Elsa C. Y. Yan

Associate Professor

Department of Chemistry

Yale University

225 Prospect Street

New Haven, CT06511

Tel: (203) 436-2509

Email: [elsa.yan@yale.edu](mailto:elsa.yan@yale.edu)

Website: <http://ursula.chem.yale.edu/~yanlab/Index.html>

# Education

# 2000 Ph.D. (Distinction) Columbia University, New York, NY

Advisor: Prof. Kenneth B. Eisenthal

Thesis Title: *Second Harmonic Generation as a Surface Probe for Colloidal Particles*

* **1999** M.Phil. Columbia University, New York, NY
* **1996** M.A. Columbia University, New York, NY

# 1995 B.Sc. (First Class Honors) Chinese University of Hong Kong, Hong Kong

# Professional Appointments

**2012-** Associate Professor, Yale University, New Haven, CT

**2007-2012** Assistant Professor, Yale University, New Haven, CT

**2010-2013** Adjunct Associate Professor, Chinese University of Hong Kong, Hong Kong

**2004-2007** Postdoctoral Research Associate, Rockefeller University, New York, NY

**2005-2006** Adjunct Assistant Professor, Hunter College, CUNY, New York, NY

**2000-2004** Postdoctoral Fellow, UC Berkeley, CA(Mentor: Prof. Richard Mathies)

Visiting Fellow, Rockefeller University, New York, NY (Mentor: Prof. Thomas Sakmar)

###### 1995-2000 Research Assistant, Columbia University, New York, NY (Mentor: Prof. Kenneth Eisenthal)

# Honors and Awards

* **Elected Chair**, Gordon Research Conference: *Vibrational Spectroscopy*, Aug 2016
* **Elected Vice Chair**, Gordon Research Conference: *Vibrational Spectroscopy*, Biddeford, ME, Aug 2014
* **Early Excellent in Physical Organic Chemistry**, Journal of Physical Organic Chemistry, Oct 2012
* **The Greer Memorial Prize for Achievement in Research in Nature Sciences**, Yale University, New Haven, CT, Oct 2011.
* **Invited Speaker**, Symposium in Honor of 100th Anniversary of Marie Curie's Nobel Prize for International Year of Chemistry, ACS Meeting, Denver, CO, Aug 2011
* **2011 Tour speaker**, Society of Applied Spectroscopy, Frederick, MD, 2011
* **NSF CAREER Award**, the National Science Foundation, 2010.
* **ACS Petroleum Research Award for New Faculty**, Petroleum Research Fund, American Chemical Society, 2009.
* **Starter Grant Award** for high-qualityinnovative research by beginning chemistry professors**.** Spectroscopy Society of Pittsburgh, 2008.
* **Invited Speaker**, Gordon Research Conference: *Vibrational Spectroscopy*, Biddeford, ME, 2010
* **Invited Participant & Speaker**, Telluride Science Research Center Workshop: *Nonlinear Optics and Interfaces* and *Vibrational Dynamics* Telluride, CO, 2008-2010
* **Individual National Research Service Award** (F32 EY014308-01), Proposal title: Structure and Dynamics of the Primary Event in Vision, National Institutes of Health, Bethesda, MD, 2003. [Note: Priority Score: 101. Not activated due to a delay of issuing I-55 (Green) Card]
* **Full Scholarship**, International Conference on Retinal Proteins, Frauenchiemsee, Germany, 2004.
* **Travel Award**, the 31st Annual Meeting, American Society for Photobiology, 2003.
* **Summer Research Travel Award**, Summer Conference: The Biology and Chemistry of Vision, The Federation of American Society for Experimental Biology, 2003.
* **Distinction for Doctor of Philosophy**, Columbia University, New York, NY, 2000.
* **Pegram Award for excellent achievement in graduate research**, Department of Chemistry, Columbia University, New York, NY, 2000.
* **Graduate Faculty Fellowship**, Columbia University, New York, NY, 1995-2000.
* **Sir Edward Youde Memorial Scholarship** for outstanding academic achievement, Sir Edward Youde Memorial Fund Council, Hong Kong, 1994.
* **First Prize in the Chemistry Olympiad**, Hong Kong Chemical Society and UK Royal Society of Chemistry, 1993.
* **First Class Honors for Bachelor Degree of Science**, Chinese University of Hong Kong, Hong Kong, 1995.

# Publications at Yale: (\*Corresponding Author, #Undergraduate Student, and †Equal Contribution)

### (Link to all publications: <http://ursula.chem.yale.edu/~yanlab/Publications.html>)

1. **Yan, E.C.Y.\*** Fu, L.; Wang, Z. “Characterization of Chiral Vibrational Structures of Proteins and DNAs at Interfaces Using Chiral Sum Frequency Generation Spectroscopy” Invited Submission, *Chemical Review*, Jun **2014**
2. Guo, Y.; Skharan, S.; Liu, J.; Liu, M.Y.; Batista, V.S.; Tully, J.C.; **Yan, E.C.Y.\*** “Unusual Kinetics of Thermal Reactions of Rhodopsin: a 1070 Pre-exponential Factor in Arrhenius Model” *Submitted*
3. Guo, Y.; Young, K.; **Yan, E.C.Y.\*** Book Chapter: “Guided Inquiry and Project-Based Learning in Biophysical Spectroscopy” in *Teaching Bioanalytical Chemistry*, Edited by Harvey J. M. Hou, ACS Books, In press, **2013**
4. Liu, M.Y. #; Liu, J; Mehrotra, D; **Yan, E.C.Y.\*** “Thermal Stability of Rhodopsin and Progression of Retinitis Pigmentosa: A Comparison of S186W and D190N Rhodopsin Mutants” *In press,* *J. Biol. Chem.* **2013**
5. Wang, Z.; Fu, L.; **Yan, E.C.Y.\*** "C-H Stretch for Probing Self-Assembly of LK7β into Chiral Macromolecular Structures at the Air-Water Interface by Chiral Sum Frequency Generation Spectroscopy" In press, Langmuir **2013**
6. Fu, L.†; Xiao, D.Q.†; Wang, Z.; Batista, V. S.\*; **Yan, E.C.Y.\*** “Chiral Sum Frequency Generation for Probing the Hydrogen/Deuterium Exchange in Antiparallel -Sheet Peptides at Interfaces” *J. Am. Chem. Soc.* 135, 3592, **2013**
7. Mitra, N.†; Liu, Y.†; Liu, J.; Serebryany, E.; Mooney, V.; DeVree, B.T.; Sunahara, R.; **Yan, E.C.Y.\*** “Calcium Dependent Ligand Binding and G-protein Signaling of Family B GPCR Parathyroid Hormone 1 Receptor Purified in Nanodiscs” ACS Chem. Biol. 8, 617, **2013**
8. Mooney, V.L.; Szundi, I.; Lewis, J.W.; **Yan, E.C.Y.**\*; Kliger, D.S.\* “Schiff base protonation changes in siberian hamster ultraviolet cone pigment photointermediates” *Biochemistry*, 51, 2603, **2012**
9. You, Y.M.†; Bloomfield, A.†; Liu, J.; Fu, L.; Herzon, S.**\***; **Yan, E.C.Y.\*** “Kinetics of Surfactant Molecules Transferring between Emulsion Particles Probed by Second Harmonic Generation Spectroscopy” *J. Am. Chem. Soc.* 134, 4264, **2012**
10. Zhu, G. A.**#**; Serebryany, E.**#**; **Yan, E.C.Y.\*** “Rational Design of Supramolecular Lipid/Detergent Assemblies for Purification of G Protein-Coupled Receptors” *Encyclopedia of Supramolecular Chemistry*,**2012**
11. Xiao, D.†; Fu, L.†; Liu, J.; Batista, V.S.\*; **Yan, E.C.Y.\*** “Amphiphilic Adsorption of Human Islet Amyloid Polypeptide Aggregates to Lipid/Aqueous Interfaces” *J. Mol. Biol.*, 421, 537*,* **2012**
12. Fu, L.; Wang, Z.; **Yan, E.C.Y.\*** “Chiral Vibrational Structures of Proteins at Interfaces Probe by Sum Frequency Generation Spectroscopy” Invited Submission, Special Issue: *Applications of Circular Dichroism*, *Int. J. Mol. Sci.*, 12, 9404,**2011**
13. Serebryany, E.**#**; Zhu, G.F.**#**; Fu, L.; Liu, J.; **Yan, E.C.Y.\*** “Artificial Membrane-like Environments for *In Vitro* Studies of Purified G-protein Coupled Receptors” Invited Review, *BBA-Biomembrane*, 1818, 225, **2011**
14. Liu, J.; Liu, M.#; Fu, L.; **Yan, E.C.Y.\*** “Chemical Kinetic Analysis of Thermal Decay of Rhodopsin Reveals Unusual Energetics of Thermal Isomerization and Hydrolysis of Schiff Base" *J. Biol. Chem.* 286, 38408, **2011**
15. Liu, J.; Liu, M.Y.**#**; Mooney, V.; Bhagat, A.; Nguyen, J; **Yan, E.C.Y\*** "Thermal Properties of Rhodopsin: Insight into Molecular Mechanism of Dim-Light Vision" *J. Biol. Chem.* 286, 27622,**2011**
16. Fu, L.; Liu, J.; **Yan, E.C.Y.\*** “Chiral Sum Frequency Generation for Identification of Protein Secondary Structures at Interfaces” *J. Am. Chem. Soc.* 133, 8094, **2011**
17. Wu, W. T.; Mitra, N.; **Yan, E.C.Y.**; Zhou, S.Q*.***\***"Integration of Optical Glucose Sensing and Self-Regulated Insulin Release into a Single Hybrid Nanogel Particle" *ACS Nano* 4, 4831, **2010**
18. Durrell, A.; Gary, H.; Hazari, N.\*; Incarvito, C.; Liu, J.; **Yan, E.C.Y.** "Tris (hydroxypropyl) phosphine Oxide: A Chiral Three-Dimensional Material with Non-linear Optical Properties" Cryst. Growth Des. 10, 1482, **2010**
19. Fu, L.; Ma, G.; **Yan, E.C.Y.\*** “*In Situ* Misfolding of Human Islet Amyloid Polypeptide at Interfaces Probed by Sum Frequency Generation Spectroscopy” *J. Am. Chem. Soc.* 132, 5405, **2010**
20. Liu, J; Liu, M.Y.**#**; Nguyen, J.B., Bhagat A., Mooney, V; **Yan, E.C.Y.\*** “Thermal Decay of Rhodopsin: Role of Hydrogen Bonds in Thermal Isomerization of 11-*cis* Retinal in the Binding Site and Hydrolysis of Protonated Schiff Base” *J. Am. Chem. Soc.* 131, 8750, **2009**
21. Ma, G.; Liu, J; Fu, L.; **Yan, E.C.Y.\*** “A Vibrational Sum Frequency Generation Spectrometer with Broad Bandwidth Technology” *Appl. Spectro.*, 63, 528,**2009**

### Publications Prior to Yale:

1. “6-s-*cis* Conformation and Polar Binding Pocket of the Retinal Chromophore in the Photoactivated State of Rhodopsin” Ahuja, S; Eilers, M.; Hirshfeld, A.; **Yan, E.C.Y**.; Ziliox, M.; Sakmar, T.P.; Sheves, M.; Smith, S.O. *J. Am. Chem. Soc.*, 131, 15160, **2009**
2. Ahuja, S; Hornak, V.; **Yan, E.C.Y**.; Syrett, N.; Goncalves, J.; Hirshfeld, A.; Ziliox, M.; Sakmar, T.P.; Sheves, M.; Reeves, P.J.; Smith, S.O.; Eilers, M. “Helix Movement is Coupled to Displacement of Extracellular Loop 2 in Rhodopsin Activation” *Nat. Struct. Mol. Biol.*, 16, 168, **2009**
3. Ye, S.; Köhrer, C.; Huber, T.; Kazmi, M.; **Yan, E.C.Y.**; Sachdev, P.; Bhagat, A.**#**; RajBhandary, U.L.; Sakmar, T.P. “Site-specific Incorporation of Keto Amino Acids Into Functional G Protein-Coupled Receptors Using Unnatural Amino Acid Mutagenesis” *J. Biol. Chem.* 283, 1525, **2008**
4. **Yan, E.C.Y.\***; Lewis, J.W.; Szundi, I; Epps, J.; Bhagat, A.; Kliger, D.S. “Photointermediates of the Rhodopsin S186A Mutant as a Probe of the Hydrogen Bond Network in the Chromophore Pocket and Counterion Switch” *J. Phy. Chem. C.* 111, 8843, **2007**
5. Vogel, R.; Siebert, F; **Yan, E.C.Y.**; Sakmar, T.P.; Hirshfeld, A.; Sheves, M. “Modulating Rhodopsin Receptor Activation by Altering the pKa of the Retinal Schiff Base” *J. Am. Chem. Soc.* 128, 10503, **2006**
6. Ludeke, S; Beck, M.; **Yan, E.C.Y.**; Sakmar, T.P.; Siebert, F.; Vogel, R. “The Role of Glu181 in the Photoactivation of Rhodopsin.” *J. Mol. Biol.* 353, 245, **2005**
7. **Yan, E.C.Y.**; Gamin, Z.**#**; Kazmi, M.A.; Chang, B.S.W.; Sakmar, T. P.; Mathies, R. A. “Resonance Raman Analysis of the Mechanism of Energy Storage and Chromophore Distortion in the Primary Visual Photoproduct” *Biochemistry* 43, 10867, **2004**
8. **Yan, E.C.Y.**; Kazmi, M.A.; Gamin, Z.**#**; Hou, J. M.; Pan, D.; Chang, B.S.W.; Sakmar, T. P.; Mathies, R. A “Counterion Switch in the Photoactivation of G Protein-Coupled Receptor Rhodopsin” *Proc. Natl. Acad. Sci. U.S.A.* 100, 9262, **2003**
9. **Yan, E.C.Y.**; Kazmi, M.A.; De, S; Chang, S.W.; Seibert, C.; Marin, E.P.; Mathies, R.A.; Sakmar, T.P. “Function of Extracellular Loop 2 in Bovine Rhodopsin: Glutamic Acid 181 Modulates Stability and Wavelength Maximal Absorption of Metarhodopsin II” *Biochemistry* 41, 3620, **2002**
10. Shang, X.; Liu, Y.; **Yan, E**.; Eisenthal, K.B. “Effect of Counterions on Molecular Transport across Liposome Bilayer: Probed by Second Harmonic Generation” *J. Phys. Chem. B.* 105, 12816, **2001**
11. **Yan, E.C.Y**.; Liu, Y.; Eisenthal, K.B. “In-situ Studies of Molecular Transfer between Colloidal Surfaces by Second Harmonic Generation” *J. Phys. Chem. B.* 105, 8531, **2001**
12. Liu, Y.; **Yan, E.C.Y.**; Zhou, X. L.; Eisenthal, K.B. “Surface Potential of Charged Liposomes Determined by Second Harmonic Generation” *Langmuir* 17, 2063, **2001**
13. Liu, Y.; **Yan, E.C.Y**; Eisenthal, K.B. “Effect of Bilayer Surface charge Density on Molecular Adsorption and Transport across Liposome Bilayers” *Biophys. J.* 80, 1004, **2001**
14. **Yan, E.C.Y.**; Eisenthal, K.B. “Effects of Cholesterol on Molecular Transport of Organic Cations across Liposome Bilayers Probed by Second Harmonic Generation” *Biophys. J.* 79, 898, **2000**
15. **Yan, E.C.Y**.; Eisenthal, K.B. “Rotational Dynamics of Anisotropic Particles Studied by Second Harmonic Generation” *J. Phys. Chem. B.* 104, 6686, **2000**
16. **Yan, E.C.Y**.; Eisenthal, K.B*.* “Probing the Interface of Microscopic Clay Particles in Aqueous Solution by Second Harmonic Generation” *J. Phys. Chem. B.* 103, 6056, **1999**
17. **Yan, E.C.Y**.; Liu, Y.; Eisenthal, K.B. “New Method for Determination of Surface Potential of Microscopic Particles by Second Harmonic Generation” *J. Phys. Chem. B* 102, 6331, **1998**
18. Wang, H.; Borguet, E.; **Yan, E.C.Y**.; Zhang, D.; Gutow, J.; Eisenthal, K.B. “Molecules at Liquid and Solid Surfaces” *Langmuir* 14, 1472, **1998**
19. Wang, H.; **Yan, E.C.Y**.; Liu, Y.; Eisenthal, K.B. “Energetics and Population of Molecules at Microscopic Liquid and Solid Surfaces” *J. Phys. Chem.* 102, 4446, **1998**
20. Wang, H.; **Yan, E.C.Y**.; Borguet, E.; Eisenthal, K.B. “Second Harmonic Generation from the Surface of Centrosymmetric Particles in Bulk Solution” *Chem. Phys. Letts.* 259, 15, **1996**
21. Wu, C.; **Yan, C.Y.#** “Studies of the Swelling and Drying Kinetics of Thin Gel Films by In-Situ Interferometry” *Macromolecules* 27, 4516, **1994**

### Invited Lectures and Conference Talks (July 2007-present):

1. “Chiral Sum Frequency Generation for Characterization of Protein Secondary Structures at Interfaces” *The 60th Annual AVS International Symposium and Exhibition*, Long Beach, CA, Oct 2013
2. “Chiral Sum Frequency Generation for Characterization of Protein Secondary Structures at Interfaces” *The 14th International Conference on Chiroptical Spectroscopy*, Vanderbilt University, Nashville, TN, Jun, 2013
3. “Chiral Sum Frequency Generation for Characterization of Protein Secondary Structures at Interfaces” Structural Characterization of Biomolecules on Surfaces, *The 96th Canadian Society for Chemistry symposium*, Quebec City, Canada, May, 2013
4. “Aggregation of Amyloid Proteins at Lipid/Water Interfaces Probed by Chiral Sum Frequency Generation Spectroscopy” *University of Colorado*, Boulder, CO, Apr 2013
5. “Aggregation of Amyloid Proteins at Lipid/Water Interfaces Probed by Chiral Sum Frequency Generation Spectroscopy” *University of Texas, Austin*, TX, Apr 2013
6. “Aggregation of Amyloid Proteins at Lipid/Water Interfaces Probed by Chiral Sum Frequency Generation Spectroscopy” *245th National Meeting of American Chemical Society*, Division of Physical Chemistry, New Orleans, LA, Apr 2013
7. “Chiral sum frequency generation spectroscopy probes vibrational structures of protein backbone with zero water background” *Princeton University*, Princeton, NJ, Apr 2013
8. “Chiral sum frequency generation spectroscopy probes vibrational structures of protein backbone with zero water background” *University of Chicago*, Chicago, IL, Mar 2013
9. “Early-Stage Aggregation of Amyloid Proteins on Membrane Surfaces Probed by Chiral Sum Frequency Generation Spectroscopy” *University of California, Los Angeles*, CA, Mar 2013
10. “Early-Stage Aggregation of Amyloid Proteins on Membrane Surfaces Probed by Chiral Sum Frequency Generation Spectroscopy” *University of Michigan, Ann Arbor*, MI, Feb 2013
11. “Characterization of protein secondary structures at interfaces using chiral sum frequency generation spectroscopy” *National Taiwan University*, Taipei, Taiwan, Dec 2012
12. “Characterization of protein secondary structures at interfaces using chiral sum frequency generation spectroscopy” *National Tsing Hua University*, Taipei, Taiwan, Dec 2012
13. “Characterization of protein secondary structures at interfaces using chiral sum frequency generation spectroscopy” *Academia Sinica*, Taipei, Taiwan, Dec 2012
14. “Nanodiscs Purification of a Family B G Protein-Coupled Receptor—Parathyroid Hormone 1 Receptor” 2nd Biophysics and Structural Biology Symposium, *Yale University*, New Haven, CT, Nov 2012
15. “Thermal Stability of Rhodopsin” *15th International Conference on Retinal Proteins*, Ascona, Switzerland, Oct 2012
16. “Chiral sum frequency generation spectroscopy for probing the hydrogen/deuterium exchange in proteins at interfaces” *244th National Meeting of American Chemical Society*, Physical Chemistry Division, Philadelphia, PA, Aug 2012
17. “Chiral sum frequency generation spectroscopy probes protein vibrational structures with zero water background” *244th National Meeting of American Chemical Society*, Division of Analytical Chemistry, Philadelphia, PA, Aug 2012
18. “Thermal stability of rhodopsin is key to vertebrate dim-light vision” *The 244th National Meeting of American Chemical Society*, Physical Chemistry Division, Philadelphia, PA, Aug 2012
19. “Characterization of protein secondary structures at interfaces using chiral sum frequency generation spectroscopy” *244th National Meeting of American Chemical Society*, Physical Chemistry Division, Philadelphia, PA, Aug 2012
20. “Chiral Sum Frequency Generation Spectroscopy for Characterization of Protein Structures and Dynamics at Interfaces” *Gordon Research Conference: Vibrational Spectroscopy*, Biddeford, ME, Aug 2012
21. “Characterization of protein structures at interfaces using chiral sum frequency generation spectroscopy” *Telluride Science Research Center Workshop: Nonlinear Optics and Interfaces*, Telluride, CO, Jun 2012
22. “Characterization of protein secondary structures at interfaces using sum frequency generation spectroscopy” *243rd National Meeting of American Chemical Society*, Physical Chemistry Division, San Diego, CA, Mar 2012
23. “Characterization of protein secondary structures at interfaces using sum frequency generation spectroscopy” *Western Connecticut State University*, Danbury, CT, Mar 2012
24. “Rhodopsin, a Light Detector at Its Very Best!” *Chinese University of Hong Kon*g, Hong Kong, Jan 2012
25. “Chiral sum frequency generation spectroscopy for characterizing protein secondary structures at interfaces” *Peking University*, Beijing, China, Dec 2011
26. “Chiral sum frequency generation spectroscopy for characterizing protein secondary structures at interfaces” *Hong Kong University of Science and Technology*, Hong Kong, Dec 2011
27. “Chiral sum frequency generation spectroscopy for characterizing protein secondary structures at interfaces” Symposium in Honor of 100th Anniversary of Marie Curie's Nobel Prize for International Year of Chemistry, *242nd National Meeting of American Chemical Society*, Denver, CO, Aug 2011
28. “Chiral Sum Frequency Generation Spectroscopy for Identification of Protein Secondary Structures at Interfaces” *Temple University*, Philadelphia, PA, Apr 2011
29. “Chiral Sum Frequency Generation Spectroscopy for Identification of Protein Secondary Structures at Interfaces” *University of Pennsylvania*, Philadelphia, PA, Apr 2011
30. “Chiral Sum Frequency Generation Spectroscopy for Identification of Protein Secondary Structures at Interfaces” *Brigham Young University*, Provo, UT, Apr 2011
31. “Misfolding of Amyloid Proteins at Interfaces Probed by Chiral Sum Frequency Generation Spectroscopy” *Pacific Northwest National Laboratory*, Richland, WA, Mar 2011
32. “Probing Protein Secondary Structures at Interfaces by Chiral Sum Frequency Generation Spectroscopy” *Trinity University*, San Antonio, TX, Mar 2011
33. “Purification of G-Protein Coupled Receptor Using Nanodiscs” *Keystone Symposia* on Molecular and Cellular Biology, Transmembrane Signaling by GPCRs and Channels, Taos, NM, Jan 2011
34. “Probing Protein Secondary Structures at Interfaces by Chiral Sum Frequency Generation Spectroscopy” Department of Chemistry, *Chinese University of Hong Kong*, Hong Kong, Jan 2011
35. “Biophysical Studies of G Protein-Coupled Receptors: New Strategies for Purification and Labeling” Department of Chemistry, *Chinese University of Hong Kong*, Hong Kong, Jan 2011
36. “Probing Protein Secondary Structures at Interfaces by Chiral Sum Frequency Generation Spectroscopy” Department of Chemistry, *University of Southern California*, Los Angles, CA, Nov 2010
37. “Probing Protein Secondary Structures at Interfaces by Chiral Sum Frequency Generation Spectroscopy” Department of Chemistry, *University of California, Irvine*, CA, Nov 2010
38. “Probing Protein Secondary Structures at Interfaces by Chiral Sum Frequency Generation Spectroscopy” Department of Chemistry, *Tulane University*, New Orleans, LA, Nov 2010
39. “Probing Protein Secondary Structures at Interfaces by Chiral Sum Frequency Generation Spectroscopy” Department of Chemistry, *Xavier University of Louisiana*, New Orleans, LA, Nov 2010
40. “Kinetics of Amyloid Formation Probed by Chiral Sum Frequency Generation Spectroscopy” Department of Chemistry, *Clark University*, Worcester, MA, Oct 2010
41. “Probing the Misfolding of Amyloid Proteins at Interfaces by Sum Frequency Generation Spectroscopy” Department of Chemistry, *Tufts University*, Medford, MA, Oct 2010
42. “Protein Structures at Interfaces Probed by Chiral Sum Frequency Generation Spectroscopy” Faculty Lunch, Department of Chemistry, *Yale University*, New Haven, CT, Sep 2010
43. “Application of Chiral Vibrational Sum Frequency Generation Spectroscopy to Protein Folding at Interfaces” *Gordon Research Conference: Vibrational Spectroscopy*, Biddeford, ME, Aug 2010
44. “Probing Protein Folding at Interfaces by Sum Frequency Generation” *Telluride Science Research Center Workshop: Nonlinear Optics and Interfaces*, Telluride, CO, Jun 2010
45. “Biomolecular Interactions at Interfaces Probed by Sum Frequency Generation Spectroscopy” *NSF Physical Organic Chemistry Workshop*, Austin, TX, Jan 2010
46. “Rhodopsin, a Biological Light Detector at Its Very Best!” *College of Staten Island, City University of New York*, New York, NY, Dec 2009
47. “Rhodopsin, a Biological Light Detector at Its Very Best!” *Arizona State University*, Tempe, AZ, Dec 2009
48. “Rhodopsin, a Biological Light Detector at Its Very Best!” *Hunter College, City University of New York*, New York, NY, Nov 2009
49. “Probing Signal Transduction of G protein-Coupled Receptors” *The US-China Workshop for Early Career Chemical Scientists, the U.S. National Science Foundation and the Chinese National Natural Science Foundation*, Beijing, China PR, Oct. 2009
50. “Probing Folding of Intrinsically Disordered Proteins at Interfaces by Sum Frequency Generation” *Telluride Science Research Center Workshop: Vibrational Dynamics*, Telluride, CO, Jul 2009
51. “Thermal Decay of Rhodopsin: Role of Hydrogen Bonds in Thermal Isomerization of 11-cis Retinal in the Binding Site and Hydrolysis of Protonated Schiff Base” *FASEB Summer Research Conference*, Biology and Chemistry of Vision. Snowmass Village, CO, Jun 2009
52. “Thermal Properties of G Protein-Coupled Receptor Rhodopsin” Sackler Discussion Group, Department of Molecular Biophysics and Biochemistry, *Yale University*, New Haven, CT, Mar 2009
53. “Photoactivation Mechanism of G Protein-Coupled Receptor Rhodopsin” Department of Chemistry, *University of Connecticut*, Storrs, CT, Dec 2008
54. “Photoactivation Mechanism of G Protein-Coupled Receptor Rhodopsin” Department of Chemistry, *Colby College*, Waterville, ME, Nov 2008
55. “Rhodopsin-A Light Detector at Its Very Best!” Faculty Lunch Meeting, Department of Chemistry, *Yale University*, New Haven, CT, Nov 2008
56. “Photoactivation Mechanism of G Protein-Coupled Receptor Rhodopsin” Department of Chemistry, *State University of New York*, Buffalo, NY, Oct 2008
57. “Photoactivation Mechanism of G Protein-Coupled Receptor Rhodopsin” Department of Biochemistry, *University of Western Ontario*, London, Ontario, Canada, Oct 2008
58. “Photoactivation Mechanism of G Protein-Coupled Receptor Rhodopsin” Department of Chemical Physics, *University of Science and Technology*, Hefei, China, Aug 2008
59. “Photoactivation Mechanism of G Protein-Coupled Receptor Rhodopsin” Department of Chemistry, *Fudan University*, Shanghai, China, Aug 2008
60. “Interactions of Amyloid Protein with Biomembranes: Ion Permeability and Protein Structures” *Telluride Science Research Workshop: Nonlinear Optics at Interfaces*, Telluride, CO, Jun 2008
61. “Photoactivation Mechanism of G Protein-Coupled Receptor Rhodopsin” Department of Chemistry, *City College, City University of New York*, New York, NY, Apr 2008
62. “Photoactivation Mechanism of G Protein-Coupled Receptor Rhodopsin” Department of Chemistry and Biochemistry, *Seton Hall University*, South Orange, NJ, Apr 2008
63. “Photoactivation Mechanism of G Protein-Coupled Receptor Rhodopsin” Department of Chemistry, *University of Massachusetts, Dartmouth*, MA, Oct 2007

### Contributed Talks and Posters (July 2007-present)

1. Fu, L.; Gang, M.; Yan, E.C.Y. “Chiral vibrational sum frequency generation spectroscopy allows real-time and in situ characterization of protein secondary structures at interfaces” 243rd ACS National Meeting, San Diego, CA, Mar **2012**
2. Fu, L.; Wang, Z.; Yan, E.C.Y. “Chiral sum frequency generation spectroscopy: a probe for protein secondary structures and proton exchange at interfaces” 243rd ACS National Meeting, San Diego, CA, Mar **2012**
3. Fu, L.; Liu, J.; Yan, E.C.Y. “Characterization of protein secondary structures at interfaces using sum frequency generation spectroscopy” 243rd ACS National Meeting, San Diego, CA, Mar **2012**
4. **Xiao**, D.; Fu, L.; Yan, E.C.Y.; Batista, V.S. “***Ab initio* simulations of chiral sum frequency generation spectra of amyloid proteins at water/membrane interfaces.”** 242nd ACS National Meeting, Denver, CO, Aug **2011**
5. Fu, L.; Liu, J.; Yan, E.C.Y. “Chiral sum frequency generation spectroscopy for characterizing protein secondary structures at interfaces.” 242nd ACS National Meeting, Denver, CO, Aug **2011**
6. You, Y.M.; Liu, J.; Yan, E.C.Y. “Application of second harmonic generation spectroscopy to probe kinetics of detergent molecules transferring between emulsion droplets.” 242nd ACS National Meeting, Denver, CO, Aug **2011**
7. Liu, J.; Liu, M.Y.; Nguyen, J.; Bhagat, A.; Mooney, V.; Yan, E.C.Y. “Thermal properties of rhodopsin: Insight into molecular mechanism of dim-light vision.” Biophysical Society 55th Annual Meeting, Baltimore, MD, March **2011**
8. Fu, L.; Ma, G.; Yan, E.C.Y. “*In situ* measurement of human islet amyloid polypeptide misfolding at lipid/water interfaces probed by sum frequency generation spectroscopy.” Biophysical Society 55th Annual Meeting, Baltimore, MD, March **2011**
9. Liu, M.Y.; Liu, J.; Yan, E.C.Y. “Thermal stability of rhodopsin and implications for *Retinitis Pigmentosa*.” Biophysical Society 55th Annual Meeting, Baltimore, MD, March **2011**
10. Mitra, N.; Yan, E.C.Y. “Purification of G-protein coupled receptors using nanodiscs.” Biophysical Society 55th Annual Meeting, Baltimore, MD, March **2011**
11. Serebryany, E.; Yan, E.C.Y. “Ligand-binding domain of type 1 metabotropic glutamate receptor is fully functional in its monomeric form.” Biophysical Society 55th Annual Meeting, Baltimore, MD, March **2011**
12. Yan, E.C.Y.; Fu, L. “Chiral sum frequency generation spectroscopy provides a set of optical vibrational markers to distinguish protein secondary structures at interfaces.” Biophysical Society 55th Annual Meeting, Baltimore, MD, March **2011**
13. Liu, J.; Liu, M.Y.; Nguyen, J.; Bhagat, A.; Mooney, V.; Yan, E.C.Y. “Molecular Mechanism for Dim-Light Detection by G Protein-Coupled Receptor Rhodopsin.” 241st ACS National Meeting, Anaheim, CA, March **2011**
14. Fu, L.; Liu, J.; Yan, E.C.Y. “Second-order chiral vibrational markers allow identification of protein secondary structures at interfaces.” 241st ACS National Meeting, Anaheim, CA, March **2011**
15. Xiao, D.Q.; Fu, L.; Batista, V.; Yan, E.C.Y. “Determination of protein secondary structures and orientation at interfaces by chiral sum frequency generation spectroscopy and computational modeling.” 241st ACS National Meeting, Anaheim, CA, March **2011**
16. You, Y.M.; Liu, J.; Yan, E.C.Y. “Probing kinetics of detergent molecules transferring between emulsion particles using second harmonic generation spectroscopy.” 241st ACS National Meeting, Anaheim, CA, March **2011**
17. Fu, L.; Yan, E.C.Y. “Amyloidogenesis detected by chiral sum frequency generation spectroscopy.” 241st ACS National Meeting, Anaheim, CA, March **2011**
18. Yan, E.C.Y.; Fu, L.; Ma, G. “Application of sum frequency generation to probe kinetics of protein folding at interfaces.” 239th ACS National Meeting, San Francisco, CA, March **2010**
19. Yan, E.C.Y.; Fu, L.; Ma, G. “Biomolecular interactions at interfaces probed by sum frequency generation spectroscopy.” 239th ACS National Meeting, San Francisco, CA, March **2010**
20. “Characterization of G Protein-Coupled Receptors Using Biophysical Spectroscopy” (Invited participant and poster presentation) *The National Academies Keck Futures Initiative Conference on Synthetic Biology*, Irvine, CA, Nov **2009**

**Research Funding**

**Active**

* **NSF: CAREER, Directorate for Biological Science-MCB and Directorate for Mathematical & Physical Sciences-CHE: Chemistry of Life Process (Role: PI)**

Title of Project: Molecular Mechanism of Vision

Duration: 03/15/10-03/14/15

* **NSF-Directorate for Mathematical & Physical Sciences-CHE: Chemistry of Life Process (Role: PI, Co-PI: Victor S. Batista)**

Title of Project: Characterization of Biomolecular Interactions at Interfaces Using Sum Frequency Generation Spectroscopy

Duration: 08/1/12-07/31/14

* **NIH-National Eye Institute (Role: Subcontractor; PI: David Kliger, UCSD)**

Title of Project: Studies of the Activation Mechanism of Visual Pigments

Duration: 05/1/13-04/30/15

**Completed**

* **Spectroscopy Society of Pittsburgh, Starter Grant (Role: PI)**

Title of Project: Development of Vibrational SFG Spectrometer for Biological Interfaces

Duration: 07/01/09-06/30/10

* **American Chemical Society, Petroleum Research Fund (Role: PI)**

Title of Project: Transport Kinetics of Surface Molecules between Emulsion Particles Probed by Surface Specific Second-Harmonic Generation

Duration: 09/01/2009-08/31/2011

**Pending**

* **NIH-R01: (Role: PI, Co-PI: Victor S. Batista)**

Title of Project: Chiral Sum Frequency Generation Spectroscopy for Evaluating the Effects of Drug Candidates on Inhibiting Early-Stage Aggregation of Islet Amyloid Polypeptide on Membrane Surfaces

Duration: 08/01/13-07/31/15

Submission Date: Feb 2013

* **Department of Energy: (Role: PI)**

Title of Project: Vibrational Structures of Photoactive Proteins at Interfaces

Duration: 09/01/13-08/31/15

Submission Date: Feb 2013

**Teaching—Undergraduate and Graduate Courses:**

**Hunter College, City University of New York, New York, NY**

* **2005 Fall** *Biophysical Chemistry*

Fraction of Course: 1

Enrollment: Undergraduate 38

**Yale University, New Haven, CT**

* **2007 Fall** *Physical Chemistry with Applications in Biological Sciences* (CHEM328)

Fraction of Course: 1

Enrollment: Undergraduate 12

* **2008 Spring** *Perspectives on Science: Discussion Section* (SCIE198)

Fraction of Course: 1

Enrollment: Undergraduate 15

* **2008 Fall** *Physical Chemistry with Applications in Biological Sciences* (CHEM328)

Fraction of Course: 1

Enrollment: Undergraduate 22 and Graduate 2

* **2008 Fall** *Chemical Biology* (CHEM421/521)

Fraction of Course: 1 Lecture

Enrollment: Undergraduate 22 and Graduate 2

* **2009 Spring** *Biophysical Chemistry* (CHEM558)

Fraction of Course: 1

Enrollment: Undergraduate 1 and Graduate 14

* **2009 Spring** *Responsible Conduct of Research* (MBB676)

Fraction of Course: 1/7

Enrollment: Graduate 40

* **2009 Fall** *Physical Chemistry with Applications in Biological Sciences* (CHEM328)

Fraction of Course: 1

Enrollment: Undergraduate 39 and Graduate 1

* **2010 Spring** *Biophysical Spectroscopy* (CHEM558)

Fraction of Course: 1

Enrollment: Graduate 3

* **2010 Spring** *Responsible Conduct of Research* (MBB676)

Fraction of Course: 1/7

### Enrollment: Graduate 45

* **2011 Fall** *Physical Chemistry with Applications in Biological Sciences* (CHEM328)

Fraction of Course: 1

Enrollment: Undergraduate 38 and Graduate 1

* **2012 Spring** *Biophysics/Biophysical Spectroscopy* (CHEM558)

Fraction of Course: 1

Enrollment: Graduate 4

**Service to Yale University**

* Member of the Advisory Board for the Beckman Scholars Program, Deans Office, Yale College, 2008-present
* Member of Selection Committee for Beckman Scholars, 2008-present

**Affiliation at Yale University**

* Yale Diabetes Endocrinology Research Center, Yale School of Medicine, 2011-present
* The NIH Chemical Biology Graduate Training Program, 2008-present
* The NIH Biophysics Graduate Training Program, 2008-present
* The Raymond and Beverly Sackler Institute for Biological, Physical and Engineering Sciences, 2010-present
* The Biochemistry, Biophysics, and Structural Biology Program, 2011-present

**Service to the Chemistry Department**

**2007-2008**

* Building Committee/Department Sub-Committee
* Graduate Admission Committee

**2008-2009**

* Building Committee/Department Sub-Committee
* Graduate Admission Committee
* Seminar Committee: Coordinator of Biophysical Seminar

**2009-2010**

* Graduate Admission Committee
* Building Committee
* Visiting Day Committee
* Junior Faculty Search Committee
* Instrument Committee
* Seminar Committee

**2011-2012**

* Graduate Admission Committee
* Building Committee

**Outreach**

* Host and Speaker for Lab Visit, *Annual High School Open House at the Chemistry Department*, Students from Ms. Porter’s Schools, May 2012
* Host and Speaker for Lab Visit, *the Yale University Science Pathways Program*, Open House at the Chemistry Department, May 2012
* Host and Speaker for Lab Visit, *the Yale University Science Pathways Program*, Open House at the Chemistry Department, May 2011
* Host for Lab Visit, *Annual High School Open House at the Chemistry Department*, Students from West Haven High Schools, May 2010
* Host for Lab Visit, *Annual High School Open House at the Chemistry Department*, Students from Miss Porter’s School and the Woodhall School, May 2009
* Speaker and Host for Lab Visit. *Annual High School Open House at the Chemistry Department* Students from Hamden High School, “Chemistry of Vision”, Yale University, Nov 2008
* Speaker for the *Biotechnology Workshop for high-school biology teachers in Connecticut*, “Molecular Mechanism of Vision”, Yale University, Jul 2008
* Judge for Poster and Oral Presentations, National Conference of Society for Advancement of Chicanos and Native Americans in Science, Kansas City, MO, Oct 2007
* Student Recruiter, National Conference of Society for Advancement of Chicanos and Native Americans in Science, Kansas City, MO, Oct 2007

**Citizenship**

* Panelist, “Preparing for Publication”, Co-organized by Graduate Writing Center at Yale and Women in Science at Yale, Yale University, New Haven, Oct 2012
* Graduate Student Recruiter: Interviewed Seniors at Xavier University of Louisiana, New Orleans, LA, Nov 2010
* Speaker, Monthly Meeting, Undergraduate Women in Science at Yale, Yale University, Apr 2010
* Graduate Student Recruiter: Interviewed seniors at University of Science and Technology, Hefei, China PR, Aug 2008
* Speaker for the Exchange Program, Yale University-New Asian College at the Chinese University of Hong Kong: *Globalization and Biomedical Research*, The Yale-China Association, Yale University, New Haven, CT, Feb 2008
* Panelist for Career Workshop: *New Junior Faculty Members Spill the Beans*, GSAS and The Postdoctoral Office, Yale University, New Haven, CT, Jun 2009
* Panelist for Career Workshop: *Academic Job Search-Identifying Opportunity and Preparing a Successful Application*, Yale University, New Haven, CT, Oct 2007
* Panelist for Career Workshop: *Preparing Future Faculty Colloquium*, Graduate School of Art and Science, Columbia University, New York, NY, Mar 2007

**Professional Service**

**Grant Reviewer and Grant Review Panelist**

* **Grant Reviewer:** German Research Foundation-Chemistry and Process Engineering, Jan 2013
* **NSF Panelist:** NSF Panel, CHE-Chemistry of Life Processes/Molecular and Cellular Biosciences, Oct 2012
* **Grant Reviewer:** NSF, Career Award, Division of Molecular and Cellular Biosciences, Directorate for Biological Sciences, National Science Foundation, Nov 2011
* **Grant Reviewer:** NSF, The Catalyzing New International Collaboration Program, Directorate for Mathematical and Physical Sciences, National Science Foundation, Oct 2011
* **Grant Reviewer:** NSF, Career Award, Division of Chemistry, Directorate for Mathematical and Physical Sciences, National Science Foundation, Oct 2010
* **Grant Reviewer:** NSF, Career Award, Division of Molecular and Cellular Biosciences, Directorate for Biological Sciences, National Science Foundation, Sep 2010
* **Grant Reviewer:** Collaborative Incentive Research Grant Program: City University of New York, New York, NY, Apr 2008

**Ph.D. External Examiner**

* **Ph.D. External Examiner:** Indian Institute of Technology, Madras, India, Nov 2012

**Manuscript Reviewer**

* *ACS Chemical Biology*
* *Acta Biomaterial*
* *Acta Crystallography*
* *Nature Chemistry*
* *Analytical Chemistry*
* *Langmuir*
* *Journal of American Chemical Society*
* *Biochemistry*
* *Photochemistry and Photobiology*
* *Journal of Biological Chemistry*
* *BBA-Biomembrane*
* *Chemical Physics Letters*
* *Physical Chemistry Chemical Physics*
* *Journal of Physical Chemistry*
* *Journal of Physical Chemistry Letters*
* *Journal of Chemical Physics*
* *Journal of Structural Biology*
* *Journal of Molecular Biology*
* *Spectroscopy Letters*
* *Plasmid*
* *Biophysical Journal*
* *Environmental Science and Technology*
* *Acta Biomaterialia*
* *Polymer*
* *Macromolecules*
* *Biomacromolecules*
* *Angewandte Chemie International Edition*
* *Vision Research*
* *Europhysics Letters*

**Symposium and Conference Organizers**

* **Elected Chair**: *Vibrational Spectroscopy*, Gordon Research Conference, 2016
* **Elected Vice Chair**: *Vibrational Spectroscopy*, Gordon Research Conference, Biddeford, ME, 2014
* **Focus Session Chair and Organizer:** *Protein Misfolding and Aggregation*, Division of Chemical Physics, American Physical Society, Annual Meeting, Baltimore, MD, Mar 2013
* **Session Chair:** *Liquid and Solid Interfaces*, Division of Chemical Physics, American Physical Society, Annual Meeting, Baltimore, MD, Mar 2013
* **Session Chair:** *Solvent Dynamics at Biomolecular Interfaces: Experiment and Theory*, Division of Physical Chemistry, 244th National Meeting of American Chemical Society, Philadelphia, PA, Aug 2012
* **Session Chair:** *Protein Secondary Structures*, Division of Physical Chemistry, 243rd National Meeting of American Chemical Society, San Diego, CA, Mar 2012

**Research Awards Obtained by Mentees**

* Li Fu—Yale Graduate ’13, Chemistry Department (CHEM)
* The William Wiley Postdoctoral Fellowship, Pacific Northwest National Laboratory, Richland, WA
* The Langmuir Student Award, The ACS Colloids and Surfaces Division for excellence in graduate research in the field of colloids and surface chemistry.
* The Langmuir Presentation Award, The 86th ACS Colloids and Surface Symposium, John Hopkins University, Baltimore, MD, 2012
* Monica Yun Liu—Yale ’11, Molecular, Cellular and Developmental Biology (MCDB)
* Edgar J. Boell Prize for Excellence in Senior Research, Department of MCDB, Yale University, 2011
* The Student Research Achievement Award in Molecular Biophysics, the 55th Annual Biophysical Meeting, Baltimore, MD, 2011
* Eugene Serebryany—Yale’11, Molecular Biophysics and Biochemistry (MBB)
* The Paul Sigler Memorial Prize for graduating MBB major demonstrating excellence in scholarship and research, Department of MBB, Yale University, 2011
* Poster Presentation Award, Raymond and Beverly Sackler Institute for Biological, Physical and Engineering Sciences, Summer Research Symposium, Yale University, New Haven, CT, 2010
* Alex Zhu—Yale’11, Chemistry (CHEM)
* The Postbaccalaureate Intramural Research Award, the National Institutes of Health, 2011
* Carolina —Hunter College, City University of New York’11, Biochemistry
* Poster Presentation Award at Science, Technology & Diversity for a Sustainable Future - SACNAS Annual Conference, Anaheim, September 2010

**Undergraduate Senior and Master Theses**

* Xiao Bai (**Yale’ 08**, MCDB)

Thesis Title: *Site-specific Incorporation of p-Methoxyphenylalanine into Functional G Protein-Coupled Receptors*

* Tian Ho (**Yale’09**, CHEM)

Thesis Title: *Synthesis and Site-Specific Incorporation of Deuterium-Labeled p-Methoxyphenylalanine into Recombinant Proteins with Mammalian Expression Systems*

* Ha Bui (**Yale’10**, CHEM)

Thesis Title: *Thermal Stability of Dim-Light Photoreceptor Rhodopsin*

* Alex Zhu (**Yale’11**, CHEM)

Thesis Title: *Thermal Stability of Cone versus Rod Photoreceptors*

* Monica Yun Liu (MS&BS, **Yale’11**, MCDB)

Thesis Title: *Thermal Stability of Rhodopsin: Insight into Pathogenic Mechanism of Retinitis Pigmentosa*

* Eugene Serebryany (**Yale’11**, MBB)

Thesis Title: *Activation Mechanism of Metabotropic Glutamate Receptor Type I*

* Jennifer Wei (**Yale’13**, CHEM)-Joint Student with Batista Lab

Thesis Title: *Homology Model of Family GPCR Parathyroid Hormone 1 Receptor*

**Mentees**

**Postdoctoral Fellows**

* Dr. Jian Liu (07 Ph.D., Columbia U.) 2007-2011; Current position: Postdoctoral Fellow, Boston University, Boston, MA
* Dr. Gang Ma (99 Ph.D., Peking U.) 2008-2010; Current position: Professor, Hebei University, Baoding, China PR.
* Dr. Nivedita Mitra (05 Ph.D., IIS, Bangalo, India) 2009-2011
* Dr. YuMeng You (09 Ph.D., Nanyang Tech. U., Singapore) 2010-2011; Current position: Postdoctoral Fellow, Columbia University, New York, NY
* Dr. Supratim Guha Ray (05 Ph.D. Weizmann Inst. of Sci., Israel) 2010-2012; Current position: Postdoctoral Fellow, Northwestern University, Evanston, IL

**Graduate Students**

* Yuting Liu (CHEM’15)
* Zhuguang Wang (CHEM’15)
* Ying Guo (CHEM’15)
* Li Fu (CHEM’13)
* Victoria Mooney (CHEM’13) Joint student with Zilm Group
* Denitza Balyozova (M.S. CHEM’09)

**International Visiting Students**

* AnneSzklarz (Ecole Nationale Supérieure de Chimie de Lille, Lille, France) 2013 Spring
* Meike Mischo (Bochum University, Germany) 2011
* Pedro A. Baldera Aguayo (Universidad Nacional de Ingenieria, Lima, Peru’ 13) 2013 Spring

**Undergraduate Students**

* Jennifer Wei (Yale’15, CHEM) 2012-present
* Devi Mehrotra (Yale’14) 2010-present
* Carolina Salguero (Hunter College’11, Biochemistry) 2010-2011
* Alex Zhu (Yale’11, CHEM) 2009-2011
* Ha Bui (Yale’10, CHEM) 2009-2010
* Tian Ho (Yale’09) 2008-09
* Monica Yun Liu (MS&BS, Yale’11, MCDB) 2008-2011
* Eugene Serebryany (Yale’11, MBB) 2008-2011
* Xiao Bai (Yale’ 08) 2008-2009
* Eric Li (Yale’12, CHEM) Summer 2010
* Qi Wen Li (Syracuse’11) Mark and Pearle Clements Scholar, Summer 2009
* Alicia Bowen (Old Westbury U’ 09) SURF at Yale, Summer 2008
* Carolyn Brotherton (Yale’ 10) Joint student with Scott Miller, Summer 2008
* Khadija Khan (Yale’ 10, Biomedical Engineering) Spring 2008

**Research Assistant**

* Aditi Bhagat (Hunter College’07, CUNY, New York, NY) 2007-2008

**High School Students**

* Aaron Green (Choate Rosemary Hall High School, Wallignford, CT) Summer 2008

### Titiana Fountain (Academy of New Haven, New Haven, CT) Summer 2010

* Sneha Shaha (Choate Rosemary Hall, Wallingford, CT) Summer 2012

**Rotation Students**

* James Blackemore (CHEM’12)
* Tabitha Guzman (M.S. CHEM’09)
* David Bulkey (CHEM’12)
* Jennifer Nguyen (CHEM’13)
* Pam Wong (CHEM’13)
* Jing Wang(CHEM’13)
* Changchang Liu (CHEM’13)
* Huan Lu (CHEM’14)
* Rebecca Allred (CHEM’15)

**Service on Ph.D. Thesis Committees**

* Katherine Shinopoulos, Brudvig Lab (CHEM’11)
* Gennady Khirich, Loria Lab (CHEM’12)
* Jennifer Nguyen, Modis Lab (CHEM’13)
* Gregory Manley, Loria Lab (CHEM’13).
* Pam Wang, Schepartz Lab (CHEM’13)
* Jing Wang, Rothman Lab (CHEM’13)
* Patrina Pellete, Rothman Lab (CHEM’13)
* Kanak Raina, Crew Lab (CHEM’13)
* Nicole (Ning-Shiuan) Lee, Batista Lab (CHEM’14)
* Beth Denton, Schepartz Lab (CHEM’15)
* Julianne Thomsen, Brudvig Lab (CHEM’15)