Haijian Chen, Ph.D.

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Education

2001-2006	College of William and Mary,	Ph.D., Physics
1998-2001	NanKai University, *Tianjin, China,*	M.S., Biophysics
1994-1998	NanKai University, *Tianjin, China,*	B.S., Applied Physics

Research Experience

2006-present Postdoctoral researcher, *College of William and Mary*

- Using TOF-SIMS to study cancer-related bio-tissues and cells, looking for characteristic chemical species that are cancer related and their spatial distributions at sub-cellular level
- Developing sample preparation protocols and optimizing experimental conditions for bio-tissues and cells
- Developing algorithm for TOF-SIMS imaging analysis
- Studying the effects of the sample surface roughness on the TOF-SIMS spectrum
- Studying room temperature ionic liquid using TOF-SIMS

2003-2006 Graduate student research assistant, *College of William and Mary*

- Developed an automated peak picking algorithm that can be applied to a variety of Time-of-Flight Mass Spectrometry spectra, from counting experiments (Time-of-Flight Secondary Ion Mass Spectrometry, TOF-SIMS) to instruments like Matrix-Assisted-Laser-Desorption-Ionization Time-of-Flight Mass Spectrometry (MALDI-TOF-MS), which integrate the ion signal rather than counting individual ions
- Demonstrated that, for the TOF-SIMS, the new algorithm improves the precision (*i.e.*, repeatability of estimates of peak positions) by almost an order of magnitude. A similar improvement has been found for Surface Enhanced Laser Desorption Ionization Mass Spectrometry (SELDI-MS), which is a version of MALDI.
- Developed an alignment procedure that aligns spectra collected at different spatial positions or at different times, using estimates of uncertainties in the peak positions and amplitudes that the algorithm automatically provides.
- Tested these algorithms on a set of peptide mixtures and showed that it is possible to estimate three-way mixture ratios, though there is much room for further improvement.

1999-2001 Graduate student research assistant, *Nankai University, Tianjin, China*

- Studied hematopoietic cytokine family by means of homology simulation, molecular mechanics, molecular dynamics, and quantum mechanics.
- Calculated structures of wild Interleukin-2 (IL-2) and its fourteen mutants, based on a crystal structure of IL-2 mutant F42A. Showed these mutants remained four-helix bundle structure with up-up-down-down topology.
- Identified amino acid residues that were potentially important when interacting with its receptor.
- Calculated structures of wild Growth Hormone (GH) and a mutant of GH. Showed that the mutation caused large structural difference.
- Performed docking simulation of GH to its receptor and mutant GH to its receptor. Showed the mutation weakened the affinity of mutant GH to the receptor.

1997-1998 Undergraduate student research assistant, *Nankai University, Tianjin, China*

- Computed structures of metal complexes using molecular mechanics.

Teaching Experience:

Teaching Assistant, Physics Dept. College of William and Mary, 2001-2002
Teaching Assistant, Physics Dept. Nankai University, China 1999

Awards

First Place in student poster competition, AVS Mid-Atlantic Chapter Spring Program, Newport News, VA, 2005
Student travel award, SIMS XIV, San Diego, CA, 2003

Publications

1. Haijian Chen Eugene R. Tracy, William E. Cooke, O. John Semmes, Maciek Sasinowski, and Dennis M. Manos, "Automated Peak Identification in a TOF-MS Spectrum", accepted to Quantitative Medical Data analysis Using Mathematical Tools and Statistical Techniques, edited by D. Hong and Y. Shyr, (World Scientific Publications, Singapore, 2007)
2. Dariya I. Malyarenko, William E. Cooke, Bao-Ling Adam, Gunjan Malik, Haijian Chen, Eugene R. Tracy, Michael W. Trosset, Maciek Sasinowski, O. John Semmes and Dennis M. Manos, "Enhancement of Sensitivity and Resolution of Surface-Enhanced Laser Desorption/Ionization Time-of-Flight Mass Spectrometric Records for Serum Peptides Using Time-Series Analysis Techniques", Clinical Chemistry **51:1**, 2005
3. D.I. Malyarenkoa, H. Chen, A.L. Wilkerson, E.R. Tracy, W.E. Cooke, D.M. Manos, M. Sasinowski, O.J. Semmes, "Ga+ TOF-SIMS lineshape analysis for resolution enhancement of MALDI MS spectra of a peptide mixture", Applied Surface Science **231–232**, 2004, 357–361