STEVEN A. SPRONK

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EDUCATION

California Institute of Technology, Pasadena, CA 1999 – 2006
Ph. D., Chemistry, 2006

Calvin College, Grand Rapids, MI 1995 – 1999
Bachelor of Science, Chemistry, 1999
Minors: Computer Science, Mathematics

RESEARCH EXPERIENCE

California Institute of Technology
Graduate Research Assistant 1999 – 2006
Professor Dennis A. Dougherty

- Achieved a better understanding of the mechanosensitive channel of small conductance (MscS), a bacterial transmembrane protein, through molecular dynamics simulations and analyses using GROMACS software and my own analysis programs
- Researched cell-permeable peptide-based methods for delivering synthetic tRNA to cultured mammalian cells, including the expression and purification of a novel fusion protein
- Made significant progress on the development of a novel high-throughput, cell-free assay for the gating of the mechanosensitive channel of large conductance (MscL), a bacterial transmembrane protein

Calvin College
Undergraduate Research Assistant 1997 – 1999
Professor Roger L. DeKock

- Calculated the vibrational spectrum of imine peroxide (HNOO) and related compounds and the electron affinities of various nickel-oxygen species using *ab initio* methods to confirm collaborators' experimental data

Student Researcher 1998
Professors Mark A. Muyskens and Karen C. Muyskens

- Researched the mechanism of the photoelimination of hydrogen fluoride from trifluoroacetylacetone (TFAA)

TEACHING EXPERIENCE

California Institute of Technology
Graduate Teaching Assistant 2002 – 2004
Courses: Introduction to Biochemistry, Biochemistry of Gene Expression

- Tutored students on difficult course concepts during weekly office hours
- Moderated a weekly discussion group in which students presented recent literature relevant to class topics

PROFESSIONAL EXPERIENCE

Intern, Quality Assurance Lab 1999
Baxter Healthcare, Round Lake, IL

- Streamlined lab procedures by developing two new assays to assure that materials were free of contaminants
- Performed assays to determine if intravenous antibiotics solutions met accepted standards

RELEVANT SKILLS

Software
- GROMACS: Simulated an ion channel/lipid system and analyzed protein, water, and ion properties
- Schrödinger: Calculated binding energies of small molecules in an ion channel protein using QM/MM
- Gaussian, Mulliken: Calculated energies, geometries, and vibrational frequencies of small molecules

Computer Languages and Operating Systems
- C++: Coded programs to analyze data from molecular dynamics simulations and manipulate data files
- Unix: Proficiency in commands and file system
- Java: Created web-based program for sorting statistics
- FORTRAN, eLISP, Smalltalk: Basic knowledge of programming and compiling

Biochemistry
- Protein expression: Overexpressed a novel fusion protein and harvested it from inclusion bodies
- Tissue culture: maintained CHO and HEK cell cultures for optimization of transfection techniques

SELECTED AWARDS AND HONORS

California Institute of Technology
- National Science Foundation Fellowship 1999 – 2002

Calvin College
- Department of Chemistry and Biochemistry Outstanding Senior Award 1999
- Dow Chemical Company Foundation Scholarship 1995 – 1999
- Calvin College Dean's List (every semester) 1995 – 1999
- Polymer Education Division of ACS Outstanding Achievement in Organic Chemistry Award 1997
- Division of Analytical Chemistry of ACS Undergraduate Award in Analytical Chemistry 1996

PUBLICATIONS AND PRESENTATIONS

Spronk, S. A. Investigations of Ion Channels with Computational Simulations and Biochemical Experiments. Ph. D. Thesis, California Institute of Technology, 2006.

Spronk, S. A., Elmore, D. E., and Dougherty, D. A. Voltage-Dependent Hydration and Conduction Properties of the Hydrophobic Pore of the MscS Channel. *Biophys. J. in press.*

Spronk, S. A., Dougherty, D. A., and Lester, H. A. Hydration of the pore of the mechanosensitive channel of small conductance (MscS) studied by molecular dynamics simulations. Poster at the conference of the Biophysical Society, 2005.

Lee, L. W., **Spronk, S. A.**, Elmore, D. E., Poon, Y. S., Dougherty, D. A., Lester, H. A., and Rees, D. C. Studies of the voltage dependence of the mechanosensitive channel of small conductance (MscS). Poster at the Gordon Research Conference on Ligand Gating and Molecular Recognition, 2004.

DeKock, R. L., McGuire, M. J., Piecuch, P., Allen, W. D., Schaefer, H. F., Kowalski, K., Kucharski, S. A., Musial, M., Bonner, A. R., **Spronk, S. A.**, Lawson, D. B., and Laursen, S. L. The electronic structure and vibrational spectrum of *trans*-HNOO. *J. Phys. Chem. A.* **2004**, *15*, 2893-2903.

Muyskens, M. A., Lautenbach, D. J., **Spronk, S. A.**, and Muyskens, K. J. Ultraviolet-laser photodissociation of fluorine-containing molecules using chemical laser IR detection. Poster at the conference of the American Chemical Society, 1999.

Laursen, S. L., Grace, J. E., DeKock, R. L., and **Spronk, S. A**. Reaction of NH (X) with oxygen in a solid xenon matrix: Formation and infrared spectrum of imine peroxide, HNOO. *J. Am. Chem. Soc.* **1998**, *120*, 12583-12594.