

Karin S. Åkerfeldt
Curriculum Vitae
Professor Emeritus of Chemistry
Haverford College

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Professional Preparation

University of Stockholm, Sweden	Chemistry and Biochemistry	B.Sc.	1980
University of California, Davis	Chemistry	M.Sc.	1980-1982
University of California, Berkeley	Chemistry	Ph.D.	1984-1989
DuPont Merck, Pharmaceutical Co Wilmington, DE	Protein Design	Postdoc	1990-1993

Appointments

Haverford College

Professor, Department of Chemistry (2008 – 2021)

Haverford College

Associate Professor, Department of Chemistry (1998 – 2008)

Rutgers University, Camden

Assistant Professor, Department of Chemistry (1993 – 1998)

Rutgers University, Camden

Associate Member of the Graduate Program, Department of Biology (1994 – 1998)

Awards and Honors

Doctor of Philosophy, honoris causa, Lund University, Sweden, May, 2019

Guest Professorship, 2018-2019 (Hedda Andersson Foundation, Lund University, Sweden)

John and Barbara Bush Professor of Natural Sciences, Endowed Chair, 2018

Cottrell Scholar Award class of 1995 (awarded 2015)

Guest Professorship, Fall 2013 (Hedda Andersson Foundation, Lund University, Sweden)

The Lise Meitner Guest Professorship, Lund University, Sweden, Fall 2005

The Henry Dreyfus Teacher-Scholar Award, 2002-2007

The Lise Meitner Guest Professorship, Lund University, Sweden, Spring 2002

The Christian R. and Mary F. Lindback Distinguished Teaching Award, 2001

NSF CAREER award, 1998

The Bruce H. Mahan Memorial Teaching Award, 1985

The Jacob and Mary Kemler Seitz Scholarship, 1984

Fulbright Fellowship, 1980-82

Publications 2000- (* indicates undergraduate research student)

1. “Insights into the nano- and macro-scale assembly of a chemically diverse peptide hydrogel of human origin” Brett Pogostin,* Kerilyn Godbe,* Marija Dubačić, Isabelle Angstman,* William Fox,* Natalie Giovino,* Matija Lagator,* Abigail Payson,* Marisa LaBarca,* Birgitta Frohm, Sara Linse, Casey Londergan, Ulf Olsson, Luigi Gentile and Karin S. Åkerfeldt (manuscript in preparation).
2. “On the charge regulation of hydrogel formation” Luigi Gentile, Birgitta Frohm, Anders Malmendal, Karin S. Åkerfeldt, Ulf Olsson, and Sara Linse (manuscript in preparation).
3. “Calmodulin complexes with brain and muscle creatine kinase peptides” Sprenger J, Trifan A, Patel N,* Vanderbeck A,* Bredfeldt J, Emad T, Rowlett R, Leggio LL, Åkerfeldt KS, Linse S *Current Research in Structural Biology* **3**, 121-132 (2021). doi: 10.1016/j.crsbti.2021.05.001.
4. “pH-Responsive Capsules with a Fibril Scaffold Shell Assembled from an Amyloidogenic Peptide” Shimanovich U, Levin A, Eliaz D, Michaels T, Toprakciaoglu Z, Frohm B, De Genst E., Linse S, Åkerfeldt KS, Knowles TPJ *Small* (2021) 17(26):e2007188. doi: 10.1002/smll.202007188.
5. “On the Mechanism of Self-Assembly by a Hydrogel-Forming Peptide” Braun GA,* Ary, BE,* Dear, AJ, Rohn MCH,* Payson AM,* Lee DSM,* Parry RC,* Friedman C,* Knowles TPJ, Linse S, Åkerfeldt KS *Biomacromolecules* **21**, 4781 (2020). doi: 10.1021/acs.biomac.0c00989.

6. “Deuterium-Enhanced Raman Spectroscopy for Histidine pKa Determination in a pH-Responsive Hydrogel” Braun GA,* Pogostin BH,* Pucetaite M, Londergan CH, Åkerfeldt KS *Biophysical Journal* **119**, 1701 (2020). doi:10.1016/j.bpj.2020.09.011.
7. “pKa Determination of a Histidine Residue in a Short Peptide Using Raman Spectroscopy” Pogostin BH,* Malmendal A, Londergan CH, Åkerfeldt KS *Molecules*, **24**, 405 (2019). doi:10.3390/molecules24030405.
8. “Disaggregation of gold nanoparticles by *Daphnia magna*” Mattsson K, Aguilar R,* Torstensson O, Perry D,* Bernfur K, Linse S, Hansson L-A, Åkerfeldt KS and Cedervall T. *Nanotoxicology*. **12**, 885-900 (2018). doi: 10.1080/17435390.2018.1485982.
9. “P450 monooxygenase ComJ catalyses side chain phenolic cross-coupling during complestatin biosynthesis” Mollo A,* von Krusenstiern N,* Bulos JS,* Ulrich V, Åkerfeldt KS, Cryle MJ and Charkoudian LK *RSC Advances*, **7**, 35376-35384 (2017). doi: 10.1039/C7RA06518C.
10. “Protein Microgels from Amyloid Fibril Networks” Shimanovich U, Efimov I, Mason TO, Flabmeier P, Buell AK, Gedanken A, Linse S, Åkerfeldt, KS, Dobson CM, Weitz DA, Knowles TP *ACS Nano*, **9**, 43-51. (2015). doi: 10.1021/nn504869d.
11. “A peptide from human semenogelin I self-assembles into a pH-responsive hydrogel” Frohm, B, DeNizio, J,* Lee, DS,* Gentile L, Olsson U, Malm, J, Åkerfeldt, KS, Linse, S *Soft Matter*, **11**, 414-421 (2014). doi: 10.1039/C4SM01793E.
12. “Förster resonance energy transfer studies of calmodulin produced by native protein ligation reveal inter-domain electrostatic repulsion” Hellstrand, E, Kukora, S,* Shuman, C, Steenbergen S,* Thulin, E, Kohli, A,* Krouse, B,* Linse, S, Åkerfeldt, K *FEBS Journal*, **280**, 2675-2687 (2013). doi: 10.1111/febs.12269.
13. “Calbindin D_{28k}.” Åkerfeldt KS, Cedervall T, Bauer M, Linse S In *Encyclopedia of Calcium Binding Proteins*. Uversky & Kretsinger, Eds, Springer (2013).
14. “Calcium-Dependent Interaction of Calmodulin with Human 80S Ribosomes and Polyribosomes.” Behnen P, Davis E,* Delaney E,* Frohm B, Bauer M, Cedervall T, O’Connell D, Åkerfeldt KS, Linse S. *Biochemistry*, **51**,6718-27 (2012).
15. “Integrated protein array screening and high throughput validation of 70 novel neural calmodulin binding proteins” O’Connell, DJO.; Bauer, MC, O’Brien J, Johnson, WM,* Divizio CA,* O’Kane S, Berggård T, Merino A, Åkerfeldt KS, Linse S, Cahill DJ *Molecular & Cellular Proteomics* **9**, 1118-1132 (2010).
16. “Reconstitution of Calmodulin from Domains and Subdomains: Influence of Target Peptide”, Shuman CF, Jiji R,* Åkerfeldt KS, Linse S *Journal of Molecular Biology*, **358**, 870-882 (2006).
17. “Calbindin D_{28k} EF-Hand Ligand Binding and Oligomerization: Four High-Affinity Sites – Three Modes of Action”, Cedervall T, André I, Selah C,* Robblee JP,* Krecioch PC,* Fairman R, Linse S, Åkerfeldt KS *Biochemistry*, **44**, 13522-13532 (2005).
18. “Redox Sensitive Cysteine Residues in Calbindin D_{28k} are Structurally and Functionally Important”, Cedervall T, Berggård T, Borek V,* Thulin E, Linse S, Åkerfeldt KS *Biochemistry*, **44**, 684-693 (2005).
19. “Deamidation and Disulfide Bridge Formation in Human Calbindin D_{28k} with Effects on Calcium Binding”, Vanbelle C, Halgand F, Cedervall T, Thulin E, Åkerfeldt KS, Laprévotte O, Linse S *Protein Science*, **4**, 968-79 (2005).
20. “Self-Assembling Porphyrin-Modified Peptides”, Dunetz JR,* Sandstrom C,* Young ER,* Baker P,* VanName SA,* Cathopolous T,* Fairman R, de Paula JC, Åkerfeldt KS *Organic Letters*, **7**, 2559-61 (2005).
21. “Peptides as Smart Materials”, Fairman R, Åkerfeldt, KS *Current Opinion in Structural Biology*, **4**, 453-63 (2005).
22. “The Role of Electrostatic Interactions in Calmodulin-Peptide Complex Formation”, André I, Kesvatera T, Jönsson B, Åkerfeldt KS, Linse S *Biophysical Journal*, **87**, 1929-38 (2004).
23. “Synthesis and Ion Conductance Behavior of a Tetrameric Alamethicin Ion Channel”, Wassner AJ,* Hurt, JA,* Lear JD, Åkerfeldt KS *Organic Letters*, **4**, 1647-1649 (2002).
24. “Fragment Complementation of Calbindin D_{28k}” Berggård T, Thulin E, Åkerfeldt KS, Linse S *Protein Science* **9**, 2094-2108 (2000).

Other Publications 2000-

25. “New Guidelines in Medical Education.” Åkerfeldt KS *Biochemical and Molecular Biological Education* **37**, 323 (2009). doi: 10.1002/bmb.20355.

Recent External Research Support

NSF “RUI: Investigations of hydrogels formed by semenogelin I-derived peptide sequences.” \$281, 610 (June 15, 2016 – May 31, 2019) – extended to May 31, 2021.

Recent Teaching and Administrative Duties at Haverford College

Courses taught:

General Chemistry (First-year level)
Organic Chemistry (Sophomore level)
Advanced Laboratory Techniques in Bioorganic Chemistry, “Superlab” (Junior level)
Proteins in Health and Disease (Junior and Senior level)
Biomaterials (Junior and Senior level)
Senior Research Tutorial in Bioorganic Chemistry (Senior Thesis mentorship)
Research Tutorial in Bioorganic Chemistry for Underclassmen
Proteins in Nutrition and Disease (Non-majors)

Administrative duties:

Education Policy Committee, Natural Science Division Faculty Representative (2019-2020)
Academic Council, Natural Science Representative (2016-18)
Presenter of Reappointment Case (2015)
Prehealth Committee (2012-2013, 2014-2018, 2020-2021)
Study Abroad Committee (2011-2013, 2015-2018)
Chair, Chemistry Department (2008-2009, 2011-2013, 2014-2015)
Faculty Representative – Cases of Sexual and Racial Harassment (2014-2016)
Academic Council – Appeals Committee (2014-2016)
Search Committee Member, Chemistry (Fall 2011)
Search Committee Member, Librarian of the College (Fall 2010)
Member, Faculty Committee on Academic Enrichment (2008-2009)
Chair, College Laboratory Safety Committee (2007-2008)
Presenter of Promotion Case for Associate Professor and tenure (2007)
Presenter of Promotion Case to Full Professor (2006)
Program Director for the administration of a Howard Hughes Medical Institute (HHMI) grant to Haverford College (2002-2005)
Coordinator of HHMI Cascade Mentoring Program (High School Outreach) (2000-2006)

Service to the Wider Scientific Community:

External reviewer of Chemistry Department, Vassar College, NY (2019)
External reviewer of Chemistry Department, Amherst College, MA (2010)
Councilor (chemistry division) of CUR, Council on Undergraduate Research (2006-2009)
Committee Member AAMC-HHMI Scientific Foundation for Future Physicians (2008)
Editorial Board Member of and regular reviewer of *BAMBED J* (2008-2011)
Advisory Editorial Board Member and regular reviewer of *FEBS Journal* (2003-2011)
Ad Hoc journal article reviewer of *Protein Science*, *Journal of the American Chemical Society*, *Organic Letters*, *FEBS Journal*
Ad Hoc Grant Reviewer for NSF, Research Corporation, American Chemical Society Petroleum Research Fund
Regular reviewer of tenure and promotion packages of outside faculty

Collaborators & Other Affiliations

i. Collaborators

Dr. Sara Linse, Department of Biochemistry and Structural Biology, Lund University, Sweden
Dr. Ulf Olsson, Department of Physical Chemistry, Lund University, Sweden
Dr. Luigi Gentile, Department of Chemistry, University of Bari Aldo Moro, Bari, Italy
Dr. Janina Sprenger, Department of Chemistry, University of Copenhagen, Denmark
Dr. Tuomas Knowles, Department of Chemistry, Cambridge University, UK
Dr. Ulyana Shimanovich, Department of Chemistry, Cambridge University, UK
Dr. Casey Londergan, Department of Chemistry, Haverford College, Haverford, PA

Dr. Robert Fairman, Department of Biology, Haverford College, Haverford, PA
Dr. Walter Smith, Department of Physics, Haverford College, Haverford, PA
Dr. Michael Mayer, Department of Biomedical Engineering and Chemical Engineering, University of Michigan, MI

ii. Graduate Advisor

M.Sc. Kevin M. Smith

Ph.D. Paul A. Bartlett

iii. Postdoctoral Advisor

William F. DeGrado

iv. Recent Undergraduate Senior Research Thesis Students

2003-04 Stephanie Kukora, Nihad Rahman, Jesse Isaacman-Beck, Terry Cathopoulos, Joshua Stecher
2004-05 Beth Krouse, Jason Bessey, Sarah Czarkowski
2005-06 Victoria Mui, Evan Birnholz
2006-07 Akram Mustafa, Mohammed Pervais, Nicolas Riccio, Sarah Steenbergen
2007-08 Neal Arakawa, Massiel Chavez, Sophie Koshland, Yanika Wolfe, Dana Mullenhard
2008-09 Reed Hurt, Winifred Johnson, Haein Kim
2009-10 Aldo Garcia
2010-11 Elizabeth Davis, Jamie DeNizio
2011-12 Peter Sacci, Catherine Divizio, Erin Delaney, Sarah Figueredo
2012-13 Brandon Robilotti, David Lee, Emily Mills, Kelly Lively
2013-14 Katrina Nayak, Naila Ijaz, Matthew Rohn
2014-15 Beatrice Ary, Jennifer Willemsen, Abigail Healy, Diana Perry
2015-16 Kerilyn Godbe, Ruben Aguilar, Neal Patel, Robert Parry
2016-17 Abigail Payson, Natalie Giovino, Matija Lagator, Sarah Lambros
2017-18 Brett Pogostin, Ann-Victoria Isaac, Victoria Ribeiro
2018-19 Benjamin Frost, Fiona Berry, Gabriel Braun, William Fox
2019-20 Isabelle Angstman, Alexander Daniels, Sheraz Qamar
2020-21 Marisa LaBarca, Brett Mozarsky, Devi Namboodiri

Recent Underclassmen Research Students

2008-09 Nikolas (Nick) Akukwe Nwoke (first-year), Vassily Kutuyavin (sophomore), Andrew McNeal (junior), Eugenia Sokolskaya (high school student, Harriton High School)
2009-10 Catherine Devizio (sophomore), Grace Cheong (first-year), Brandon Robilotti (first-year)
2010-11 Catherine Devizio (junior), Ashley Vanderbeck (sophomore), Grace Cheong (sophomore), Brandon Robilotti (sophomore)
2011-12 Brandon Robilotti (junior), David Lee (junior), Maria D'Amico (first-year)
2012-13 Elias Borne (junior), Naila Ijaz (junior), Katrina Nayak (junior), Luke Franklin (junior), Matthew Rohn (junior), Shelby Lyons (sophomore)
2013-14 Beatrice Ary (junior), Abigail Healy (junior), Jennifer Willemsen (junior)
2014-15 Marco Rivas (first-year), Brett Pogostin (first-year), Ruben Aguilar (junior), Kerilyn Godbe (junior), Neal Patel (junior), Robert Parry (junior)
2015-16 Benjamin Frost (first-year), Marco Rivas (sophomore), Brett Pogostin (sophomore)
2016-17 Benjamin Frost (sophomore), Kaiwei Wang (summer 2016, sophomore), Brett Pogostin (junior)
2017-18 Gabriel Braun (junior), Benjamin Frost (junior), William Fox (junior), Fiona Berry (junior), Katherine Chung (first-year)
2019-20 Marisa LaBarca (junior), Brett Mozarsky (junior), Devi Namboodiri (junior)