

WEISI SONG

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EDUCATION

2015	Ph.D.	Physics, Arizona State University, Tempe, USA
2008	M.S.	Optics, Harbin Institute of Technology, Harbin, China
2006	B.S.	Applied Physics, Harbin Institute of Technology, Harbin, China

PROFESSIONAL EXPERIENCE

2015 – Present	Postdoctoral Research Associate, the Biodesign Institute, Arizona State University
2010 – 2015	Graduate Research Associate, the Biodesign Institute, Arizona State University
2008 – 2012	Graduate Teaching Assistant, Physics Department, Arizona State University

RESEARCH EXPERIENCE

2015 – Present	Single Protein Molecule Detection with Multilayer Electrode Devices Fabrication of multilayer electrode devices (e-beam evaporation, atomic layer deposition, e-beam lithography, focused ion beam milling) for human integrin detection by specific binding to cyclic (RGD) peptide linked on electrodes within tunneling range.
2013 – Present	Nanopore Based Fixed-Gap Tunneling Junction for DNA Sequencing Design of fixed-gap stacked junction membrane devices (e-beam evaporation, atomic layer deposition, e-beam lithography). Design and prototyping of microfluidic sample system. Nanopore drilling through stacked electrodes on SiN membrane using transmission electron microscope (TEM) and reactive ion etching. ssDNA sensing using nanopore tunneling hybrid devices.
2012 – 2014	Single Molecule Translocation through Solid-State Nanopores Solid-state nanopore drilling and size control using TEM. Surface modification of metalized nanopore with universal reader molecules to reduce the speed of ssDNA translocation. Translocation detection of ssDNA-peptide conjugates using low current amplifier.
2010 – 2012	Dye Molecule Translocation through Carbon Nanotubes Single-walled carbon nanotubes (SWCNTs) growth using chemical vapor deposition (CVD) method. Verifying translocation by simultaneous optical (single molecule fluorescence) and electrical detection of single molecule through SWCNTs.
2009 – 2010	Investigation of Hydrophilicity by Contact Angle Methodology for Materials of Artificial Eye Reconstructed via Ordered Passivation and Nanobonding Established a contact angle measuring system for material hydrophilicity test. Verification of Herbots-Atluri Cleaning and nanobonding method for Si(100) surface passivation.
2008 – 2009	Single Molecule Fluorescence Correlation Spectroscopy Investigation of conformational dynamics of short DNA fragments using energy transfer between donor (Cy3) and acceptor (Cy5).
2006 – 2008	Time-resolved Two-photon Fluorescence Spectroscopy and Imaging Nanosecond time-resolved fluorescence spectroscopy and intensity imaging based on ultrashort

femtosecond laser pulses and intensified CCD (ICCD) detector.

Fluorescence Resonance Energy Transfer (FRET) between Quantum Dots (QDs) and Porphyrin Derivatives (TPP)

FRET Study in donor (QDs) - acceptor (TPP) and donor (QDs) - acceptor (QDs) systems using one/two-photon excitation, steady and lifetime (time-resolved) fluorescence spectroscopy. Up conversion luminescence study of CdTe/CdS QDs using femtosecond laser excitation.

2005 – 2006 **Background Elimination of Coherent Anti-Stokes Raman Scattering (CARS) Microscopy**

Analysis of background elimination methods in CARS microscopy. Experience with high spectroscopic resolution CARS.

PUBLICATIONS

- **W. Song**, B. Zhang, P. Pang, Y. Zhao, P. Zhang, I. Csabai, G. Vattay, S. Lindsay. Observation of giant conductance fluctuations in a protein. *Nano Futures*. Accepted Sep. 2017.
- S. Biswas, **W. Song**, C. Borges, S. Lindsay, P. Zhang. Click addition of a DNA thread to the N-Termini of peptides for their translocation through solid-state nanopores. *ACS Nano*. 2015 9 (10), 9652-9664
- P. Pang, B. A. Ashcroft, **W. Song**, P. Zhang, S. Biswas, Q. Qing, J. Yang, R. J. Nemanich, J. Bai, J. T. Smith, K. Reuter, V. SK Balagurusamy, Y. Astier, G. Stolovitzky, S. Lindsay. Fixed-gap tunnel junction for reading DNA nucleotides. *ACS Nano*. 2014 8 (12), 11994-12003
- Y. Zhao, B. Ashcroft, P. Zhang, H. Liu, S. Sen, **W. Song**, J. Im, B. Gyarfas, S. Manna, S. Biswas, C. Borges, S. Lindsay. Single-molecule spectroscopy of amino acids and peptides by recognition tunneling. *Nature Nanotechnology*. 2014 9, 466–473
- P. Krishnakumar, B. Gyarfas, **W. Song**, S. Sen, P. Zhang, P. Krstic, S. Lindsay. Slowing DNA translocation through a nanopore using a functionalized electrode. *ACS Nano*. 2013 7 (11), 10319-10326
- **W. Song**, P. Pang, J. He, S. Lindsay. Optical and electrical detection of single-molecule translocation through carbon nanotubes. *ACS Nano*. 2012 7 (1), 689-694
- Y. Wen, Y. Liu, Y. Yang, L. An, **W. Song**, Z. Yang. Indirect activation of porphyrin by semiconductor quantum dots with two-photon excitation. *Journal of Micro/Nanolithography, MEMS, and MOEMS*. 2010 9 (3), 031003-031003-4
- S. Zhang, W. Wu, **W. Song**, Y. Wang, Y. Peng, Y. Liu, Y. Yang. Energy transfer dynamics between Alq₃ and CdTeS/ZnS core shell nanocrystals. *Optik-International Journal for Light and Electron Optics*. 2010 121 (4), 312-316
- Y. Wen, **W. Song**, L. An, Y. Liu, Y. Wang, Y. Yang. Activation of porphyrin photosensitizers by semiconductor quantum dots via two-photon excitation. *Applied Physics Letters*. 2009 95 (14), 143702
- L. An, Y. Yang, **W. Song**, W. Su, Q. Zeng, K. Chao, X. Kong. Up-conversion luminescence of CdTe and CdTe/CdS quantum dots excited by femtosecond laser of low intensity. *Acta Phys. Sin.* 2009, 58(11): 7914-7920
- S. Zhang, **W. Song**, Y. Wang, Y. Peng, Y. Liu, Y. Yang. Photoinduced energy transfer in blend films of hole and electron transport materials. *Applied Surface Science*. 2008 254 (20), 6662-6665

CONFERENCE PRESENTATION

2014 Click Addition of a Polyionic Thread to the N-Termini of Peptides for Nanopores Analysis. NHGRI Advanced Sequencing Technology Grantee Meeting, San Diego, USA

SKILLS

Nanofabrication	Reactive Ion Etching (RIE), E-Beam Lithography (EBL), Photolithography, E-Beam Evaporation Deposition, Thermal Metal Deposition, Chemical Vapor Deposition (CVD), Atomic Layer Deposition (ALD)
Measurement	TEM, SEM, FIB-SEM, STM, AFM, FTIR, UV-Vis Spectroscopy, XPS, Confocal Microscope, Low Current Measurement (Axon Axopatch 200B) system, Cyclic Voltametry (CV), Metrology Tools including: Profilometer, Ellipsometer, Contact Angle Meter
Engineering Design	SolidWorks, AutoCAD, 3DMax, Autodesk Eagle
Programming Language	Familiar with C, Assembly Language
Data Analysis	Origin, LabView, MATLAB, Microsoft Software

ACADEMIC ACTIVITIES AND AWARDS

2005	C.S. Wu – C.L. Yuan Science Camp in Hong Kong, representing HIT
2007	Top-class Scholarship for Graduate Students of HIT
2006 – 2007	First-class Scholarship for Graduate Students of HIT
2006	Excellent Graduate Student Award of HIT
2006	Excellent Thesis of Bachelor Degree of HIT
2002 – 2006	People's Scholarship for Undergraduate Students, Six Times Special Scholarship for Undergraduate Students, Once