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RESEARCH INTERESTS:

Label free imaging techniques: plasmonic-based electrochemical imaging and its applications;
nano-plasmonic: catalytic reaction of single nanoparticle; biosensors and charge detection of
protein, DNA and small molecules;

EDUCATION:

Ph.D. in Electrical Engineering, 2011

GPA: 4.0

Arizona State University, Tempe, AZ

Thesis: Plasmonic-based Label-free Detection and Imaging of Molecules

Committee: Nongjian Tao (Chair), Junseok Chae, Jennifer Blain Christen and Mark Hayes

M.S. in Electrical Engineering, 2006

Major GPA: 3.94

Peking University, Beijing, China

Advisor: Ru Huang

B.S. in Electrical Engineering, 2003

Major GPA: 3.65

Peking University, Beijing, China

PROFESSIONAL EXPERIENCE:

July 2011-Present: Postdoctoral Scholar

The Biodesign Institute at Arizona State University, Center for Bioelectronics and Biosensors.
Temp, AZ

2006-2011: Graduate Research Associate

Arizona State University, Department of Electrical Engineering, Tempe, AZ

2003-2006: Graduate Research Assistance

Peking University, Department of Microelectronics, Beijing, China

TEACHING EXPERIENCE:

CHE 598: Molecular sensor systems

Guest lecture for Surface Plasmon Resonance: basic, instrument and applications designed for graduate students.

00831130-- Introduction to Microelectronics

Teaching assistant for Introduction to Microelectronics in Spring 2004 at Peking University.

PROFESSIONAL AFFILIATIONS:

Institute of Electrical and Electronics Engineers

American Chemical Society

PUBLICATIONS:

Journal Articles:

14. X.N. Shan, S.P. Wang, W. Wang, N.J. Tao, "Plasmonic-based Imaging of Local Square Wave Voltammetry", *Analytical Chemistry*, 2011, Accepted.
13. W. Wang, K. Foley, X.N. Shan, S. P. Wang, S. Eaton, V. J. Nagaraj, P. Wiktor, U. Patel, N. J. Tao, "Single cells and intracellular processes studied by a plasmonic-based electrochemical impedance microscopy," *Nature Chemistry*, vol. 3, pp. 249-255, Mar 2011.
12. X.N. Shan, S. Wang, N. Tao, "Study of single particle charge and Brownian motions with surface plasmon resonance," *Applied Physics Letters*, vol. 97, p. 223703, 2010.
11. Shaopeng Wang, X.N. Shan, Urmez Patel, Xinping Huang, Jin Lu, Jinghong Li, Nongjian Tao, "Label-free imaging, detection, and mass measurement of single viruses by surface plasmon resonance," *Proceedings of the National Academy of Sciences*, vol. 107, pp. 16028-16032, August 26, 2010 2010.
10. X. N. Shan, U. Patel, S. P. Wang, R. Iglesias, N. J. Tao, "Imaging Local Electrochemical Current via Surface Plasmon Resonance," *Science*, vol. 327, pp. 1363-1366, Mar 2010.

9. S. P. Wang, X. P. Huang, X. N. Shan, K. J. Foley, N. J. Tao, "Electrochemical Surface Plasmon Resonance: Basic Formalism and Experimental Validation," *Analytical Chemistry*, vol. 82, pp. 935-941, Feb 2010.
8. X. Huang, S. Wang, X.N. Shan, X. Chang, N. Tao, "Flow-through Electrochemical Surface Plasmon Resonance: Detection of intermediate reaction products," *Journal of Electroanalytical Chemistry*, vol. 649, pp. 37-41, 2010.
7. X. N. Shan, X. P. Huang, K. J. Foley, P. M. Zhang, K. P. Chen, S. P. Wang, N. J. Tao, "Measuring Surface Charge Density and Particle Height Using Surface Plasmon Resonance Technique," *Analytical Chemistry*, vol. 82, pp. 234-240, Jan 2010.
6. K. J. Foley, X.N. Shan, N. J. Tao, "Surface impedance imaging technique," *Analytical Chemistry*, vol. 80, pp. 5146-5151, Jul 2008.
5. X. N. Shan, K. J. Foley, N. J. Tao, "A label-free optical detection method for biosensors and microfluidics," *Applied Physics Letters*, vol. 92, p. 133901, 2008.
4. X.N. Shan, Yimao Cai, Ru Huang, "Thermal stability of electrical characteristics nickel silicide metalgate", *Acta Physica Sinica* Volume: 56 Issue: 8 Pages: 4943-4949 Aug. 2007.
3. Y. Li, R. Huang, Y.M. Cai, F.L. Zhou, X.N. Shan, X. Zhang, Y.Y. Wang. "A novel dual-doping floating-gate (DDFG) flash memory featuring low power and high reliability application" *IEEE Electron Device Letters*, vol. 28, issue 7, pages 622-624, Jul 2007
2. Yimao Cai, Ru Huang, X.N. Shan, Yan Li, Falong Zhou, Yangyuan Wang, "Program/Erase Injection Current Characteristic of Low-Voltage Low-Power NROM Using High-K Materials as Tunnel Dielectric", *Semiconductor Science and Technology*. vol. 21, issue 4, pages 507-512, Apr. 2006.
1. Yimao Cai, Ru Huang, X.N. Shan, Falong Zhou, Yan Li, Yangyuan Wang, "LaAlO₃ as Tunnel Dielectric for Low-Voltage and Low-Power P-Channel Flash Memory Free of Drain Disturb", *Solid State Electron.* Vol. 50, issue 2, pages 276-281, Feb 2006.
1. Yimao Cai, Chuan Xu, X.N. Shan, Ru Huang, Yangyuan Wang, "Study on the impact of Ge-implantation on the work function of fully silicided NiSi gate as ultra-shallow junction formed by using germanium preamorphization", the 5th International Workshop on Junction Technology 2005

MENTORING ACTIVITIES:

Graduate Students:

Rui Wang

Christopher MacGrif

Yan Guan

Yen-Chun Chao

AWARDS AND HONERS:

University Graduate Fellowship (UGF) award 2011.

1st prize in Poster Competition of National Nanotechnology Infrastructure Network Symposium 2011.

“WuSi” Scholarship of Peking University, 2003~2004. Awarded to top 3 out of 40 students in Department of Microelectronics.

Outstanding Student in Morality, Academic and Health, 2003~2004.

GRANT ACTIVITY:

Grant Reviewer Activity:

American Chemical Society Petroleum Research Fund, Doctoral New Investigator Proposal.