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Biocomplexity Faculty Search Committee  
c / o Prof. Rob de Ruyter van Steveninck  
Department of Physics  
Indiana University  
Swain Hall West 117  
Bloomington IN, 47405-7105

Dear Biocomplexity Faculty Search Committee:

I am currently a postdoctoral fellow in Professor George C. Schatz's group at the Chemistry Department, Northwestern University. I wish to apply for a faculty position in your department.

My research interests will focus on the optical properties of nanoparticle arrays and their applications in molecular detection, the self-assembly of supermolecules, molecular dynamics of small molecules, and the vibrational spectra of both small and big molecules. Collaborations with other faculty both within and outside the department will also be of the interest.

After four intense and enjoyable years in the group of Professor Joel M. Bowman in the Chemistry Department at Emory University, I obtained my Ph.D degree, including recognition through the Charles T. Lester Award (excellence in graduate research). The projects done there involved dynamical studies of triatomic and tetratomic molecules using a quantum method. Ten papers were published and a code for solving the Schrodinger equation for tetratomic molecules in full dimensionality was developed from scratch.

Before joining Professor Bowman's group, I was doing experiments using crossing beams to study small molecule reaction dynamics. To further understand the mechanisms behind these experimental phenomena, I wanted to learn about the theory of small molecule reaction dynamics, and hence I joined Professor Bowman's group. Realizing that quantum mechanics is largely limited to small molecules, I applied for a postdoctoral position in Professor George C. Schatz's group at Northwestern University. Here we have been learning how to use theory to study the spectra of nanoparticles and the self-assembly of supermolecules.

The current project I am involved in concerns the optical properties of nanoparticles which are potential biosensors for detecting biomolecules like DNA. Ten papers have

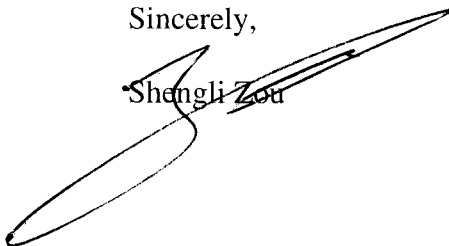
been published in less than two years of my stay in Professor Schatz's group. Several contributions to current theories have been made which allow us to calculate the extinction spectra of nanoparticles with multilayers of surrounding dielectric material and also to arrays of particles with arbitrary shapes. A parallel program, which contains subroutines to carry out molecular dynamics, Monte Carlo, and energy minimization calculations, will be finished and optimized. I was recognized as a Dupont fellow and received outstanding research award from the Institute for nanotechnology in 2004.

Besides the research training during my stay in Emory and Northwestern, I have served as a teaching assistant in the physical chemistry lab in Emory for three years and instructor of a physical chemistry course to help students with their mathematics skills. In Professor Schatz's group, I was mentor of three summer students the last two years. These experiences have helped my abilities to be a good teacher

Thank you very much for your kind consideration. Looking forward to hearing from you soon.

Sincerely,

Shengli Zou



## RESUME

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### OBJECTIVE:

Obtain a faculty position in a Chemistry or Biochemistry department.

### RESEARCH INTEREST:

The optical properties of nanoparticle arrays.

The self-assembly of supermolecules, molecular dynamics of small molecules.

The vibrational spectra of both small and big molecules.

### EDUCATION and EXPERIENCE:

Post doctoral fellow, Northwestern University (Dr. George C. Schatz's group),  
2002~present

Ph. D, Emory University (Dr. Joel M. Bowman's group), 1998~2002

M. S., Shandong University, P. R. China, 1993-1996

B. A., Shandong University, P. R. China, 1989-1993

### AWARDS:

Dupont Fellowship, 2004

Charles T. Lester Award for excellence in graduate research, 2002

### REFERENCES:

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## BOOK CHAPTERS:

2. "Electrodynamics in Computational Chemistry." Linlin Zhao, Shengli Zou, Encai Hao and G. C. Schatz, *Theory and Applications of Computational Chemistry: The First 40 Years, A Volume of Technical and Historical Perspectives*, Clifford E. Dykstra, Gernot Frenking, Kwang S. Kim, and Gustavo Scuseria, editors, submitted (2004).
1. "The challenge of high-resolution dynamics: Rotationally mediated unimolecular dissociation of HOCl" J. M. Bowman, S. Skokov, S. Zou, K. Peterson in "LOW-LYING POTENTIAL ENERGY SURFACES" M. Hoffman and K. Dyllal eds., *ACS SYMPOSIUM SERIES Washington DC*, (2002) PP: 346-360

## PUBLICATIONS:

31. "Narrow plasmonic/photonic extinction and scattering lineshapes for one and two dimensional silver nanoparticle arrays" Shengli Zou, George C. Schatz, *J. Chem. Phys.* (Accepted) (2004)
30. "A Global ab Initio Potential Energy Surface for Formaldehyde" Zhang, X.; Zou, S.; Harding, L. B.; Bowman, J. M.; *J. Phys. Chem. A.*, (2004) 108(41), 8980-8986.
29. "Confined plasmons in nanofabricated single silver particle pairs - experimental observations of strong interparticle interactions." Linda Gunnarsson, Tomas Rindzevicius, Juris Prikulis, Bengt Kasemo, Mikael Kall, Shengli Zou and George C. Schatz, *J. Phys. Chem. B*, (2004) ASAP.
28. "Comparative analysis of Localized and Propagating Surface Plasmon Resonance Sensors: The Binding of Concanavalin A to a Monosaccharide Functionalized Self-Assembled Monolayer." Chanda Ranjit Yonzon, Eunhee Jeoung, Shengli Zou, George C. Schatz, Milan Mrksich and Richard P. Van Duyne, *J. Am. Chem. Soc.*, (2004) 126,12669-12676.
- 27 "Optical Properties of One-Dimensional Metal Nanostructures" Encai Hao, Shengli Zou, and George C. Schatz *MRS Proceedings Volume* (2004) 818, M3.8
- 26 "Generating narrow plasmon resonances from silver nanoparticle arrays: influence of array pattern and particle spacing." Shengli Zou, George C. Schatz, *SPIE proceedings*, (2004).
25. "Finding sharp extinction peak in one and two dimensional silver nanoparticle arrays", Shengli Zou, Nicolas Janel, George C. Schatz, *J. Chem. Phys.*, (2004) 120, 10871-10875.

24. "The optical Properties of Metal Nanoshells" Encai Hao, Shuyou Li, Ryan C. Bailey, Shengli Zou, George C. Schatz, Joseph T. Hupp, *J. Phys. Chem. B*, (2004) 108, 1224-1229.
23. "A Nanoscale Optical Biosensor: The Short Range Distance Dependence of the Localized Surface Plasmon Resonance of Noble Metal Nanoparticles" , Amanda J. Haes, Shengli Zou, George C. Schatz, and Richard P. Van Duyne, *J. Phys. Chem. B*, (2004) 108, 6961-68.
22. "A Nanoscale Optical Biosensor: The Long Range Distance Dependence of the Localized Surface Plasmon Resonance of Noble Metal Nanoparticles", Amanda J. Haes, Shengli Zou, George C. Schatz, and Richard P. Van Duyne, *J. Phys. Chem. B*, (2004) 108, 109-116.
21. "Extinction spectra of silver nanoparticle arrays", Shengli Zou, Linlin Zhao, George C. Schatz, *SPIE Proceedings*, 5221 (Plasmonics: Metallic Nanostructures and Their Optical Properties), (2003) 174-181.
20. "A scaled ab initio potential energy surface for acetylene and vinylidene" D. G. Xu, H. Guo, Shengli Zou, Joel M. Bowman *Chem. Phys. Lett.* (2003) 377 (5-6): 582-588
19. "Full dimensionality quantum calculations of acetylene/vinylidene isomerization" Shengli Zou, Joel M. Bowman, and Alex Brown *J. Chem. Phys.* (2003) 118 (22): 10012-10023
18. "A new ab initio potential energy surface describing acetylene/vinylidene isomerization" Shengli Zou, and Joel M. Bowman, *Chem. Phys. Lett.* (2003) 368 (3-4): 421-424
17. "Full dimensionality quantum calculations of acetylene/vinylidene isomerization" Shengli Zou, and Joel M. Bowman *J. Chem. Phys.* (2002) 117 (12): 5507-5510
16. "Reduced dimensionality quantum calculations of acetylene  $\leftrightarrow$  vinylidene isomerization" Shengli Zou, and Joel M. Bowman *J. Chem. Phys.*,(2002) 116(15) 6667-6673
15. "Characterization of the sulfur fluoride radical in the ground electronic state" Ida M. B. Nielsen Shengli Zou, Joel M. Bowman, Curtis L. Janssen *Chem. Phys. Lett.* (2002) 352(1,2) 26-32
14. "Ab initio calculation of resonance energies and widths of HOCl(7vOH and 8vOH) and comparison with experiment", S. Zou, S. Skokov, and J. M. Bowman, *Chem. Phys. Lett.* (2001), 339(3,4), 290-294.

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12. "Thermal and State-Selected Rate Coefficients for the O(<sup>3</sup>P) + HCl Reaction and New Calculations of the Barrier Height and Width", Sergei Skokov, Shengli Zou, Joel M. Bowman, Thomas C. Allison, Donald G. Truhlar, Yongjing Lin, B. Ramachandran, Bruce C. Garrett, and Benjamin J. Lynch, *J. Phys. Chem. A* (2001), 105(11), 2298-2307.
11. "State distribution of NH<sub>2</sub>(A<sup>2</sup>A<sub>1</sub>) produced in the collision of Ar(<sup>3</sup>P<sub>0,2</sub>) + NH<sub>3</sub>", Shengli Zou, Feng Dong, Liming Wang, Xuechu Li, and Zhifeng Cui, *Huaxue Wuli Xuebao* (2000), 13(1), 1-5.
10. "Rotational inelastic collisions of NH<sub>2</sub>(A<sup>2</sup>A<sub>1</sub>, (0, 9, 0)) under single collisional condition", Feng Dong, Shengli Zou, Hong Chen, Xuechu Li, Nanquan Lou, *Wuli Huaxue Xuebao* (1999), 15(9), 812-818.
9. "Propensity rules in rotational inelastic collisions of NH<sub>2</sub> (A<sup>2</sup>A<sub>1</sub>) under molecular beam condition", Feng Dong, Shengli Zou, Hong Chen, Xuechu Li, Nanquan Lou, *Chinese Chemical Letters* (1999), 10(2), 147-150
8. "Penning ionization process of CO + He(2<sup>3</sup>S) under single collision condition", Shengli Zou, Yongbin Ma, Feng Dong, Xiaofeng Tan, Hong Chen, Lianhong Sun, Dadong Xu, Xuechu Li, *Prog. Nat. Sci.* (1998), 8(4), 451-456
7. "Ionization process of collision of Ne(<sup>3</sup>P<sub>0,2</sub>) with CO under molecular beam condition", Hong Chen, Yongbin Ma, Shengli Zou, Feng Dong, Xiaofeng Tan, Lianhong Sun, Dadong Xu, Xuechu Li, *Chin. Sci. Bull.* (1998), 43(6), 477-480
6. "The Application of the Computer Simulation in the Study of the Vibrational Distributions for the Products from the Energy Transfer Reaction", Shengli Zou, Chuanpu Liu, Jingzhong Guo, Yueshu Gu, Xuechu Li, Dadong Xu, *Guangpuxue Yu Guangpu Fenxi* (1998), 18(6), 654-657.
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3. "A study of the quenching of PCl(b) by the E-V model", Chuanpu Liu, Shengli Zou, Jingzhong Guo, Yueshu Gu, Yannan Chu, Dezhao Cao, *Chinese Journal of Chemistry*, 1997, 15(3), 211.
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