

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.

TEACHING EXPERIENCE

- *College of the Holy Cross.* 2006 - present
Assistant Professor of Chemistry. 2006 - 2012
Associate Professor of Chemistry. 2012 - present
Classical physical chemistry with associated lab.
Modern physical chemistry with associated lab.
Biophysical Chemistry (upper level elective course)
Instrumental Chemistry and Analytical Methods lab course
Equilibrium and Reactivity (General Chemistry 2) with associated lab
Atoms and Molecules (General Chemistry 1) with associated lab
Elements of Writing Argument (Summer Passport)
Exploring Newton's Rainbow (Fall semester of co-taught Montserrat course:
"The Science and Art of Color")
[Energy and Agriculture \(co-taught; summer 2019\)](#)
- *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.

RESEARCH EXPERIENCE

- *College of the Holy Cross.* 2006 - present
Principal Investigator.
My research lab studies protein misfolding primarily through the use of infrared spectroscopy.
- *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.

PROFESSIONAL INVOLVEMENT

- Associate Board Member of Protein and Peptide Letters June 2018 – present
- Faculty Athletic Representative Aug 2019 – present
- Policy Committee Representative to the Patriot League Aug 2019 – present

PUBLICATIONS

- (12) E. A. Gooding, S. Sharma, S. A. Petty, E. A. Fouts, C. J. Palmer, B. E. Nolan and M. Volk; "pH-dependent helix folding dynamics of poly-glutamic acid"; *Chemical Physics*; 2013, 422, 115-123
- (11) **M. T. Bauer, K. A. Gilmore** and S. A. Petty; "Formation of β -sheets in glutamine and alanine tripeptides"; *Biochemical and Biophysical Research Communications*; 2011, 406, 3, 348-352
- (10) G. Liu, A. Prabhakar, D. Aucoin, M. Simon, S. Sparks, K. J. Robbins, A. Sheen, S. A. Petty and N. D. Lazo; "Mechanistic studies of peptide self-assembly: Transient α -helices to stable β -sheets"; *Journal of the American Chemical Society*; 2010, 132, 18223-18232
- (9) Y. Wang, S. A. Petty, **A. T. Trojanowski**, K. M. Knee, **D. R. Goulet**, I. Mukerji, and J. A. King; "Formation of amyloid fibrils in vitro from partially unfolded intermediates of Human γ C-Crystallin"; *Investigative Ophthalmology and Visual Science*; 2010, 51, 672-678.
- (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 α -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 β -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 β -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 α -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, β -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 α -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 α , β -Unsaturated Ketones Using a Soluble Triblock Polyethylene Glycol-Polyamino Acid Catalyst; *Org. Letts*, 2001, 3, 5, 683-686.

INVITED TALKS

- (7) S. A. Petty; ““Infrared Insights into Protein (Mis)Folding””; Department of Chemistry and Biochemistry, Worcester Polytechnic Institute, MA. March 2014.
- (6) S. A. Petty; “Infrared Insights into Protein (Mis)Folding””; Department of Chemistry, Trinity College, CT. March 2013.
- (5) S. A. Petty; “Spectroscopic Studies of Protein Misfolding and Hydration””; Department of Chemistry, University of New Hampshire, New Hampshire. March 2010.
- (4) S. A. Petty; “Using Infrared Spectroscopy to Study Protein Misfolding Diseases””; Department of Chemistry, Haverford College, Pennsylvania. July 2009.
- (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. April 2006.
- (2) S. A. Petty and S.M. Decatur; “Mechanisms of β -Strand Alignment and Fibril Formation in Amyloidogenic Peptides””; Department of Chemistry, University of Maine (Orono), Maine. October 2005.
- (1) S. A. Petty and S.M. Decatur; “ β -sheet Stability, Alignment and Aggregation in Amyloidogenic Peptides””; Department of Molecular Biology and Biochemistry, Wesleyan University, Connecticut. October 2005.

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 β -sheet Aggregate””; American Peptide Society Symposium; San Diego, CA. 2005.
- (2) S. A. Petty and M. Volk; “Fast Folding Dynamics of α -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.

POSTER PRESENTATIONS

- (48) S.A. Petty, M.J. Calcaterra, M.W. Fernandez, C.G. Fernandez and S.A. Von Fedak; “Destablizing Beta Sheet Peptides from the Hydrophobic Core of Alpha Synuclein””; Annual

Meeting of the Biophysical Society; San Diego, CA. 2020 [Abstract accepted but poster not ultimately presented]

- (47) S.A. Petty, A.T. Mullin, S. Michelhaugh and B.R. Fitzgerald; "The Disruption Of Beta Sheets In Amyloidogenic Sequences By Gly-Gly-Ala"; Annual Meeting of the Biophysical Society; Baltimore, MD. 2019
- (46) C. Fernandez and S.A. Petty; "Investigating the Nucleating Region of Protein Misfolding in α -Synuclein"; American Chemical Society National Meeting; New Orleans, LA. 2018
- (45) B.R. Fitzgerald and S.A. Petty; "Preventing Aggregation in Peptides Derived from β -sheets Rich Sections of α -Synuclein"; American Chemical Society National Meeting; New Orleans, LA. 2018
- (44) **P. Mon** and S. A. Petty; "Inducing β -sheets in Disordered Peptides in α -Synuclein"; American Chemical Society National Meeting; New Orleans, LA. 2018
- (43) **S.A. Petty, A. Mullin; S. Michelhaugh; B. Fitzgerald; C. Fernandez; P. Mon; M. Stuckey; M. Schefter**; "The Effect of Small Peptides on the Aggregation of Amyloidogenic Sequences"; Symposium of the Protein Society; Montreal, Canada. 2017
- (42) **L. Balesano** and S. A. Petty; "Concentration Dependence of Alanine and Isoleucine Containing Peptides"; American Chemical Society National Meeting; San Diego, CA. 2016
- (41) **M. Schefter** and S. A. Petty; "Can beta sheet peptides isolated from α -synuclein induce beta sheet formation in disordered sequences?"; American Chemical Society National Meeting; San Diego, CA. 2016
- (40) **B. Chartier** and S.A. Petty; " β -Sheet formation in alanine based peptides"; American Chemical Society National Meeting; San Diego, CA. 2016
- (39) **S. Michelhaugh** and S. A. Petty; "Inhibition of β -Sheet Formation by a Short, Random Coil Peptide"; American Chemical Society National Meeting; San Diego, CA. 2016
- (38) **J. Henao** and S. A. Petty; "Studying the effect of cellular crowding on α -syn peptides"; American Chemical Society National Meeting; San Diego, CA. 2016
- (37) **M. E. Stuckey** and S. A. Petty; " α -Synuclein Misfolding and β -Sheet Aggregation in Parkinson's Disease"; American Chemical Society National Meeting; San Diego, CA. 2016
- (36) **A. T. Mullin** and S. A. Petty; "Studying the Aggregation of α -Synuclein Based Peptides Using Infrared Spectroscopy"; American Chemical Society National Meeting; Dallas, TX. 2014
- (35) **J. X. Lam** and S. A. Petty; "The Structure and Aggregation of Glutamine Based Peptides"; American Chemical Society National Meeting; Dallas, TX. 2014
- (34) **R. M. Paranal** and S. A. Petty; "Kinetics of Beta Sheet Formation and Disaggregation"; American Chemical Society National Meeting; Dallas, TX. 2014
- (33) **S. A. Petty, K. A. Gilmore, C. M. E. Pineda and J. M. Stewart**; " β -Sheet Formation in Short Peptides"; Symposium of the Protein Society; Boston, MA. 2013
- (32) **B. E. Deane** and S. A. Petty; "Mapping the Energy Landscape of a Model Peptide Using Infrared Spectroscopy"; American Chemical Society National Meeting; San Diego, CA. 2012
- (31) **K. A. Gilmore** and S. A. Petty; "Studying the Aggregation of Glutamine and Alanine-Based Tripeptides Using Infrared Spectroscopy"; American Chemical Society National Meeting; San Diego, CA. 2012.

- (30) **C. M. E. Pineda** and S. A. Petty; "The Structure and Aggregation of Glutamine Based Tetrapeptides"; American Chemical Society National Meeting; San Diego, CA. 2012.
- (29) **S. A. Petty, L. A. Tonge and B. E. Deane**; "The Stability of β -Sheets in Poly-L-Lysine"; Symposium of the Protein Society; Boston, MA. 2011.
- (28) **K. A. Gilmore**, S. A. Petty; "The Aggregation of Glutamine and Alanine-Based Tripeptides"; American Chemical Society National Meeting; Anaheim, CA. 2011.
- (27) **D. M. Balyozian**, S. A. Petty; "Determining the Size of the Hydration Sphere Surrounding Myoglobin"; American Chemical Society National Meeting; Anaheim, CA. 2011.
- (26) **M. T. Bauer**, S. A. Petty; "Analysis of Glutamine Based Peptides using Infrared Spectroscopy"; American Chemical Society National Meeting; San Francisco, CA. 2010.
- (25) **L. A. Tonge**, S. A. Petty; "Determining the Size of the Hydration Sphere around Myoglobin"; American Chemical Society National Meeting; San Francisco, CA. 2010.
- (24) **A. T. Trojanowski**, Y. Wang, J. A. King and S. A. Petty; "Effects of Buffer on Human- γ 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- γ 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- γ 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 β (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 α -Helical Peptides"; International Conference on Advanced Vibrational Spectroscopy; Delavan, WI. 2005.

Curriculum Vitae: S. Petty

- (15) S. A. Petty and S. M. Decatur; "Isotope Edited Infrared Spectroscopy Gives Insights into β -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 β -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 β -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 β -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 α -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 α -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 α -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.

GRANTS AWARDED

- (5) Committee on Faculty Scholarship Grant, College of the Holy Cross; "Elucidating the Mechanism of Peptide Disaggregation With Isotope-Edited Spectroscopy"; \$2918; Spring 2019.
- (4) Committee on Faculty Scholarship Grant, College of the Holy Cross; "Effects of Salts on Protein Hydration"; \$2926.16 (funded partially through Kresge funds); Fall 2012
- (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 γ 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.