

**Cumulative Curriculum Vitae Accompanying
Faculty Activity Report/Self Evaluation**

I. Professional Background

Name: Pamela D. Twigg

Rank and Year Appointed to that Rank: Lecturer, 2014

Year of Appointment to Graduate Faculty if applicable: 2004

Department: Chemistry

Office Address: MSB 225

Academic Specialty (ies): Biochemistry, Biophysics

Degrees:

Ph.D., Florida State University, 2001.

Major: Molecular Biophysics

Supporting Areas of Emphasis: Structural Biology

Dissertation Title: Crystallographic and Spectroscopic Investigations into Mechanisms for Regulation of Diphtheria Toxin Repressor Activity

M.S., University of Alabama at Birmingham, 1986.

Major: Biomedical Engineering

B.S., Auburn University, 1982.

Major: Chemical Engineering

II. Teaching Activities: Summary list of courses taught, theses advised

UAH Courses Taught:

- CH 121 General Chemistry I
- CH 123 General Chemistry II
- CH/BYS 301 Elementary Biochemistry
- CH/BYS 347 Biophysical Chemistry I
- CH/BYS 348 Biophysical Chemistry II
- CH/BYS 361 Biochemistry I
- CH/BYS 362 Biochemistry I Laboratory
- CH 480 Selected Topics in Chemistry
- CH 492/493 Introduction to Chemical Research
- H 499 Honors Senior Project
- CH 647 Advanced Biophysical Chemistry I
- CH 648 Advanced Biophysical Chemistry II
- BYS 691 Special Topics in Structural Biology
- BYS 692 Research
- BYS 699 Master's Thesis
- CH 700 Current Topics in Chemistry
- CH 765 Special Topics in Structural Biology
- CH 765 Special Topics: Biochemical Methods
- CH 765 Special Topics: Enzyme Inhibition
- CH 765 Special Topics: Introduction to NMR Theory
- BSE 799 Doctoral Dissertation

Doctoral Dissertations Advised:

- Randall Wilson, Ph.D. Biotechnology, 2011

Master's Theses Advised:

- Talitha Caudle, M.S. Biology, 2007
- Randall Wilson, M.S. Chemistry, 2007
- Mariana Rangelova (with Dr. Bernhard Vogler), M.S. Chemistry, 2008
- Ferdousi Khan, M.S. Chemistry, 2009
- Amicia Elliott, M.S. Biology, 2009
- Kimberli Helms, M.S. Chemistry, 2012
- Ruchi Bhatt, M.S. Biology, 2012
- Chris James, M.S. Chemistry, 2013

Undergraduate Research Advised:

- Sean McConnell, B.S. Chemistry
- Brooke Belyea, B.S. Chemistry
- Rashi Singhal, Visiting Summer REU Research Student
- Tadeusz Ciszak, Visiting Summer REU Research Student
- Emad Elsamadicy, Visiting Summer REU Research Student
- Thomas Spain, B.S. Physics (Honor's Thesis)
- Justin Richmond, B.S. Chemistry
- Thomas Savage, B.S. Biology
- Justin Flatt, B.S. Chemistry
- Stefan Brzezinski, B.S. Chemistry
- David Brown, B.S. Chemistry
- Chase Gamwell, B.S. Chemistry
- Joshua King (Zhan Scholar), B.S. Chemistry
- Michelle Watters, B.S. Chemistry
- James Lawlor, B.S. Chemistry
- Kimberli Helms, B.S. Chemistry
- Rosemary Puckett, Non-degree
- James Wolfsberger, B.S. Chemistry
- Reah Lee, B.S. Chemistry
- Caitlin Allison, B.S. Chemistry
- Stephen Layne, B.S. Chemistry
- Alicia Caudle, B.S. Chemistry
- David Jackson, B.S. Chemistry
- Marianne Smith, B.S. Biotechnology, Calhoun College (Intern)

Additional Teaching Activities:

- **UAH HudsonAlpha Outreach Program (UHOP) Orientation**
Developed and presented a 1-hour sample lecture on General Chemistry for NSF S-STEM Scholarship recipients. Aug. 2016, Aug. 2017, Aug. 2018
- **MCAT Review**, University of Alabama in Huntsville
Developed and presented a 4-hour review of General Chemistry topics for pre-professional students. Jan. 2016, Jan. 2017
- **National Youth Science Camp**, Bartow, WV
Developed and presented 3-day Directed Studies in Structural Biology.
Summer, 1995-1999, 2001-2018 - average of 8-15 students per workshop.

- **AP Biology**
Developed, wrote, and implemented two laboratory exercises covering enzyme catalysis (as a replacement for AP Biology Lab #2) and bacterial transformation and restriction enzyme digest (as a replacement for AP Biology Lab #6) at six local high schools. This was in conjunction with the Partnership for Biotechnology Research (PBR) and the Hudson/Alpha Institute for Biotechnology. Fall 2006 - Spring 2011
- **Sally Ride Festival**
Developed and taught a workshop on enzyme catalysis titled “In a Hurry? Try Enzymes!” for middle-school aged students at the Sally Ride Festival held on the UAH campus. Fall 2006, Fall 2007

III. Research, Creative, and Scholarly Activity:

- Refereed Journal Articles:
 - Helms, K. M., Wilson, R. C., Ogungbe, I. V., Setzer, W. N., and **Twigg, P. D.** 2011. "Vitexin Inhibits Polyubiquitin Synthesis by the Ubiquitin-conjugating Enzyme E2-25K." *Natural Product Communications*, **6(10)**, 1411-1416.
 - Wilson, R. C., Edmondson, S. P., Flatt, J. W., Helms, K., and **Twigg, P. D.** 2011. "The E2-25K Ubiquitin-associated (UBA) Domain Aids in Polyubiquitin Chain Synthesis and Linkage Specificity." *Biochem. Biophys. Res. Com.*, **405(4)**, 662-666.
 - Wilson, R. C., Hughes, R. C., Flatt, J. W., Meehan, E. J., Ng, J. D., and **Twigg, P. D.** 2009. "The crystal structure of full-length ubiquitin-conjugating enzyme E2-25K (huntingtin-interacting protein 2)." *Acta Cryst.*, **F65**, 440-444.
 - Wilson, R. C., Hughes, R. C., Curto, E. V., Ng, J. D., and **Twigg, P. D.** 2007. "Backbone ^1H , ^{15}N , and ^{13}C Resonance Assignments and Secondary Structure of a Novel Protein OGL-20P^T-358 from Hyperthermophile *Thermococcus thio还原ens* sp. nov." *Molecules and Cells*, **24(3)**, 437-440.
 - **Twigg, P. D.**, Parthasarathy, Guerrero, G., L., Logan, T. M., and Caspar, D. L. D. 2001. "Disordered to Ordered Folding in the Regulation of Diphtheria Toxin Repressor Activity." *Proc. Natl. Acad. Sci. USA*, **98**, 11259-64.
 - Wang, G., Wylie, G. P., **Twigg, P. D.**, Caspar, D. L. D., Murphy, J. R., and Logan, T. M. 1999. "Solution Structure and Peptide Binding Studies of the C-Terminal SH3-Like Domain of the Diphtheria Toxin Repressor Protein." *Proc. Natl. Acad. Sci. USA*, **96**, 6119-6124.
 - **Twigg, P. D.**, Wylie, G. P., Wang, G., Caspar, D. L. D., Murphy, J. R., and Logan, T. M. 1999. "Expression and Assignment of the ^1H , ^{15}N , and ^{13}C Resonances of the C-terminal Domain of the Diphtheria Toxin Repressor." *J. Biomolecular NMR*, **13(2)**, 197-198.
 - Carter, D. C., Wright, B. S., Miller, T. Y., Chapman, J., **Twigg, P. D.**, Keeling, K. M., Moody, K., White, M., Click, J., Ruble, J. R., Ho, J. X., Adcock-Downey, L., Bunick, G., and Harp, J. 1999. "Diffusion-controlled crystallization apparatus for microgravity (DCAM): flight and ground-based applications." *J. Crystal Growth*, **196**, 602-609.
 - Carter, D. C., Wright, B. S., Miller, T. Y., Chapman, J., **Twigg, P. D.**, Keeling, K. M., Moody, K., White, M., Click, J., Ruble, J. R., Ho, J. X., Adcock-Downey, L., Dowling, T., Chang, C.-H., Ala, P., Rose, J., Wang, B. C., Declerq, J.-P., Evrard, C., Rosenberg, J., Wery, J.-P., Clawson, D., Wardell, M., Stallings, W., and Stevens, A. 1999. "PCAM: a multi-user

- facility-based protein crystallization apparatus for microgravity.” *J. Crystal Growth*, **196**, 610-622.
- Carter, D. C., Lim, K., Ho, J. X., Wright, B. S., **Twigg, P. D.**, Miller, T. Y., Chapman, J., Keeling, K. M., Ruble, J. R., Vekilov, P. G., Thomas, B. R., Rosenberger, F., and Chernov, A. A. 1999. “Lower dimer impurity incorporation may result in higher perfection of HEWL crystals grown in microgravity. A case study.” *J. Crystal Growth*, **196**, 623-637.
 - Wardell, M. R., Skinner, R., Carter, D. C., **Twigg, P. D.**, & Abrahams, J.-P. 1997. “Improved diffraction of antithrombin crystals grown in microgravity.” *Acta Cryst.D*, **53**, 622-625.
 - Ho, J.X., Holowachuk, E.W., Norton, E.J., **Twigg, P.D.**, and Carter, D.C. 1993. “X-ray and Primary Structure of Horse Serum Albumin (*Equus caballus*) at 0.27-nm Resolution.” *Eur. J. Biochem.*, **215**, 205-212.
 - Carter, D.C., He, X.-M., Munson, S.H., **Twigg, P.D.**, Gernert, K.M., Broom, M.B., and Miller, T.Y. 1989. “Three-Dimensional Structure of Human Serum Albumin.” *Science*, **244**, 1195-1198.
 - Howard, S.B., **Twigg, P.D.**, Baird, J.K., and Meehan, E.J. “The Solubility of Hen Egg White Lysozyme.” 1988. *J. Crystal Growth*, **90**, 94-104.
 - Fowles, W.A., DeLucas, L.J., **Twigg, P.D.**, Howard, S.B., Meehan, E.J., Jr., and Baird, J.K. 1988. “Experimental and Theoretical Analysis of the Rate of Solvent Equilibration in the Hanging Drop Method of Protein Crystal Growth.” *J. Crystal Growth*, **90**, 117-129.
 - Abstracts and Papers Delivered at Professional Meetings:
 - Morgan, T.J., Jr., Twigg, P.D., Gower-Winter, S., Schepkin, V., Logan, T., and Levenson, C. “Ultra-high field imaging, genomic and metabolomics analysis of chemotherapeutic resistant glioma cell lines.” Poster presented at Society for Neuroscience Annual Meeting, New Orleans, LA, 2012.
 - Helms, K. M., Wilson, R. C., Ogungbe, I. V., Setzer, W. N., and Twigg, P. D. “Vitexin Inhibits Diubiquitin Formation by the Ubiquitin-Conjugating Enzyme E2-25K.” Poster presented at 43rd International Symposium on Essential Oils in Lisbon, Portugal, September 2012.
 - Cassidy, C. Twigg, P. D., Holmes-Caudle, T., and Setzer, W. N. "Inhibition of caspase-3 by isolates from *Lonchocarpus haberi* from Monteverde, Costa Rica." Poster presented at 7th Joint Meeting of AFERP, ASP, GA, PSE, & SIF Natural Products with pharmaceutical, nutraceutical, cosmetic, and agrochemical interest Athenaem Intercontinental, Athens, Greece, 3-8 August 2008.
 - Wilson, R., Edmondson, S., Flatt, J., Meehan, E., and Twigg, P. D. “Characterization of the UBA Domain of E2-25K, a Ubiquitin-conjugating Enzyme.” Poster presented at the 36th Southeastern Magnetic Resonance Conference, Tuscaloosa, AL, November 2007.
 - Twigg, P. D., Wilson, R., Edmondson, S., and Meehan, E. “Solution Structure and Characterization of E2-25K, a Huntingtin-interacting Protein.” Poster presented at the Hereditary Disease Foundation annual meeting, “HD2006: Changes, Advances, and Good News”, Boston, MA, August 2006.
 - Carter, D.C., He, X.-M., Twigg, P.D., and Casale, E. 1990. “Drug Binding to Human Serum Albumin: Functional and Therapeutical Implications.” *Technology 2000 Proceedings*, Washington, D.C., November 27-28, 1990.

- DeLucas, L.J., Smith, C.D., Ealick, S.E., Carter, D.C., Twigg, P.D., He, X.-M., Snyder, R.S., Weber, P.C., Schloss, V., Einspahr, H.M., Clancy, L.L., McPherson, A.M., Koszelak, S., Vandoselaar, M.M., Prasad, L., Quail, J.W., Delbaere, L., and Bugg, C.E. 1990. “Protein Crystal Growth Aboard the U.S. Space Shuttle Flights STS-31 and STS-32.” *Advances in Space Research*.
- Baird, J.K., Frieden, R.W., Meehan, E.J., Jr., Twigg, P.D., Howard, S.B., and Fowles, W.A. 1987. “Evaporation Kinetics in the Hanging Drop Method of Protein Crystal Growth.” *Mat. Res. Soc. Symp. Proc.*, **87**, 231-237.
- Baird, J.K., Frieden, R.W., Meehan, E.J., Jr., Twigg, P.D., Howard, S.B., and Fowles, W.A. 1987. “Model for Determining Vapor Equilibration Rates in the Hanging Drop Method of Protein Crystal Growth.” *Proc. 6th European Symposium on Material Sciences under Microgravity Conditions*, 391-394.
- Other Publications:
 - Twigg, P. D., Lamb, N. E., DuBreuil, R. M., and Zahorchak, R. 2011. “APPLE for the Teacher: Scientists in the Classroom. From Grass Roots to Productive Orchard.” *The American Biology Teacher*, **73(8)**, 444-448.
- Invited Colloquia, Seminars and Presentations:
 - “Metabolomics of Cancer.” UAH Dept. of Chemistry Seminar Series, November 4, 2016.
 - “Metabolomics of Chemoresistance in Glioma.” UAH Dept. of Chemistry Seminar Series, March 25, 2014.
 - “The Role of the Ubiquitin-binding Domain in E2-25K.” Abbvie Pharmaceuticals, North Chicago, IL, June 11, 2013.
 - “Ubiquitin-binding Domains: What’s a nice domain like you doing in a place like this?” Kasha Award Lecture, Florida State University, Tallahassee, FL, June 23, 2009.
 - Invited spokesperson for Alabama EPSCoR program; met with Alabama representatives and senators, Washington, D.C., February 23-25, 2009.
 - “The Role of Structural Biology in Huntington’s Disease Research.” Seminar presented at Sewanee University of the South, Sewanee, TN, November 16, 2007.
 - “Structural Biology at UAH: What’s Happening in the Rocket City?” Seminar presented at Trevecca Nazarene University, Nashville, TN, November 16, 2006.
- Research Grants and Contracts Received:
 - **Alpha Foundation** – “Characterization of E2-25K (Huntingtin-interacting protein 2) as a Potential Drug Target for Huntington’s Disease and Alzheimer’s Disease Therapy”, \$25,000 (2008).
 - **NIH R15 NS066391-01** – “Investigations into the structure, function, and activity of E2-25K”, \$220,750 (2009).
 - **Alpha Foundation** – Gift check to UAH Foundation for continuing support of Huntington’s Disease Research, \$25,000 (2010).

IV. Service Activities:

Discipline:

- **Journal Article Reviewer** - *Acta Cryst. F Biological Crystallography*, 2002 – present.
- **Journal Article Reviewer** - *Biochemistry*, 2010 – present
- **Journal Article Reviewer** – *Nature Oncology*, 2011 – present
- **Treasurer**, National Youth Science Camp Alumni Association, 2010 - 2011
- **Program Oversight Committee**, National Youth Science Foundation, 2015 – present.
- **Board of Directors**, Partnership for Biotechnology Research (PBR), Huntsville, AL, 2009 - 2014
- **Steering Committee**, PBR, Huntsville, AL, 2004 - 2011
- **APPLE (Advanced Placement Program for Learning Enhancement)**, PBR, Huntsville, AL, 2006 – 2014.
- **Alabama Louis Stokes Alliance for Minority Participation Annual Research Conference**, Judge, 2010
- **North Alabama Regional Science and Engineering Fair**, Judge, 2005-2010, 2019
- **Alabama State Science and Engineering Fair**, Judge, 2006, 2010, 2019
- **National Junior Science and Humanities Symposium**, Judge, 2007.

Institutional:

University

- **Science Olympiad**, Event Coordinator, UAH Tournament, 2005-2011, 2015-2019
- **Radiation Safety Committee**, UAH, 2004-2011
- **University of Alabama System Honors Research Conference**, Judge, 2010
- **Sally Ride Science Festival**, Workshop/Exhibit coordinator for UAH Laboratory for Structural Biology and Alabama High Field NMR Laboratory, 2006-2007.

Department

- **Departmental Outreach and Recruitment Committee**, Chem. Dept., UAH, 2018-present
- **Departmental Advisor for Undergraduate Chemistry Majors**, Chem. Dept., UAH, 2015 – present
- **Departmental Committee for Identification of PASS Leaders**, Chem. Dept., UAH, 2015 – present
- **Departmental Representative**, College Visit Days, UAH, 2014 – present
- **Departmental Representative**, Discovery Days, UAH, 2017
- **Departmental Representative**, Freshman Orientation, UAH, 2017
- **Emergency Supervisor for Laboratory for Structural Biology**, UAH, 2006-2011
- **Departmental Honors Student Committee**, Chemistry Dept., UAH
- **Departmental Space Advisory Committee**, Chem. Dept., UAH
- **Committee to Evaluate Departmental Operating Paper**, Chem. Dept., UAH
- **Committee to Review Course Requirements for Master's Degree in Chemistry**, Chem. Dept., UAH
- **Biosciences Retreat Organization Committee**, Biotechnology Ph.D. Program, UAH

V. Honors, Awards, and Special Recognitions:

- **College of Science Teaching Excellence Award**, UAH, 2016
- **Michael Kasha Student Publication Award**, Florida State University, 2004
- **National Science Foundation Research Training Grant**, 1999-2001
- **NASA Group Achievement Award - Protein Crystal Growth Team**, 1994
- **NASA Certificate of Appreciation**, 1993