

**Curriculum Vitae**  
**Christopher J. Roberts, Ph.D**

*Professor, Chemical and Biomolecular Engineering*  
*University of Delaware, Newark, DE 19716*  
*Email: cjr@udel.edu*

**Positions / Appointments**

2018 - Institute Associate Director, National Institute for Innovation in Manufacturing of Biopharmaceuticals, USA

2017 - Associate Chair for Undergraduate Studies, Chemical & Biomolecular Engineering, University of Delaware

2016 - 2017 Visiting Professor, School of Chemical Engineering and Analytical Sciences, University of Manchester

2015 - Director, Center for Biomanufacturing Science and Technology, University of Delaware

2015 - Professor, Department of Chemical and Biomolecular Engineering, University of Delaware

2014 - Director, Biomolecular Interaction Technologies Center

2010 - Guest Researcher, National Institute of Standards and Technology, Center for Neutron Research

2009 - Faculty Member, Center for Molecular and Engineering Thermodynamics, University of Delaware

2003 - Faculty Member, UD Chemistry-Biology Interface Program, University of Delaware

2010 Visiting Investigator, GlaxoSmithKline

2010 - 2014 Associate Professor (affiliated), Biomedical Engineering, University of Delaware

2009 - 2015 Associate Professor, Department of Chemical and Biomolecular Engineering, University of Delaware

2008 - 2014 Graduate Program Co-Director, Department of Chemical and Biomolecular Engineering, University of Delaware

2006 - 2008 Faculty Member, UD IGERT Biotechnology Program

2002 - 2009 Assistant Professor, Department of Chemical Engineering, University of Delaware

2000 - 2002 Senior Research Scientist, Department of Pharmaceutical R&D, Pfizer Global Research and Development

1999 - 2000 Research Scientist, Department of Pharmaceutical R&D, Pfizer Central Research

1994 - 1999 Graduate Research Associate, Department of Chemical Engineering, Princeton University

1995 Visiting Research Associate, Pafra Biopreservation, Ltd.

**Education**

|                        |   |      |
|------------------------|---|------|
| Princeton University   | Chemical Engineering, Ph.D.                       | 1999 |
| University of Delaware | Chemical Engineering, BChE <i>summa cum laude</i> | 1994 |

**Selected Honors**

*Research & Scholarship*

- Inaugural John Finlayson Lecture, US Food & Drug Administration (2016)
- AAPS Chapter Pharmaceutics Lecturer, University of Kansas (2006)
- AAPS New Investigator Award (Pharmaceutics and Pharmaceutical Technology) (2005)
- Merck Faculty Fellow, University of Delaware (2004-2007)
- Ebert Prize, American Pharmaceutical Association & American Pharmaceutical Research Society (2004)
- Wallace Memorial Fellowship, Princeton University (1998)
- National Science Foundation Graduate Fellowship (1994-1998)
- Barry M. Goldwater Scholarship (1992-1994)

## Teaching and Service

- Editorial Advisory Board, *J. Pharm. Sci.* (2017-present)
- Industrial & Academic Advisory Board, PIPPI consortium (2016-present)
- College of Engineering, Excellence-in-Teaching Award, University of Delaware (2008)
- Nominated, University Excellence-in-Teaching Award, University of Delaware (2004, 2006, 2009)
- *Journal of Pharmaceutical Sciences* Service Award (2007, 2008, 2012, 2015), *Biophysical Chemistry* Service Award (2014)

## Peer-Reviewed Publications (*h-index* = 32, for multi-author publications, asterisk denotes corresponding author(s))

1. Roberts CJ, Franks F\* Crystalline and amorphous phases in the binary system water –  $\beta$ , $\beta$  trehalose. *J. Chem. Soc. Faraday Trans.* 92:1337-1343 (1996).
2. Roberts CJ, Debenedetti PG\* Polyamorphism and density anomalies in network-forming fluids: Zeroth- and first-order approximations. *J. Chem. Phys.* 105:658-672(1996).
3. Roberts CJ, Panagiotopoulos AZ, Debenedetti PG\* Liquid-liquid immiscibility in pure fluids: Polyamorphism in simulations of a network-forming fluid. *Phys. Rev. Lett.* 77:4386-4389 (1996).
4. Roberts CJ, Karayiannakis GA, Debenedetti PG\* Pure-fluid liquid-liquid equilibrium in a model of network-forming fluids, and implications for polyamorphism in water. *Ind. & Eng. Chem. Res.* 37:3012-3020 (1998).
5. Roberts CJ, Debenedetti PG\* Structure and dynamics in concentrated amorphous carbohydrate-water systems by molecular dynamics simulation. *J. Phys. Chem. B* 103:7308-7318 (1999).
6. Debenedetti PG\*, Stillinger FH, Truskett TM, Roberts CJ. The equation of state of an energy landscape. *J. Phys. Chem. B* 103:7390-7397 (1999).
7. Roberts CJ, Stillinger FH, Debenedetti PG\* Equation of state of the energy landscape of SPC/E water. *J. Phys. Chem. B* 103:10258-10265 (1999).
8. Roberts CJ\*, Ji Q, Zhang L, Darrington RT. Dissolution behavior of porcine somatotropin with simultaneous gel-formation and lysine Schiff-base hydrolysis. *J. Controlled Release*, 77:107-116 (2001).
9. Waterman KC\*, Adami RC, Alsante KM, Hong J, Landis MS, Lombardo F, Roberts CJ. Stabilization of pharmaceuticals to oxidative degradation. *Pharm. Dev. Tech.* 7:1-32 (2002).
10. Roberts CJ, Debenedetti PG\* Engineering pharmaceutical stability with amorphous solids. *AIChE J.* 48:1140-1144 (2002).
11. Roberts CJ. Kinetics of irreversible protein aggregation: analysis of extended Lumry-Eyring models and implications for shelf life prediction *J. Phys. Chem. B* 107:1194-1207 (2003).
12. Roberts CJ\*, Darrington RT, Whitley MB. Irreversible aggregation of recombinant bovine granulocyte-colony stimulating factor (bG-CSF) and implications for predicting protein shelf life. *J. Pharm. Sci.*, 92:1095-1111 (2003).
13. Roberts CJ. Improved quasi-chemical equation of state based on energy and density fluctuations in the small system grand canonical ensemble, *J. Phys. Chem. B* 108:19843-19851 (2004).
14. Shah PP, Roberts CJ\* Molecular solvation in water-methanol and water-sorbitol mixtures: the roles of preferential hydration, hydrophobicity, and the equation of state, *J. Phys. Chem. B* 111:4467-4476 (2007).
15. Andrews JM, Roberts CJ\* Non-native aggregation of  $\alpha$ -chymotrypsinogen occurs through nucleation and growth with competing nucleus sizes and negative activation energies, *Biochemistry* 46:7558-7571 (2007).
16. Andrews JM, Roberts CJ\* A Lumry-Eyring nucleated-polymerization model of protein aggregation kinetics: 1. Aggregation with pre-equilibrated unfolding, *J. Phys. Chem. B* 111:7897-7913 (2007).
17. Roberts CJ Nonnative protein aggregation kinetics. *Biotechnol. Bioeng.* 98:927-938 (2007).
18. Young TM, Roberts CJ\* A quasichemical approach for protein-cluster free energies in dilute solution, *J. Chem. Phys.* 127:165101/1-10 (2007).
19. Weiss WF IV, Hodgdon TK, Kaler EW, Lenhoff AM, Roberts CJ\* Nonnative protein polymers: structure, morphology, and relation to nucleation and growth, *Biophys. J.* 93:4392-4403 (2007).
20. Shah PP, Roberts CJ\* Solvation in mixed-aqueous solvents from a thermodynamic cycle approach, *J. Phys. Chem. B* 112:1049-1052 (2008).
21. Andrews JM, Weiss WF IV, Roberts CJ\* Nucleation, growth, and activation energies for seeded and unseeded aggregation of  $\alpha$ -chymotrypsinogen A. *Biochemistry* 47:2397-2403 (2008).
22. Top A, Kiick KL\*, Roberts CJ\* Modulation of self-association and subsequent fibril formation in an alanine-rich helical polypeptide. *Biomacromolecules* 9:1595-1603 (2008).
23. Weiss WF IV, Young TM, Roberts CJ\* Principles, approaches, and challenges for prediction of protein aggregation kinetics and shelf life *J. Pharm. Sci.*, 98:1246-1277 (2009).

24. Li Y, Weiss WF IV, Roberts CJ\* Characterization of high molecular-weight nonnative aggregates and aggregation kinetics by size exclusion chromatography with inline multi-angle laser light scattering. *J. Pharm. Sci.* 98:3997-4016 (2009).
25. Spataro ML, Roberts CJ, Robinson AS\* Kinetic folding studies of the P22 tailspike beta-helix domain reveal multiple unfolded states. *Biophys. Chem.* 141:214-221 (2009).
26. Li Y, Roberts CJ\* A Lumry-Eyring nucleated-nolpolymerization (LENP) model of protein aggregation kinetics 2. Competing growth via condensation- and chain-polymerization. *J. Phys. Chem. B* 113:7020-7032 (2009).
27. Young TM, Roberts CJ\* Structure and thermodynamics of colloidal protein cluster formation: comparison of square-well and simple dipolar models. *J. Chem. Phys.* 131:125104/1-9 (2009).
28. Li Y, Ogunnaik BA, Roberts CJ\* Multi-variate approach to global protein aggregation behavior and kinetics: effects of pH, NaCl, and temperature for  $\alpha$ -chymotrypsinogen A. *J. Pharm. Sci.* 99:645-662 (2010).
29. Sahin E, Grillo AO, Perkins MD, Roberts CJ\* Comparative effects of pH and ionic strength on protein-protein interactions, unfolding, and aggregation for IgG1 antibodies, *J. Pharm. Sci.* 99:4830-4848 (2010).
30. Zhang A, Jordan JL, Ivanova MA, Weiss WF, Roberts CJ, Fernandez EJ\* Molecular-level insights into thermally-induced  $\alpha$ -chymotrypsinogen A amyloid aggregation mechanism and semi-flexible protofibril morphology. *Biochemistry* 49:10553-10564 (2010).
31. Sahin E, Jordan JL, Zhang A, Naranjo A, Costanzo JA, Weiss WF IV, Spataro ML, Robinson AS, Fernandez EJ\*, Roberts CJ\* Computational design and biophysical characterization of point mutations for gamma-D-crystallin illustrate a balance of conformational stability and intrinsic aggregation propensity. *Biochemistry* 50:628-639 (2011).
32. Brummitt RK, Nesta DP, Chang L, Chase SF, Laue TM, Roberts CJ\* Non-native aggregation of an IgG1 antibody in acidic conditions: 1. Unfolding, colloidal interactions, and formation of amyloid-like high molecular weight aggregates. *J Pharm Sci* 100:2087-2103 (2011).
33. Brummitt RK, Nesta DP, Chang L, Kroetsch AM, Roberts CJ\* Non-native aggregation of an IgG1 antibody in acidic conditions: 2. Nucleation-and-growth kinetics with competing growth mechanisms. *J Pharm Sci* 100:2104-2119 (2011).
34. Top A, Roberts CJ\*, Kiick KL\* Conformational and aggregation properties of a PEGylated alanine-rich polypeptide *Biomacromolecules* 12:2184–2192 (2011).
35. Blanco MA, Sahin E, Li Y, Roberts CJ\* Reexamining Protein-Protein and Protein-Solvent Interactions from Kirkwood-Buff Analysis of Light Scattering in Multi-Component Solutions. *J Chem Phys* 134:225103/1-12 (2011).
36. Brummitt, RK, Nesta DP, Roberts, CJ\* Predicting accelerated and low-temperature aggregation rates for monoclonal antibody formulations. *J Pharm Sci* 100:4234-4243 (2011).
37. Roberts CJ\*, Das TK, Sahin E. Predicting Aggregation Rates for Therapeutic Proteins: Approaches and Challenges. *Int J Pharm* 418:318-333 (2011).
38. Top A, Zhong S, Yan C, Roberts CJ\*, Pochan DJ\*, Kiick KL\* Controlling assembly of helical polypeptides via PEGylation strategies. *Soft Matter* 7:9758-9766 (2011).
39. Sahin E, Weiss WF IV, Kroetsch AM, King KR, Kessler RK, Das TK, Roberts CJ\* Non-native aggregation and pH-temperature phase behavior of aggregates for an IgG2 antibody *J Pharm Sci* 101:1678–1687 (2012).
40. Siderius DW\*, Krekelberg WP, Roberts CJ, Shen VK. Osmotic virial coefficients for model protein and colloidal solutions: Importance of ensemble constraints. *J Chem Phys*, 136(17) 175102/1-9 (2012).
41. Brummitt RK, Andrews JM, Jordan JL, Fernandez EJ, Roberts CJ\* Thermodynamics of amyloid dissociation provide insights into aggregate stability regimes *Biophys Chem*, 168-169: 10-18 (2012).
42. Kroetsch AM, Sahin E, Wang H-Y, Krizman S, Roberts CJ\* Relating particle formation to salt- and pH-dependent phase separation of non-native aggregates of alpha-chymotrypsinogen A. *J Pharm Sci*, 101:3651-3660 (2012).
43. Sahin E, Roberts CJ\* Size-Exclusion Chromatography with Multi-Angle Light Scattering (SEC-MALS) for Elucidating Protein Aggregation Mechanisms. *Methods Mol Biol* 899:403-423 (2012).
44. Grünberger A, Lai P-K, Blanco MA, Roberts CJ\* Coarse-grained modeling of protein second osmotic virial coefficients: sterics and non-specific attractions. *J Phys Chem B*, 117:763-770 (2013).
45. Kim N, Remmele RL, Liu D, Razinkhov V, Fernandez EJ, Roberts CJ\* Aggregation of Anti-Streptavidin Immunoglobulin Gamma-1 Mediated by Fab Unfolding and Competing Growth Pathways. *Biophys Chem*, 172:26-36 (2013).
46. Wang W\*, Roberts CJ\* Non-Arrhenius Protein Aggregation. *AAPS J*, (online only) doi: 10.1208/s12248-013-9485-3 (2013).
47. Roberts CJ\*, Nesta DP, Kim N. Effects of temperature and osmolytes on parallel degradation routes for an IgG1 antibody. *J Pharm Sci* 102:3556-3566 (2013).

48. Murphy RM\*, Roberts CJ. Protein misfolding and aggregation research: some thoughts on improving quality and utility. *Biotechnol Prog* 29:1109-1115 (2013).
49. Maurer RW, Hunter AK, Wang X, Wang WK, Robinson AS\*, Roberts CJ\* Folding and aggregation of a multi-domain engineered immunotoxin. *Biochem Eng J.* 81:8-14 (2013).
50. Blanco MA, Sahin E, Robinson AS, Roberts CJ\* Coarse-grained model of protein-protein interactions, B<sub>22</sub>, and protein cluster formation. *J Phys Chem B* 117: 16013-16028 (2013).
51. Weiss WF IV, Zhang A, Jordan JL, Ivanova MA, Sahin E, Fernandez EJ, Roberts CJ\* Reduction of the C191-C220 disulfide of  $\alpha$ -chymotrypsinogen A accelerates amyloid formation via reduced nucleation barriers. *Biophys Chem* 185:79-87 (2014).
52. Maurer RW, Hunter AK, Robinson AS\*, Roberts CJ\* Aggregates of  $\alpha$ -chymotrypsinogen anneal to access more stable aggregate states. *Biotechnol Bioeng* 111: 782-791 (2014).
53. Wu H, Kroe-Barrett R, Singh S, Robinson AS, Roberts CJ\* Competing aggregation pathways for monoclonal antibodies. *FEBS Letters* 588: 936-941(2014).
54. Costanzo JA, O'Brien CJ, Tiller K, Tamargo E, Robinson AS, Roberts CJ\*, Fernandez EJ\* Computational Design to Control Protein Aggregation Rates Through Conformational Stability. *Protein Engineering Design & Selection* 27: 157-167 (2014).
55. Blanco MA, Martorana E, Manno M, Perevozchikova T, Roberts CJ\* Protein-protein interactions in dilute to concentrated solutions: alpha-chymotrypsinogen at acidic pH. *J Phys Chem B* 118: 5817-5831 (2014).
56. Roberts CJ. Therapeutic protein aggregation: mechanisms, design, and control. *Trends Biotech.* 32: 372-380 (2014).
57. Roberts CJ. Protein Aggregation and Its Impact on Product Quality. *Curr Opin Biotech* 30:211-217 (2014).
58. Roberts CJ,\* Blanco MA. Role of anisotropic interactions for proteins and patchy nanoparticles. *J Phys Chem B* 118:12599-12611 (2014).
59. Amin S,\* Barnett GV, Pathak J,\* Roberts CJ, Sarangapani PS. Protein aggregation, particle formation, characterization, and rheology. *Curr Opin Coll Int Sci* 19:439-449 (2014).
60. Paik B, Blanco MA, Roberts CJ,\* Jia X, Kiick KL\* Aggregation of poly(acrylic acid)-containing elastin copolymers. *Soft Matter* 11:1839-1850 (2015).
61. Barnett GV, Razinkov V, Kerwin BA, Laue TM, Woodka A, Butler PD, Perevozchikova T, Roberts CJ\* Specific ion effects on the aggregation mechanisms and protein-protein interactions for anti-streptavidin immunoglobulin gamma 1. *J Phys Chem B* 119:5793-5804 (2015).
62. Perevozchikova T, Nanda H, Nesta DP, Roberts CJ\* Protein adsorption, desorption, and aggregation mediated by solid-liquid interfaces. *J Pharm Sci* 104:1946-1959 (2015).
63. Barnett GV, Qi W, Amin S, Lewis EN, Roberts CJ\* Aggregate structure, morphology and the effect of aggregation mechanisms on viscosity at elevated protein concentrations. *Biophys Chem* 207:21-29 (2015).
64. Wu H, Truncali K, Ritchie J, Kroe-Barrett R, Singh S, Robinson AS, Roberts CJ\* Weak protein interactions and pH- and temperature-dependent aggregation of human Fc1. *mAbs* 7:1-12 (2015).
65. Barnett GV, Qi W, Amin S, Lewis EN, Razinkov V, Kerwin BA, Liu Y, Roberts CJ\* Structural Changes and Aggregation Mechanisms for Anti-streptavidin IgG1 at Elevated Concentration. *J Phys Chem B* 119:15150-15163 (2015).
66. Barnett GV, Razinkov V, Kerwin BA, Hillsley A, Roberts CJ\* Acetate and Citrate Specific-Ion-Effects on Temperature-Dependent Aggregation Rates of Anti-Streptavidin IgG1. *J Pharm Sci* 105:1066-1073 (2016).
67. Ghosh R, Calero-Rubio C, Saluja A, Roberts CJ\* Relating protein-protein interactions and aggregation rates from low to high concentrations. *J Pharm Sci* 105:1086-1096 (2016).
68. Barnett GV, Razinkov V, Kerwin BA, Blake S, Qi W, Curtis RA, Roberts CJ\* Osmolyte Effects on Monoclonal Antibody Stability and Concentration-Dependent Protein Interactions with Water and Common Osmolytes *J Phys Chem B* 120:3318-3330 (2016).
69. O'Brien CJ, Blanco MA, Robinson AS,\* Roberts CJ\* Modulating Non-Native Aggregation and Electrostatic Protein-Protein Interactions with Computationally Designed Single Point Mutations, *Protein Engineering Design & Selection* 29:231-243 (2016).
70. Calero-Rubio C, Saluja A, Roberts CJ\* Coarse-grained antibody models for "weak" protein-protein interactions from low to high concentrations *J Phys Chem B* 120:6592-6605 (2016).
71. Calero-Rubio C, Paik BA, Jia X, Kiick KL\*, Roberts CJ\* Predicting unfolding thermodynamics and stable intermediates for alanine-rich helical peptides with the aid of coarse-grained molecular simulation. *Biophys Chem* 217:8-19 (2016).
72. Barnett GV, Drenski MC, Razinkov V, Reed WF\*, Roberts CJ\* Protein aggregation mechanisms and kinetics from combined monomer depletion rates and continuous scattering *Analytical Biochem* 511:80-91 (2016).

73. Barnett GV, Razinkov V, Kerwin BA, Blake S, Qi W, Curtis RA, Roberts CJ\* Reply to Comment on Osmolyte Effects on Monoclonal Antibody Stability and Concentration-Dependent Protein Interactions with Water and Common Osmolytes. *J Phys Chem B* 120:11333-11334 (2016).
74. Bain DL, Brenowitz M, Roberts CJ. Commentary on higher education and next-generation researchers: Biophysical characterization, higher-order structure, and industrial/academic opportunities. *J Pharm Sci*. 105:3483-3486 (2016).
75. Meric UG, Robinson AS\*, Roberts CJ\* Driving forces for non-native protein aggregation and approaches for predicting aggregation-prone regions. *Ann Rev Chem Biomol Eng* 8 (2017), DOI: 10.1146/annurev-chembioeng-060816-101404
76. Mazzer A, Nanda T, Butler P, Roberts CJ, Clifton L, Bracewell DG\* Neutron reflectivity measurement of protein A -- antibody complex at the solid-liquid interface. *J Chromatography A*, 1499:118-131 (2017).
77. Rosa MF, Roberts CJ, Rodriguez MA\* Connecting High-Temperature and Low-Temperature Protein Stability and Aggregation, *PLoS One* (online only) DOI: 10/1371/journal.pone.0176748 (2017)
78. Woldeyes MA,\*\* Calero-Rubio C,\*\* Furst EM\*, Roberts CJ\* Predicting protein interactions in concentrated globular protein solutions using colloidal models *J Phys Chem B* 121:4756-4767 (2017).
79. Calero-Rubio C, Strab C, Barnett GV, Roberts CJ\* Protein partial molar volumes in multi-component solutions from the perspective of inverse Kirkwood-Buff theory. *J Phys Chem B* 121:5897-5907 (2017).
80. Yang D, Kroe-Barrett R, Singh S, Roberts CJ, Laue TM\* IgG cooperativity – is there allostery? Implications in therapeutic antibody development. *mAbs* 9:1231-1252 (2017).
81. Calero-Rubio C, Saluja A, Ghosh R, Roberts CJ\* Predicting high-concentration monoclonal antibody interactions with dilute solution data and coarse-grained molecular simulations. *J Pharm Sci* (in press).

#### Book Chapters

1. Roberts CJ. Non-native protein aggregation: pathways, kinetics, and shelf-life prediction, in *Misbehaving Proteins: Protein (Mis)Folding, Aggregation, and Stability*, Murphy, R. M. & Tsai, A. M. Eds., Springer-Verlag: New York, NY 2006.
2. Roberts CJ. Irreversible protein aggregation: principles and rationale for common stabilization strategies, in *Encyclopedia of Agricultural, Food, and Biological Engineering*, Heldman, D., Ed., Taylor and Francis, 2006. (<http://www.dekker.com/sdek/issues~db=enc~content=t713172957>)
3. Li Y, Roberts CJ\* Protein Aggregation Pathways, Kinetics, and Thermodynamics, in *Aggregation of Therapeutic Proteins*. Wang, W & Roberts, CJ, Eds., John Wiley & Sons: New York, NY 2010.
4. Roberts, CJ Nucleation, Aggregation, and Conformational Distortion, Ch. 5 in *Biophysical Methods for Biotherapeutics: Discovery and Development Applications*, Das, TK (Ed.), John Wiley & Sons, Hoboken, NJ, 2014.
5. S. Ewing, A. Hussain, G. Collins, C. Roberts, E. Shalaev. Low-Temperature Mobility of Water in Sugar Glasses: Insights from Thermally Stimulated Current Studies, in *Water Stress in Biological, Chemical, Pharmaceutical, and Food Systems*, G. F. Gutierrez-Lopez, L. Alamilla-Beltran, M. del Pilar Buera, J. Welti-Chanes, E. Parada-Arias, G. V. Barbosa-Canovas (Eds.), Springer, New York (2015).

#### Books

*Aggregation of Therapeutic Proteins*, Eds. W. Wang and C. J. Roberts, John Wiley & Sons: New York, NY (2010).

#### Patents

*Device and method for determining reaction kinetics*, C. J. Roberts, G. V. Barnett, V. I. Razinkov, B. A. Kerwin, US Patent 9,632,095 (2017)

#### Research Presentations and Lectures

##### *Plenary / Keynote / Named Lectures*

1. Protein Engineering Summit, Lisbon, Portugal (2017).
2. Biologics by Design, Boston, MA (2017).
3. ACS Colloid & Surface Science Symposium, New York, NY (2017).
4. Inaugural John Finlayson Lecture, US Food and Drug Administration, Silver Spring, MD (2016).

5. Symposium for the Relevance of Protein Aggregation in Biologics and Vaccines Development, Merck & Co., Kenilworth, NJ (2016).
6. Advanced Biomanufacturing Centre, University of Sheffield, Sheffield, United Kingdom (2015).
7. Protein Engineering Summit, Boston, MA (2015).
8. International Symposium on Polymer Analysis and Characterization, New Orleans, LA (2013).
9. International Light Scattering Conference, Santa Barbara, CA (2012).
10. 2012 Biomolecular Interaction Technologies Conference, Durham, NH (2012).
11. XV International Congress on Rheology, Lisbon, Portugal (2012).
12. CHI Bioprocessing Summit, Boston, MA (2012).
13. Symposium on Biopharmaceutical and Pharmaceutical Applications, CALCON, Oahu, HI (2011).
14. AAPS Chapter Annual Pharmaceutics Lecture, Department of Pharmaceutical Chemistry, University of Kansas, Lawrence, KS (2006).

*Invited*

15. Computational Drug Development for Biologics, Boston, MA (2017)
16. Boehringer Ingelheim Pharmaceuticals, Ridgefield, CT (2017)
17. Novo Nordisk, Copenhagen, Denmark (2017)
18. BioProNet Annual Meeting, University of Warwick, Warwick, United Kingdom (2017)
19. Bioprocessing Summit, Boston, MA (2017)
20. Protein Engineering Summit, Boston, MA (2017)
21. Department of Pharmaceutical Chemistry, University of Kansas, Lawrence, KS (2017)
22. Janssen Pharmaceuticals, Spring House Station, PA (2017)
23. Workshop on Recent Breakthroughs and New Perspectives on Protein Aggregation, University of Manchester, United Kingdom (2017)
24. Mid-Atlantic Soft Matter Conference, Newark, DE (2017)
25. Advances in Biophysical Methods for Protein Characterisation, Palermo, Italy (2016)
26. Merck Research Laboratories, West Point, PA (2016)
27. Dept. of Biochemistry and Molecular Biology, University of Kansas Medical Center, Kansas City, KS (2016)
28. Protein Engineering Summit, Boston, MA (2016)
29. Eli Lilly, Indianapolis, IN (2016)
30. Amgen, Thousand Oaks, CA (2016)
31. Department of Pharmaceutical Sciences, University of Connecticut, Storrs, CT (2015).
32. IABS, Progress and Challenges for Particle Formation and Immunogenicity of Biotherapeutics 2015, Rockville, MD (2015).
33. Bristol-Myers Squibb Biologics Development Organization, Pennington, NJ (2015)
34. AAPS Annual Meeting, Orlando, FL (2015).
35. Department of Pharmaceutical Sciences, University of Kentucky, Lexington, KY (2015).
36. Higher Order Structure Conference, Boston, MA (2015).
37. PepTalk, Cambridge Healthtech Institute, San Diego, CA (2015).
38. AbbVie, Worcester, MA (2014).
39. Merck Research Laboratories, Kenilworth, NJ (2014).
40. Neutron Characterisation in Fundamental and Applied Biotechnology, Abingdon, UK (2014).
41. Bioprocessing Summit, Boston, MA (2014).
42. Biological and Pharmaceutical Complex Fluids II, Durham, NC (2014).
43. Teva Pharmaceuticals, Rockville, MD (2014).
44. Department of Chemical Engineering, University of California, Santa Barbara, CA (2014).
45. Institute for Bioscience and Biotechnology Research, University of Maryland, Rockville, MD (2014).
46. Colorado Protein Stability Meeting, Breckenridge, CO (2013)
47. Malvern Instruments, Columbia, MD (2013).
48. Departmental Seminar, Preclinical Development, Regeneron Pharmaceuticals, Tarrytown, NY (2013).
49. Department of Chemical and Biological Engineering, Princeton University, Princeton, NJ (2013).
50. Department of Chemical Engineering, University of Texas, Austin, TX (2012).
51. Department of Chemical Engineering, University of Virginia, Charlottesville, VA (2012).
52. American Association of Pharmaceutical Sciences Annual Meeting, Chicago, IL (2012).
53. Peck Symposium, College of Pharmacy, Purdue University, West Lafayette, IN (2012).
54. Department of Pharmaceutical Sciences, University of Kentucky, Lexington, KY (2012).

55. ECI, Biological and Pharmaceutical Complex Fluids: New Trends in Characterizing Microstructure, Interactions & Properties, Tomar, Portugal (2012).
56. American Conference on Neutron Scattering, Washington, D.C. (2012).
57. Process Development Department, Genentech, South San Francisco, CA (2012).
58. University of Manchester Interdisciplinary Biosciences, Manchester, United Kingdom (2012).
59. Bioprocess International Annual Conference, Prague, Czech Republic (2012).
60. Formulation Sciences, Allergan, Inc., Irvine, CA (2012).
61. Department of Chemical Engineering, Lehigh University, Bethlehem, PA (2012).
62. Department of Chemical and Biomolecular Engineering, Univ. of Maryland, College Park, MD (2011).
63. Departmental seminar, Drug Product Development, Amgen, Seattle, WA (2011).
64. Department of Biotherapeutics R&D, Boehringer-Ingelheim Pharmaceuticals, Ridgefield, CT (2011).
65. World Pre-Filled Syringes Summit, Tyson's Corner, VA (2011).
66. Laboratory of Biochemistry and Genetics, National Institute of Diabetes, Digestive, and Kidney Disorders, Bethesda, MD (2011).
67. 1<sup>st</sup> International Symposium on Higher-Order Structure of Protein Therapeutics, Rockville, MD (2011).
68. Drug Product Science & Technology R&D Seminar, Bristol Myers Squibb, New Brunswick, NJ (2011).
69. Colorado Protein Stability Conference, Breckenridge, CO (2011).
70. Symposium on Databases, Global Analysis, Modeling, and Simulations, CALCON, Oahu, HI (2011).
71. CHI Protein Engineering Summit, Boston, MA (2011).
72. Institute of Biophysics, National Research Council of Italy (Consiglio Nazionale della Ricerche), Palermo, Italy (2011).
73. Novo Nordisk Biophysics Symposium, Copenhagen, Denmark (2011).
74. Department of Chemical and Biomolecular Engineering, Tulane University, New Orleans (2011).
75. XV School of Pure and Applied Biophysics, Venice, Italy (2011).
76. Protein Sciences, Inc., Meridan, CT (2010).
77. New Cell, New Vaccines Conference, Wilmington, DE (2010).
78. Department of Biochemical Engineering, University College London, London UK (2010).
79. Chemical Science & Technology Laboratories, Departmental Seminar, National Institute of Standards and Technology, Gaithersburg, MD (2010).
80. Bioproduct R&D Departmental Seminar, Eli Lilly & Co., Indianapolis, IN (2010).
81. Food and Drug Administration, Bethesda, MD (2010).
82. SANS Seminar Series, National Institute of Standards and Technology, Gaithersburg, MD (2010).
83. Cambridge Health Institute, Protein Aggregation Conference, San Diego, CA (2010).
84. Wyeth Vaccine Research, Pearl River, NY (2009).
85. BD Sensitive Drug Initiative 2009 Science and Technology Forum, San Francisco, CA (2009).
86. IIR BioProduction Conference, Barcelona, Spain (2009).
87. Colorado Protein Stability Conference, Breckenridge, CO (2009).
88. National Institute of Standards and Technology, Gaithersburg, MD (2009).
89. CALCON, Santa Fe, NM (2009).
90. AAPS National Biotechnology Conference, Seattle, WA (2009).
91. Fraunhofer, Inc., Newark, DE (2009)
92. ARO Enzyme Stability Workshop, Key West, FL (2008).
93. Dept. of Chemical and Biological Engineering, Rensselaer Polytechnic Institute, Troy, NY (2008).
94. EMD Chemicals Inc., Gibbstown, NJ (2008).
95. Biomolecular Interaction Technologies Conference, Durham, NH (2008)
96. Recovery of Biological Products XIII, Québec City, Québec (2008).
97. AAPS National Biotechnology Conference, Toronto, Ontario (2008).
98. RISE seminar series, College of Natural Sciences, University of Puerto Rico – Rio Piedras (2008).
99. Symposium on Biophysics and Multiscale Modeling, ACS Spring Meeting, New Orleans, LA (2008)
100. IIR 5<sup>th</sup> Annual Formulation & Forced Degradation Strategies for Biomolecules, San Diego, CA (2008)
101. Computational Biology Seminar Series, Washington University at St. Louis, St. Louis, MO (2007).
102. Department of Chemical Engineering, Purdue University, West Lafayette, IN (2007).
103. Parenteral Center of Emphasis, Pfizer Global R&D, Groton, CT (2007).
104. Department of Chemical and Biological Engineering, University of Colorado – Boulder (2007).
105. Merck Bioprocess R&D, Rahway, NJ (2007)
106. Bristol-Myers Squibb, New Brunswick, NJ (2007)
107. Biochemical Engineering XV, Québec City, Québec (2007)
108. AAPS National Biotechnology Conference, San Diego, CA (2007).

109. Dept. of Chemical and Biochemical Engineering, University of Maryland – Baltimore County (2007).
110. Department of Pharmaceutical Sciences, University of Kentucky (2007).
111. Department of Pharmaceutical Sciences, University of Connecticut (2007).
112. Society of Biological Engineering Meeting, Coronado, CA (2007).
113. Department of Chemical and Biological Engineering, University of Wisconsin (2007).
114. Pfizer Global R&D, St. Louis, MO (2006).
115. Glaxo-Smith Kline, King of Prussia, PA (2006).
116. Amgen, Inc., Thousand Oaks, CA (2005).
117. Centocor, Inc., Malvern, PA (2005).
118. American Association of Pharmaceutical Scientists Annual Meeting, Nashville, TN (2005).
119. 5<sup>th</sup> Annual IBC Formulation Strategies for Protein Therapeutics, Boston, MA (2005).
120. Colorado Protein Stability Conference, Breckenridge, CO (2005).
121. Midwest Thermodynamics and Statistical Mechanics Conference, Purdue University (2005).
122. Bristol-Meyers Squibb, Pennington, NJ (2005).
123. DuPont Experimental Station, Wilmington, DE (2004).
124. 4<sup>th</sup> Annual IBC Formulation Strategies for Protein Therapeutics, Boston, MA (2004).
125. Barnett Protein Aggregation Conference, Phila., PA (2004).
126. Protein Society Annual Meeting, San Diego, CA (2004).
127. Freeze-Drying of Pharmaceuticals and Biologicals Conference, Breckenridge, CO (2004).
128. Chemistry-Biology Interface Seminar, University of Delaware (2003).
129. 3<sup>rd</sup> Annual IBC Conference on Protein Formulation and Stability, Philadelphia, PA (2003).
130. International Workshop on Non-Equilibrium Thermodynamics and Complex Fluids, Princeton, NJ (2003).
131. Merck Bioprocess Symposium, West Point, PA (2003).
132. AAPS Short Course, *Understanding Amorphous Pharmaceutical Systems*, AAPS Annual Meeting, Toronto, Ontario (2002).

*Accepted from open submissions (underline indicates presenter)*

133. J. Pathak, S. Nugent, M. Bender, C. Calero-Rubio, M. Woldeyes, D. Corbett, R. Curtis, E. Furst, C. Roberts, J. Douglas, Society of Rheology Meeting, Denver CO (2017)
134. G. M. Ferreira, H. Sharma, R. Remmele Jr., C. J. Roberts, ACS Spring National Meeting, San Francisco, CA (2017)
135. M. A. Woldeyes, L. L. Josephson, W. Galush, C. J. Roberts, E. M. Furst, ACS Spring National Meeting, San Francisco, CA (2017)
136. C. Calero-Rubio, A. Saluja, C. J. Roberts, ACS Spring National Meeting, San Diego, CA (2016).
137. M. A. Woldeyes, V. Razinkov, E. M. Furst, C. J. Roberts, ACS Spring National Meeting, San Diego, CA (2016)
138. M. A. Woldeyes, C. J. Roberts, E. M. Furst, Society of Rheology Meeting (2015).
139. G. V. Barnett, V. Razinkov, B. A. Kerwin, C. J. Roberts, ACS Spring National Meeting, Denver, CO (2015).
140. R. Ghosh, C. Calero-Rubio, A. Saluja, C. J. Roberts, ACS Spring National Meeting, Denver, CO (2015).
141. C. J. Roberts, G. V. Barnett, B. A. Kerwin, V. Razinkov, Amorph 2014, Cambridge, UK (2014).
142. C. J. Roberts, V. K. Shen, ACS Spring National Meeting, Dallas, TX (2014).
143. C. J. Roberts, M. A. Blanco, AIChE Annual Meeting, San Francisco, CA (2013).
144. M. A. Blanco, T. Perevozchikova, E. Martorana, M. Manno, C. J. Roberts, ACS Spring National Meeting, New Orleans, LA (2013).
145. C. J. O'Brien, M. A. Blanco, J. A. Costanzo, E. J. Fernandez, A. S. Robinson, C. J. Roberts, ACS Spring National Meeting, New Orleans, LA (2013).
146. T. Perevozchikova, H. Nanda, R. L. Jones, C. J. Roberts, ACS Spring National Meeting, New Orleans, LA (2013).
147. R. Jones, T. Perevozchikova, K. Weigandt, C. J. Roberts, Society of Rheology Meeting, Pasadena, CA (2013).
148. J. Wiesbauer, R. Meier, C.J. Roberts, B. Nidetzky, 4<sup>th</sup> ÖGMBT Annual Meeting, Graz, Austria (2012).
149. J. Wiesbauer, R. Meier, C. J. Roberts, B. Nidetzky, NAWI Graz Doctoral School of Molecular Biosciences and Biotechnology. Graz, Austria (2012).
150. J. A. Costanzo, C. J. O'Brien, E. Sahin, E. Tamargo, K. Tiller, A. S. Robinson, C. J. Roberts, E. J. Fernandez, ACS Spring Annual Meeting, San Diego, CA (2012).
151. M. A. Blanco, J. Costanzo, C. J. O'Brien, E. J. Fernandez, A. S. Robinson, C. J. Roberts, ACS Spring Annual Meeting, San Diego, CA (2012).

152. C. J. Roberts, E. Sahin, M. Blanco, T. K. Das, AIChE Fall Meeting, Minneapolis, MN (2011)
153. J. A. Costanzo, E. Sahin, C. O'Brien, E. Tamargo, K. Tiller, A. S. Robinson, C. J. Roberts, E. J. Fernandez, ACS Spring National Meeting, Anaheim, CA (2011).
154. C. J. Roberts, D. P. Nesta, R. K. Brummitt, ACS Spring National Meeting, Anaheim, CA (2011).
155. M. A. Blanco, E. Sahin, A. Gruenberger, C. J. Roberts, AIChE Annual Meeting, Salt Lake City, UT (2010).
156. E. Sahin, A. O. Grillo, M. D. Perkins, C. J. Roberts, ACS Spring National Meeting, San Francisco, CA (2010).
157. W. F. Weiss IV, A. Zhang, E. Sahin, E. J. Fernandez, C. J. Roberts, AIChE Fall Meeting, Nashville, TN (2009).
158. R. K. Brummitt, L. Chang, D. P. Nesta, C. J. Roberts, ACS Annual Meeting, Washington D.C. (2009)
159. J. L. Jordan, E. Sahin, A. S. Robinson, C. J. Roberts, E. J. Fernandez, ACS Annual Meeting, Washington D.C. (2009)
160. A. Zhang, E. Sahin, W. F. Weiss IV, K. L. Kiick, C. J. Roberts, E. J. Fernandez, ACS Annual Meeting, Washington D.C. (2009)
161. (poster) E. Sahin, J. L. Jordan, A. S. Robinson, E. J. Fernandez, C. J. Roberts, Colorado Protein Stability Conference, Breckenridge, CO (2009)
162. (poster) E. Sahin, A. O. Grillo, M. D. Perkins, C. J. Roberts, Colorado Protein Stability Conference, Breckenridge, CO (2009)
163. T. M. Young, C. J. Roberts, AIChE Annual Meeting, Philadelphia, PA (2008)
164. Y. Li, B. A. Ogunnaike, C. J. Roberts, AIChE Annual Meeting, Philadelphia, PA (2008)
165. Y. Li, B. A. Ogunnaike, C. J. Roberts, ACS Annual Fall Meeting, Philadelphia, PA (2008)
166. A. Top, K. L. Kiick, C. J. Roberts, ACS Annual Fall Meeting, Philadelphia, PA (2008)
167. T. M. Young and C. J. Roberts, AIChE Annual Meeting, Salt Lake City, UT (2007)
168. P. P. Shah and C. J. Roberts, AIChE Annual Meeting, Salt Lake City, UT (2007)
169. W. F. Weiss IV, A. M. Lenhoff, C. J. Roberts, ACS National Fall Meeting, Boston, MA (2007)
170. M. L. Spataro, C. J. Roberts, A. S. Robinson, ACS National Fall Meeting, Boston, MA (2007)
171. J. M. Andrews, C. J. Roberts, AIChE Annual Meeting, San Francisco, CA (2006).
172. J. M. Andrews, C. J. Roberts, AIChE Annual Meeting, Cincinnati, OH (2005).
173. E. M. O'Dea, R. S. Farmer, K. L. Kiick, C. J. Roberts, ACS Spring Meeting, San Diego, CA (2005).
174. J. M. Andrews, E. M. O'Dea, C. J. Roberts, AIChE Annual Meeting, Austin, TX (2004).
175. P. P. Shah, C. J. Roberts, AIChE Annual Meeting, Austin, TX (2004).
176. C. J. Roberts, D. J. Caravoulis, J. H. Nonnemacher, AIChE Annual Mtg., Indianapolis, IN (2003).
177. C. J. Roberts, J. M. Roberts, J. F. Blake, ACS Annual Meeting, Boston, MA (2002).
178. C. J. Roberts, J. M. Roberts, J. F. Blake, AIChE Annual Meeting, Indianapolis, IN (2002).
179. C. J. Roberts, R. T. Darrington, M. B. Whitley, AIChE Annual Meeting, Indianapolis, IN (2002).

## Post-Doctoral Researchers Supervised

1. Erinc Sahin (Ph.D Biochemistry, U. Delaware); 2008 – 2011; current employer, Bristol-Myers Squibb.
2. Tatiana Perevozchikova (Ph.D. Biochemistry, U. Tennessee); 2012 – 2014; current employer, GlaxoSmithKline.
3. Ranendu Ghosh (Ph.D. Structural Biology & Bioinformatics, U. Calcutta); 2013 – 2015; current employer, Biocon Research Ltd.
4. Marco A. Blanco (Ph.D. Chemical Engineering, U. Delaware); 2014; current employer, National Institute of Standards and Technology and University of Maryland.
5. Joel Roevner (Ph.D. Physics, Johns Hopkins University), co-advised with S. Hudson and E. Furst; 2013-2015.
6. Subhashandra Naik (Ph.D. Chemistry and Molecular Biology, University of Kansas); 2014 - 2017; current employer, ReForm Biologics.

## Graduate and Undergraduate Research Students Supervised

### Previous Graduate Students

#### *Ph.D. Degrees*

1. Prateek P. Shah (Ph.D., Spring 2008; “Thermodynamics of Apolar Solvation in Mixed-Aqueous Solvents”) current employer: Exxon-Mobil.

2. Jennifer M. (Andrews) Woods (Ph.D., Summer 2008; “Non-Native Aggregation of alpha-Chymotrypsinogen A from a Combined Experimental and Modeling Approach”) current employer: self-employed.
3. Yi Li; secondary advisor, B. A. Ogunnaike (Ph.D., Summer 2009; “Global Nonnative Aggregation Behavior for alpha-Chymotrypsinogen A”) current employer: Sanofi-Genzyme.
4. Michelle L. Spatara; primary advisor, A. S. Robinson (Ph.D., Fall 2009; “Protein folding and aggregation: in vitro and in vivo”) current employer: GlaxoSmithKline
5. Teresa M. Young (Ph.D., Winter 2009; “Statistical Thermodynamics of Cluster Formation in Dilute Colloidal and Coarse-Grained Protein Solutions”) current employer: OSIssoft
6. William F. Weiss IV; secondary advisor, A. M. Lenhoff (Ph.D., Winter 2009; “Nonnative Aggregation of alpha-Chymotrypsinogen A and Related Systems”) current employer: Eli Lilly & Co.
7. Rebecca K. (Brummitt) Kalman (MChE, 2008; Ph.D., Summer 2010; “Biophysical and Mechanistic Characterization of Non-Native Aggregation of an IgG1 Antibody”) current employer: Georgia Gwinnett College.
8. Marco A. Blanco (Ph.D., Fall 2013; “Protein-Protein Interactions and Cluster Formation from Scattering Experiments and Coarse-Grained Molecular Models”) current employer: University of Maryland; National Institute of Standards and Technology.
9. Haixia (Helen) Wu (Ph.D., Fall 2015; “pH- and Temperature-Dependent Mechanisms of Non-Native Aggregation of Anti-CD40 IgG1”) current employer: Boehringer-Ingelheim Pharmaceuticals.
10. Gregory V. Barnett (Ph.D., Fall 2015; “Mechanistic Insights Into the Role of Protein Interactions on The Aggregation Behavior of Anti-Streptavidin IgG1”) current employer: Bristol-Myers Squibb.
11. Ronald W. Maurer (Ph.D., Fall 2016; “Biophysical Characterization of Folding and Aggregation Behavior of Model Single- and Multi-domain Proteins”) current employer: Bristol-Myers Squibb.
12. Cesar Calero-Rubio (Ph.D., Fall 2017; “Protein Interactions, Unfolding, and Aggregation from Low to High Protein Concentrations via Coarse-Grained Molecular Modeling and Experimental Characterization”) current employer: Sanofi-Genzyme
13. Christopher J. O'Brien; secondary advisory, A. S. Robinson (Ph.D., Fall 2017; “Colloidal Protein-Protein Interactions as a Design Target for Aggregation Resistance”) current employer: Sanofi-Genzyme

#### *M.ChE degrees*

1. Rebecca Brummitt (Spring 2008), continued to Ph.D. at UD.
2. Nayoung (Kim) Park (Spring 2012) current position: graduate student, Rice University (Ph.D. program).

#### *Ph.D. Candidates*

- Gulsum Meric (co-advised with A. Robinson; expected grad. Spring 2018)
- Mahlet Woldeyes (co-advised with E. Furst; expected grad. Spring 2018)
- Diana Gomes (co-advised with M. Rodriguez, Univ. Lisbon; expected grad. Fall 2018)
- Maria Papachristodolou (co-advised with D. Bracewell, UCL; expected grad. Fall 2018)
- Glenn Ferreira (expected grad. Spring 2019)
- Caitlin Wood (co-advised with E. Furst; expected grad. Spring 2020)
- Hassan Shahfar (expected grad. Spring 2021)
- Jordan Berger (expected grad. Spring 2022)

#### *Visiting Students*

Alexander Grünberger (University of Karlsruhe), Nov. 2009 – June 2010  
 Hsiang-Yun (Stella) Wang (National Taiwan University), Sep. 2010 – May 2011  
 Pin-Kuang (Jeff) Lai (National Taiwan University), Sep. 2010 – Aug. 2011  
 Johanna Weisbauer (Grätz University), Jan. – Mar. 2012  
 Monica Rosa (Technical University of Lisbon), June 2014 – August 2014.  
 Diana Gomes (Technical University of Lisbon), February 2016 – present

#### *Rotation Students*

Ana Fuzaylova (CHEM; Chemistry-Biochemistry Interface Program, Fall 2005)  
 Sarah Yerkes (BIOL; Chemistry-Biochemistry Interface Program, Fall 2007)  
 Brandy Haines (BIOL; Chemistry-Biochemistry Interface Program, Fall 2010)

Mackenzie Lauro (CHEM; Chemistry-Biochemistry Interface Program, Fall 2011)

## Undergraduate Students

### *Honors Senior Theses*

- Dean J. Caravoulas (BChE `03), “An investigation of the intrinsic kinetics of irreversible protein aggregation using  $\alpha$ -chymotrypsinogen”; current employer, Merck & Co.
- Erin M. O’Dea (BChE `05), “Thermodynamic and kinetic characterization of the unfolding and aggregation of a synthetic polypeptide”; current employer: Merck & Co.
- William Rayfield (BChE `05), “Investigation into the cross-aggregation of  $\alpha$ -chymotrypsinogen A and ribonuclease A”; current employer: Merck & Co.
- Lindsay M. Argust (BChE `06), co-advised by Prof. Kristi Kiick, MSEG, “Sequence and solvent effects on the aggregation and unfolding of synthetic polypeptides”; current employer: SABIC Innovative Plastics.
- Justin Quon (BChE `07), “Unfolding thermodynamics, kinetics, and mechanisms of aggregation of recombinant bG-CSF”; current employer: Dept. of Chemical Engineering, M.I.T. (post-doctoral researcher).
- Rebecca K. Pagels (BChE `09), “Accelerated stability and approaches to predict protein aggregation kinetics and effects of Hofmeister salts”; current employer: Proctor & Gamble.
- Andrew M. Kroetsch (BChE `10), “Phase Behavior of Non-Native Protein Oligomers and Polymers”; current employer: Bristol-Myers Squibb.

### *Undergraduate & High School Research Students (non-thesis)*

- Michael Wang (BChE `03), Josh Brugger (BChE `04), Theresa Beinke (BChE `04), Joseph Robinson (BChE `04), Randall Press (BChE `05), Matthew Mitsche (BChE `06), Steven Zaritsky (BChE `08), Brian Kennedy (BChE `08), Deepthi Cherian (BSc – Biol. Sci. `09), Aaron Morris (GA Tech), Atish Parekh (IIT-Bombay), Maciej Murakowski (BChE `10), Brendan MacLean (BECE `10), Jessica Gryga (BChE class of `12), Kee-Siang Chuah (Imperial College London), Sintia Krizman (CHEM class of `13), Raymond Asare (high school intern, 2011), Matthew Enterline (BChE class of `14), William Faciolo (BChE class of `15), Ryan Dudek (BChE class of `15), Samuel Schenkman (BChE class of `15), Ian Leblanc (BChE class of `15), Marianna Fleischman (BChE class of `15), Mairead Haiger (high school intern, 2014), Daniel Castle (high school intern, 2014, 2015, 2016), Matthew Weber (class of `17), Alexander Hillsley (class of `17), Carly Battistoni (class of `18), Curtis Strab (class of `17), Gabrielle Parker (class of `18), Michael Paisner (class of `18), Grace Michaels (class of `19).

## **Courses Instructed**

### *Undergraduate Core Courses*

- CHEG 445 Chemical Engineering Laboratory II; *Fall 2002, Fall 2003.*
- CHEG 305 Applied Math for Chemical Engineering, co-instructed with G. Schleiniger (Mathematical Sciences); *Spring 2003, Spring 2004.*
- CHEG 443 Mass Transfer Operations, co-instructed with D. Short; *Fall 2003, Fall 2004, Fall 2005, Fall 2006, Fall 2007, Fall 2008* (also w/ E. Papoutsakis for Fall 2008), co-instructed with Y. Yan for *Fall 2012 and Fall 2013*
- CHEG 342 Heat and Mass Transfer, co-instructed with T.W. F. Russell and M. O’Malley (graduate teaching fellow), *Spring 2007*; co-instructed with N. J. Wagner, *Spring 2008.*
- CHEG 345 Chemical Engineering Laboratory I; co-instructed with A. M. Lenhoff, *Spring 2008.*
- CHEG 231 Chemical Engineering Thermodynamics I; co-instructed with D. J. Buttrey and J. L. Albert (graduate teaching fellow), *Fall 2009*
- CHEG 112 Introduction to Chemical Engineering; co-instructed with W. Chen and M. O. Sullivan, *Spring 2012*; co-instructed with W. Chen, *Spring 2014*; co-instructed with J. Richards, *Spring 2015*; co-instructed with A. Jayaraman and J. Enzser *Spring 2016.*

### *Graduate Courses and Upper Level Undergraduate / Graduate Electives*

- CHEG 867 Principles of Molecular Simulation; co-instructed with N. J. Wagner, *Spring 2003*.
- CHEG 867 Biophysical Principles, Characterization, and Technologies, *Fall 2014, Fall 2015*
- CHEG 828 Statistical Thermodynamics; *Spring 2005, Spring 2009, Spring 2011, Spring 2013*.
- CHEG 667 Biochemical Engineering II / Bio-Pharmaceutical Formulation Science and Engineering; *Spring 2006, Spring 2011*; co-instructed with D. Colby, *Spring 2012*.
- CHEG 825 Chemical Engineering Thermodynamics; co-instructed with S. Lustig, *Fall 2011*; co-instructed with C. Kloxin, *Fall 2017*

## Professional Service

### External Service

#### Organization of Technical Conferences

ACS BIOT “Biomolecular & Biophysical Processes” Area Programming Co-Chair – Spring ACS National Meeting, New Orleans, LA (2013)

ACS BIOT “Therapeutic Proteins; Biomolecular & Biophysical Processes” Area Programming Co-Chair – Spring ACS National Meeting, San Diego, CA (2012)

ACS BIOT “Down-Stream Processing” Area Programming Co-Chair – Fall ACS National Meeting, Washington, D.C. (2009)

*Amorph 2006*, Conference Convenor and Lead Organizer, Cambridge, UK (2006)

Neutron Characterisation and Fundamentals in Applied Biotechnology, Member of Organizing Committee, Oxford, UK (2014)

*Amorph 2014*, Member of Organizing Committee, Cambridge, UK (2014)

*BITC Annual Symposium*, Newark, DE (2014, 2016)

*Advances in Biophysical Methods for Protein Characterisation*, conference co-chair, Palermo, Italy (2016)

Co-Chair, Gordon Research Conference, *Development of Biotherapeutics and Vaccines*, Galveston, TX (2019)

#### Session Chair for Technical Conferences

Gordon Research Conference, “Water and Aqueous Solutions”, Holderness, NH, 2002

AIChE Annual Meeting, Indianapolis, IN, 2002.

AIChE Annual Meeting, San Francisco, CA, 2003. (3 sessions)

AIChE Annual Meeting, Austin, TX, 2004. (3 sessions)

IBC Formulation Strategies for Protein Therapeutics, Boston, MA, 2004.

AIChE Annual Meeting, Cincinnati, OH, 2005. (2 sessions)

AAPS Annual Meeting, Nashville, TN, 2005.

IBC Formulation Strategies for Protein Therapeutics, Boston, MA, 2005.

ACS Fall National Meeting, San Francisco, CA, 2006.

AIChE Annual Meeting, San Francisco, CA, 2006. (2 sessions)

ACS Fall National Meeting, Boston, MA, 2007.

AIChE Annual Meeting, Salt Lake City, UT, 2007. (2 sessions)

Biochemical Engineering XV, Quebec City, Quebec, 2007.

ACS Fall National Meeting, Philadelphia, PA, 2008.

AIChE Annual Meeting, Salt Lake City, UT, 2010

ACS Spring National Meeting, Anaheim, CA, 2011.

AAPS National Biotechnology Conference, San Francisco, 2011.

Cambridge Health Institute Protein Engineering Summit, Boston, MA 2011.

BPI European Conference, Prague, CZ 2012.

ACS Spring National Meeting, New Orleans, LA 2013.

ACS Spring National Meeting, Denver, CO 2015 (2 sessions).

#### External Service Committees & Advisory Boards

Member, AAPS Student/Post-Doc Outreach & Development (SPOD) Committee (2014 – 2016)

Member, AAPS Physical Pharmacy and Biopharmaceutics (PPB) Committee (2014 – 2016)

Member, Scientific Advisory Board, PIPPI consortium, Denmark (2016 – present)

Member, Editorial Advisory Board, *J Pharm Sci* (2017-present)

Reviewer for private and federal funding agencies:

American Chemical Society – Petroleum Research Fund  
National Science Foundation (BBBE and CTS divisions)  
National Institutes of Health (Biomaterials and Biointerfaces Study Section)  
Biotechnology and Biological Sciences Research Council (UK)

External committee member of non-UD Ph.D. theses:

Jacob Jordan (Ph.D. '09; University of Virginia)  
Joseph Costanzo (Ph.D. '12; University of Virginia)  
Daniel Weinbuch (Ph.D. '16; Leiden University)  
Spyros Charonis (Ph.D. '16; University of Manchester)  
Danlin Yang (Ph.D. '17; University of New Hampshire)

***Internal Service – Department of Chemical and Biomolecular Engineering***

Associate Chair for Undergraduate Studies (2017 – present)  
Director, Center for Biomanufacturing Science and Technology (2015 – present)  
Graduate Program Co-Director for Dept. of Chemical and Biomolecular Engineering (2008 - 2014)  
Academic advisor (20-30 undergraduates per year) in Chemical Engineering (2002-present)  
Incoming Freshman Honors Student Advising (Summer 2003)  
Member, Department of Chemical Engineering Graduate Curriculum Committee (2004-2008)  
Chair, Department of Chemical Engineering Graduate Studies Committee (2009-present)  
Member, Department of Chemical Engineering Undergraduate Curriculum Committee (2008-2014)  
Member, Department of Chemical Engineering Safety Committee (2004-2007)  
Faculty Coordinator for Dept. of Chemical Engineering Seminar Series (2006 – 2007)  
Member, Faculty Search Committee, Chem. Eng. (2005 – 2006)

Member of Ph.D. and Masters thesis committees for current students (not listed) and 29 graduates (listed below with year thesis defended; non-CHEG students listed elsewhere)

Brenda Danek (Ph.D. '03); Jason Smith (Ph.D. '03); Maider Labourt-Ibarre (Ph.D. '05);  
Jason Myers (Ph.D. '05); Steven Garrison (Ph.D. '05); Ronald Niebauer (Ph.D. '05);  
Brian To (Ph.D. '06); Junghwa Kim (Ph.D. '06); Joseph Fedeyko (Ph.D. '06); Bryan  
Berger (Ph.D. '06); Sarah Lawrence (Ph.D. '06); John Langford (Ph.D. '07); Steven Bane  
(Ph.D. '07); Andre Dumetz (MChE '04, Ph.D. '07); Xuankuo Xu (Ph.D. '08); Carolina  
Bianco (Ph.D. '08); Egor Trilisky (Ph.D. '08); Stuart Collins (MChE '09); Ronald Maurer  
(MChE '09); Rachel Lewus (Ph.D. '11), Christopher Gillespie (Ph.D. '11), Brian Bowes (Ph.D.  
'11), Steven Traylor (Ph.D. '13), Kristin Valente (Ph.D. '14), P. Doug Godfrin (Ph.D. '15),  
Matthew Armstrong (Ph.D. '15), James Angelo (Ph.D. '16) Lilian Lam-Josepheson (Ph.D. '16), Daniel  
Greene (Ph.D. '16), Paul Mswame (Ph.D. '17)

Second reader for 11 Undergraduate Honors Senior Theses:

Vincent Verruto (BChE '03); John Bishop (BChE '03); Elizabeth Bell (BChE '05); Alison  
Wedekind (BChE '05); Sean Maloney (BChE '05); Scott Epstein (BChE '05); Marissa  
Herzog (BChE '05); Becky Gable (BChE '06); Elizabeth Oeffinger (BChE '06), Matthew Petroff  
(BChE '09)

***Internal Service – College of Engineering***

Director, Biomolecular Interaction Technologies Center (2014 – present)  
Member, College of Engineering First Year Curriculum Committee (2004-2005)  
Member, College of Engineering Freshman Course Committee (2005-2006)  
Chair, College of Engineering Elections Committee (2008-2010)  
Academic advisor to approx. 10 undergraduates majoring in Biomedical Engineering (2010-2014)

### ***Internal Service – University***

Member, biopharmaceutical innovation (BPI) building committee (2017)  
Member, faculty search committee, Mathematical Sciences (Fall 2011)  
Panel Member, New Faculty Orientation Workshop (October 2009)  
Faculty Advisor to the University of Delaware Student Chapter of the International Society of  
Pharmaceutical Engineers (2005-2009)

Ph.D. Committee Member for students in MSEG, CHEM, and MATH  
Robin Farmer (Ph.D., Materials Science and Engineering `06)  
Paula (Fallen) McGinley (Ph.D. Chemistry & Biochemistry `07)  
Danny Ramadan (Ph.D., Chemistry & Biochemistry `08)  
Ayben Top (Ph.D., Materials Science and Engineering `10)  
Shuang Liu (Ph.D., Materials Science and Engineering, `10)  
Yang Zhong (Ph.D., Chemistry & Biochemistry `11)  
Yan Song (Ph.D., Mathematical Sciences `14), Brice Ludwig (current student)

CBI Rotation Advisor:

A. Fuzaylova (Chemistry and Biochemistry, F04); S. Yerkes (Biological Sciences, F07);  
B. Haines (Biological Sciences, F10); Mackenzie Lauro (Chemistry and Biochemistry, F11)

Third reader for Undergraduate Honors Senior Theses:

Amanda Peters (AS `05); Heather Egolf-Fox (AS `05); Brian Gladnick(AS `05); Thomas Keane (AS `16);  
Jessica Mann (`16); Ryan Kozlowski (`16)