

## Sarah A. Petty

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### EDUCATION

- *University of Liverpool; Department of Chemistry* 2000 - 2004  
PhD in Chemistry. Advisor: Dr. Martin Volk.
  - *University of Liverpool; Department of Chemistry.* 1996 - 2000  
Degree of Masters of Chemistry. Degree classification: 1 with honors.
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### TEACHING EXPERIENCE

- *College of the Holy Cross.* 2006 - present  
Assistant Professor of Chemistry.  
Classical physical chemistry with associated lab.  
Modern physical chemistry with associated lab.
  - *Mount Holyoke College.* 2005 - 2006  
Lead literature discussions for course in biophysical and general chemistry.  
Experimental Methods Laboratory.  
Supervised students with research projects.
  - *University of Liverpool.* 2000 - 2003  
Teaching Assistant for undergraduate physical and analytical chemistry laboratories.  
Tutored workshops in math for chemistry students.
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### RESEARCH EXPERIENCE

- *College of the Holy Cross.* 2006 - present  
Principal Investigator.  
My research lab studies proteins associated with diseases such as Huntington's disease and Cataracts. The projects are at the interface of molecular biology and physical chemistry.
- *Mount Holyoke College.* 2003 - 2006  
Post-doctoral research fellow.  
My research studied the molecular level structure of amyloidogenic peptides using isotope-edited infrared spectroscopy and atomic force microscopy.
- *University of Liverpool.* 2000 - 2003  
PhD Title: "The Stability and Dynamics of Alpha Helical Peptides - An Infrared Study"  
My graduate research focused on structural changes in peptides occurring on nanosecond time-scales as a result of a fast laser induced temperature jump.

## PUBLICATIONS

- (8) D. A. Kirschner, A. A. R. Gross, M. M. Hidalgo, H. Inouye, K. A. Gleason, G. A. Abdelsayed, G. M. Castillo, A. D. Snow, A. Pozo-Ramajo, S. A. Petty, S. M. Decatur; "Fiber Diffraction as a Screen for Amyloid Inhibitors"; *Current Alzheimer Research*, 2008, 5, 3, 288-307.
  - (7) A. Pozo-Ramajo, S. A. Petty and M. Volk; "Fast Folding Dynamics of  $\alpha$ -Helical Peptides - Effects of Solvent Additives and pH"; *Chem. Phys.*, 2006, 325, 1, 11-20.
  - (6) S. A. Petty and S. M. Decatur; "Intersheet Rearrangements of Polypeptides During Nucleation of  $\beta$ -Sheet Aggregates" *Proc. Natl. Acad. Sci., U.S.A.*, 2005, 102, 40, 14272-14277.
  - (5) S. A. Petty and S. M. Decatur; "Experimental Evidence for the Reorganization of  $\beta$ -Strands within Aggregates of the A $\beta$ (16-22) Peptide"; *J. Am. Chem. Soc.*, 2005, 127, 39, 13488-13489.
  - (4) A. Pozo-Ramajo, S. A. Petty, A. Starzyk, S. M. Decatur and M. Volk; The  $\alpha$ -Helix Folds More Rapidly at the C-Terminus Than at the N-Terminus; *J. Am. Chem. Soc.*, 2005, 127, 40, 13784-13785.
  - (3) S. A. Petty, T. Adalsteinsson and S. M. Decatur; Correlations Between Aggregate Morphology,  $\beta$ -sheet Stability and Molecular Structure in Prion Peptide Aggregates; *Biochemistry*, 2005, 44, 12, 4720-4726.
  - (2) S. A. Petty & M. Volk; Fast Folding Dynamics of an  $\alpha$ -Helical Peptide with Bulky Side Chains; *Phys. Chem. Chem. Phys.*, 2004, 6, 1022-1030.
  - (1) R. W. Flood, T. P. Geller, **S. A. Petty**, S. M. Roberts, J. Skidmore and M. Volk; Efficient Asymmetric Epoxidation of  $\alpha$ ,  $\beta$ -Unsaturated Ketones Using a Soluble Triblock Polyethylene Glycol-Polyamino Acid Catalyst; *Org. Letts*, 2001, 3, 5, 683-686.
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## INVITED TALKS

- (3) S. A. Petty and S.M. Decatur; "Using Infrared Spectroscopy to Probe the Molecular Level Structure and Dynamics of Amyloid Aggregates"; Department of Chemistry, Wesleyan University, Connecticut, USA. April 2006.
  - (2) S. A. Petty and S.M. Decatur; "Mechanisms of  $\beta$ -Strand Alignment and Fibril Formation in Amyloidogenic Peptides"; Department of Chemistry, University of Maine (Orono), Maine, USA. October 2005.
  - (1) S. A. Petty and S.M. Decatur; " $\beta$ -sheet Stability, Alignment and Aggregation in Amyloidogenic Peptides"; Department of Molecular Biology and Biochemistry, Wesleyan University, Connecticut, USA. October 2005.
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## ORAL PRESENTATIONS

- (6) Y. Wang, S. A. Petty and J. A. King; "Kinetics of Amyloid Formation in Vitro by Human Gamma Crystallins"; US-Japan Cooperative Cataract Research Group Meeting; Kailua-Kona, HI. 2007.

- (5) S. A. Petty and S. M. Decatur; "Inhibiting the Aggregation of a Fragment of the Amyloid-Beta Polypeptide"; Annual Meeting of the Biophysical Society; Salt Lake City, UT. 2006.
  - (4) S. A. Petty and S. M. Decatur; "Isotope Edited Infrared Spectroscopy as a Site Specific Probe for the Structure and Dynamics of Amyloid Aggregates"; International Conference on Advanced Vibrational Spectroscopy; Delavan, WI. 2005.
  - (3) S. A. Petty and S. M. Decatur; "Peptide Reptation as a Mechanism for Rearrangements Within a  $\beta$ -sheet Aggregate"; American Peptide Society Symposium; San Diego, CA. 2005.
  - (2) S. A. Petty and M. Volk; "Fast Folding Dynamics of  $\alpha$ -Helical Peptides"; Biophysical Chemistry Conference: Instrumentation, techniques and technologies for biophysical chemistry; University of Warwick, U.K. 2003.
  - (1) S. A. Petty and M. Volk; "Structural and Dynamic Properties of Peptides"; PhD Seminar; University of Liverpool, UK. 2003.
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#### POSTER PRESENTATIONS

- (24) A. T. Trojanowski, Y. Wang, J. A. King and S. A. Petty; "Effects of Buffer on Human- $\gamma$ C-Crystallin Aggregation"; American Chemical Society National Meeting; Salt Lake City, UT. 2009.
- (23) S. A. Petty, M. T. Bauer and T. D. Kelley; "Resolving the Complications Induced by the Side Chain Carbonyl of Glutamine"; Annual Meeting of the Biophysical Society; Boston, MA. 2009.
- (22) S. A. Petty, A. T. Trojanowski, J. A. King, D. R. Goulet and Y. Wang; "An Equilibrium and Kinetics Study of the Aggregation of Human- $\gamma$ C-Crystallin"; Symposium of the Protein Society; San Diego, CA. 2008.
- (21) S. A. Petty, A. T. Trojanowski, J. A. King, D. R. Goulet and Y. Wang; "Structural Rearrangements on the Pathway to Human- $\gamma$ C-Crystallin Aggregation"; Annual Meeting of the Biophysical Society; Long Beach, CA. 2008.
- (20) A. B. Andrew, K. M. Lyons, S. A. Petty, T. Ramlall and D. Eliezur; "Infrared Studies of Polyglutamine Aggregates"; Annual Meeting of the Biophysical Society; Long Beach, CA. 2008.
- (19) D. R. Goulet, Y. Wang, K. M. Knee, S. A. Petty, I. Mukerji and J. A. King; "Influence of Local Environment on Aggregation"; Annual Meeting of the Biophysical Society; Long Beach, CA. 2008.
- (18) A. R. Gragnolati, S. A. Petty and S. M. Decatur; "The Structure and Dynamics within Aggregates of A $\beta$ (16-22) as a Function of Ionic Strength and Pressure"; Annual Meeting of the Biophysical Society; Baltimore, MD. 2007.
- (17) D. M. Alessi, S. A. Petty and S. M. Decatur; "The mechanism of thermal disruption of an aggregate formed by a prion peptide"; Annual Meeting of the Biophysical Society; Baltimore, MD. 2007.
- (16) A. Pozo-Ramajo, S. A. Petty, M. Volk and S. M. Decatur; "Time-Resolved Isotope-Edited Infrared Spectroscopy: Detailed Insight into the Fast Folding Dynamics of  $\alpha$ -

- Helical Peptides"; International Conference on Advanced Vibrational Spectroscopy; Delavan, WI. 2005.
- (15) S. A. Petty and S. M. Decatur; "Isotope Edited Infrared Spectroscopy Gives Insights into  $\beta$ -Strand Alignment in Amyloidogenic Peptides"; Symposium of the Protein Society; Boston, MA. 2005.
  - (14) S. A. Petty and S. M. Decatur; "Correlating Fibril Morphology and Stability with the Alignment of  $\beta$ -Sheets in the Prion Peptide PrP(109-122)"; European Symposium of the Protein Society; Barcelona, Spain. 2005.
  - (13) S. A. Petty and S. M. Decatur; "Kinetics of  $\beta$ -sheet Alignment and Fiber Formation in the Prion Peptide"; American Chemical Society National Meeting; San Diego, CA. 2005.
  - (12) N. A. Hanick, S. A. Petty and S. M. Decatur; "Solvent Effects on the Stability and Formation of Prion Peptide Aggregates"; American Chemical Society National Meeting; San Diego, CA. 2005.
  - (11) S. A. Petty and S. M. Decatur; "The Kinetics of Strand Alignment and Aggregate Nucleation in Prion Peptide Aggregation"; Annual Meeting of the Biophysical Society; Long Beach, CA. 2005.
  - (10) T. Adalsteinsson, S. A. Petty and S. M. Decatur; "Aggregates of Prion Peptides Observed by Atomic Force Microscopy"; Annual Meeting of the Biophysical Society; Long Beach, CA. 2005.
  - (9) S. A. Petty and S. M. Decatur; "The Organization and Assembly of a Prion Peptide Aggregate"; European Peptide Symposium; Prague, Czech Republic. 2004.
  - (8) S. A. Petty, **C. A. Pevtsova** and S. M. Decatur; "The Effect of A117 Substitutions of the Stability and Interstrand Side Chain Packing of  $\beta$ -sheet Aggregates in PrP(109-122)"; Symposium of the Protein Society; San Diego, CA. 2004.
  - (7) S. A. Petty & M. Volk; "The Amide I band of Helical Peptides"; Annual Meeting of the Biophysical Society; Baltimore, MD. 2004.
  - (6) Martin Volk, A. Pozo-Ramajo, **E. Leary** and S. A. Petty; "Fast Folding Dynamics of Complex  $\alpha$ -Helical Peptides"; Annual Meeting of the Biophysical Society; Baltimore, MD. 2004.
  - (5) S. M. Decatur, R. A. G. D. Silva, W. Barber-Armstrong, **C. A. Pevtsova**, S. A. Petty; "Dissecting the Structure and Dynamics of a Beta-Sheet Aggregate via Isotope-Edited IR Spectroscopy"; Annual Meeting of the Biophysical Society; Baltimore, MD. 2004.
  - (4) **C. A. Pevtsova**, S. M. Decatur, S. A. Petty; "Structure and Assembly of Beta-Sheet Aggregates of Prion Peptides PrP(106-126) and PrP(109-122)"; Annual Meeting of the Biophysical Society; Baltimore, MD. 2004.
  - (3) S. A. Petty and M. Volk; "Fast Folding Dynamics of  $\alpha$ -Helical Peptides"; Biophysical Chemistry Conference: Instrumentation, techniques and technologies for biophysical chemistry; University of Warwick, U.K. 2003.
  - (2) M. Volk, **R. M. Orange**, S. A. Petty; "Kinetic Simulations of  $\alpha$ -Helix Folding Following Fast Temperature Jumps"; Annual Meeting of the Biophysical Society; San Antonio, TX. 2003.

- (1) S. A. Petty and M. Volk; "Fast Events in Protein Folding"; Annual Northern Universities Meeting on Chemical Physics; University of Leicester, U.K. 2002.

\* Presenting author underlined; undergraduate students in bold.

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### GRANTS AWARDED

- (3) Research and Publications Grant, College of the Holy Cross; "Preparation of Thioamidated Peptides for Studying the Early Phases in Protein Folding"; \$3000; Spring 2009
- (2) Summer Faculty Fellowship / Charles and Rosanna Batchelor (Ford) Foundation Grant; "Using Infrared Spectroscopy and Proteolytic Digestion to Study the Aggregation of Human  $\gamma$ C-Crystallin"; \$3500; Spring 2009.
- (1) Summer Faculty Fellowship / Charles and Rosanna Batchelor (Ford) Foundation Grant; "Transition Dipole Coupling Effects on the Infrared Spectra of Glutamine"; \$3500; Spring 2008.

### SCHOLARSHIPS AND PRIZES

- *Ultrafine prize* for best performance in MChem degree course. 2000
- *Venables prize* for female achieving distinction. 1999
- *Dr. Austin Leslie Roberts prize* for distinction in physical chemistry 1998
- *Royal Institute (Canning) University undergraduate scholarship* for distinction in chemistry modules of year 2. 1998
- *High school scholarship* for high achievement in examinations. 1993

### COURSES

- New England Biolabs workshop in "Molecular Biology and PCR" July 2006
- German Stages 1 & 2, "Languages for All" course. 2001 - 2003
- Research Councils' Graduate School 5-day residential workshop. June 2002
- Written communications workshop. June 2001
- Epistemology workshop. June 2001
- Workshop for postgraduate laboratory demonstrators. Feb. 2001