2021), ***Co-Chair and substitute advisor*** (Original Advisor: Prof. NJ Tao); Current position: Executive director, Zhongke Yitong Technology Ltd.

Graduated Ph.D. Students Co-supervised and as Committee Member (total: 10)

1. Christopher McGriff (ECE, 2008 - 2013), (Chair: Prof. NJ Tao); Thesis title: Small Molecule Detection by Surface Plasmon Resonance: Improvements in Sensitivity and Kinetic Measurement. Current position: Senior Director of Strategic Planning, Inflammatix Inc.
2. Yan Guan (Female, ECE, 2010-2015), (Chair: Prof. NJ Tao); current position: Optical Sensing Hardware Engineer at Apple, Cupertino, California
3. Yunze Yang (ECE, 2010-2016), (Chair: Prof. NJ Tao); Current position: Research Fellow, Mayo Clinic Arizona

4. Karan Syal (Biological design, 2011-2017), (Chair: Prof. NJ Tao); Thesis title: Rapid antimicrobial susceptibility testing based on Bacterial motion tracking. Current position: Founder and Chief Technology Officer at cAST Technologies, San Francisco
5. Yan Wang (ECE, 2013.08 - 2018.07); (Chair: Prof. NJ Tao); Current position: Industrial Engineer
6. Fenni Zhang (Female, ECE, 2013.08 – 2018.07), ((Chair: Prof. NJ Tao); Current position: Assistant Professor at Dept. of Biomedical Engineering, Zhejiang University.
7. Rafael Iriya (ECE, 2014 – 2020), Advisor Chair: Prof. NJ Tao,; Current position: principal research scientist at Fetch Rewards.
8. Manni Mo (Female, Chemistry, 2016 - 2020), (Advisor: Prof. NJ Tao); Current position: Packaging R&D Engineer at Intel Corporation, Intel, Arizona.

Graduated Ph.D. Students Co-supervised (total: 2)

1. Kyle Foley (ECE, 2008-2010), Chair: Prof. NJ Tao; current position: Packaging R&D Engineer at Intel Corporation, Intel, Arizona
2. Xiaonan Shan (EE, 2008-2011), Chair: Prof. NJ Tao; Current position: Assistant Professor, Department of Electrical & Computer Engineering, University of Houston

Graduated Ph.D. Students as Committee Member (total: 3)

1. Brianne Petritis (Female, Biological design, 2009-2018), ***Committee member*** (Advisor: Prof. Joshua LaBaer); Current position: Global Marketing Coordinator, Olink Protemics.
2. Yuan Wang (Physics, 2013-2021), ***Committee member*** (Advisor: Prof. Quan Qing)
3. MD Ashif Ikbal (ECE, 2017-2022), ***Committee member*** (Advisor: Prof. Chao Wang)

Graduated Master Students Chaired (2)

1. Yunlei Zhao (ECE, 2019-2021); Current position: PhD student at UIUC.
2. Zachary Fisher (BME, 2022 Spring), MS applied project. Current position: Industry

Graduated Master Thesis Students Co-supervised (total: 2)

1. Yen-chun Chao (Female, Chemistry, 2011-2013); Current position: Engineer at TSMC (Committee member)
1. Ashley Hunt (Female, Chemistry, 2016-2018), 3 co-authored papers; Current position: Scientist at Biosensing Instrument Inc. (Tempe AZ)

Graduated Non-thesis Master Students Co-Supervised (total: 6)

1. Urmez Patel (ECE, 2009 – 2010), Current position: Graphics Hardware Engineer at Intel
2. Feng Xiao (Chemistry, 2014-2017), Current position: Software Development Engineer at AWS
3. Jia Zeng (Female, Bioinformatics, 2015-2017), Current position: Senior Clinical Informatics Scientist at Caris Life Sciences
4. Nikhilkumar Kheni (Mechanical Engineer, 2018-2019) Current position: Manufacturing Engineer at MAAX Spas Industries Corp
5. Ahmed Al-Sultani (BME), Master Applied Project Committee Member, Graduated Dec 2022. Advisor: Prof Jennifer Blain Christen.
6. Emanuel Salayandia (CHE), Master Applied Project Committee Member, Graduated Dec 2022. Advisor: Prof. Erica Forzani.

Graduated Undergraduate Students Supervised (total: 8)

1. Joseph Peterman (student worker, Biology, 2019-2020)
2. Isabelle Hernandaz (2021.08 – 2022.05, student worker on rapid antimicrobial susceptibility test project, major in medical microbiology, school of life science
3. Sonja Brett (BME), Natalie Stevens (BME), Emma Peterson (BME), Sean Tucker (BME), and Tor Christian Tjorhom (BME), (2021.09-2022.05) BME capstone project team #23, Development of a portable microscope for point of care digital immunoassay for rapid troponin detection; ***Faculty Mentor***
4. Shaun Victor, Barrett Honors college major in Biomedical Engineering, 2021.09 – 2022.05, **secondary advisor** (primary advisor Prof. Erica Forzani).

Supervised High School Student Researchers (total: 3)

1. Simon Shen (2014 - 2016), Current position: Ph.D. student at Harvard University.

2. Peter Gao (2015), Current position: Law school student at University of Arizona.
3. Jessica Zhang (2018 - 2020), Current position: Undergrade student at Stanford University.

Teaching

- Lectured on biosensor related topics in the following classes:
    - ASU Ira A. Fulton Schools of Engineering Global Outreach and Extended Education: Kazan State Technological University/ Institute of Additional Vocational Training; "Advanced Chemistry, Nanotechnology, Research Management and Innovations" Workshop (2010)
    - BDE 701/598 Fundamentals of Biological Design (2009, 2010, 2011)
    - EEE 598 Personal Sensors for Mobile Health Applications (2012, 2016, 2019)
    - BME 598 Biosensing Technologies (2019)
- Taught general, physical and organic chemistry labs for 4 years as a graduate teaching assistant during Ph.D. study at Department of Chemistry, University of Miami.
- 2022 Spring: BME 340 Thermodynamics for BME (60 students)
- 2022 Spring: BME 598 Biosensing Technologies (26 students)
- 2022 Fall: BME 423 Biomedical Instrumentation Laboratory (52 students)
- 2022 Fall: BME ASU 101 (2 sections, total 28 students)
- 2023 Spring: BME 340 Thermodynamics for BME (60 students)