

David Carl Speckhard
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Education

Ph. D., Ohio State University, 1975, Chemistry
B. A., DePauw University, 1970, Chemistry/Pre-Medicine double major

Employment/Honors

2011-Summer&Fall Visiting Researcher at U. Iowa NSF ROA
2010-Summer Visiting Researcher at U. Iowa
2009-present Chemistry Program Coordinator Loras College
2009-summer FUTURE in Biomedicine Fellow at Iowa
2005-2009 Chair of Molecular and Life Sciences Division
2002-fall Fr. Naumann Award, awarded by Loras students and parents for service to students "above and beyond the call of duty"
1998-2005 Co-director of MAHP Recombinant DNA Lab at Loras College
1997-spring/summer Visiting Professor, Biochem/Mol.Bio, Indiana Univ. Medical School
1995-present Professor of Biochemistry, Loras College
1990-1995 Professor and Chairman, Loras College Chemistry Dept.
1990-93 summers Visiting Professor, UW-Madison
1989-1990 Associate Professor and Chairman, Loras College Chem. Dept.
1988-1989 Fulbright Senior Professor, Max-Planck Institute for Experimental Medicine, Göttingen, Germany
1985-88 summers Visiting Associate Professor, UW.-Madison
1985-fall Lecturer, UW-Platteville, Chemistry
1983-1988 Associate Professor, Loras College
1981-1983 Assistant Professor Chemistry, Loras College
Department of Chemistry
1977-1981 Assistant Professor Biochemistry, Clemson University
Department of Biochemistry
1976-1977 Visiting Assistant Professor, Clemson University
1975-1976 Postdoctoral Fellow, Albert Einstein College of Medicine
1970-1975 Teaching and Research Assistant, Ohio State University
Department of Chemistry

Professional Organizations

I am a member of MACTLAC (Midwest Association of Chemistry Teachers at Liberal Arts Colleges), the American Chemical Society, Lambda Upsilon, and Delta Epsilon Sigma.

Grants Funded 1988-2010

2010 Iowa College McElroy Foundation \$1900 grant for undergraduate research with Priyanka Parajuli "Is Coronin-1 involved in *Danio rerio* cell mobility in a ubiquitin dependent fashion?"
2009 Federal Earmark for chemistry and biochemistry equipment \$94,000
2007-2010 NSF CCLI Grant for spectroscopy equipment \$122,000
2007-2008 Iowa College McElroy Foundation \$1500 grant for undergraduate research
2007-2010 Medical Associates Matching funds for DNA sequencer \$50,000 over 3 yr.
2006 Beckman-Coulter GEMF grant for DNA Sequencer \$50,000
2005-2006 Iowa Science Foundation research grant \$3,500
2004 Carver Foundation Grant to support research in Biology and Chemistry \$115,000

2002-2003 Iowa College McElroy Foundation \$1700 grant for undergraduate research
2001-2004 NSF Major Research Instru., \$185,000 for a high field NMR (\$40,000 match)
2000-2001 Iowa College McElroy Foundation \$1400 grant for undergraduate research
1998-2000 Medical Associates HMO, \$200,000 grant to establish a teaching lab
1996-1998 Medical Associates HMO, \$21,500 grant to purchase computer equipment
1994-1999 National Science Foundation, \$140,000 RUI grant
1993-1994 Dreyfus Foundation, \$15,000 Advanced Biochemistry Laboratory Grant
1991-1993 Research Corporation Cottrell Grant, \$29,985
1991-1992 Iowa Science Foundation, \$5,000
1990-1992 Amoco Foundation, \$20,000 Departmental Equipment Grant
1988-1989 Fulbright Senior Professor Award

TEACHING and ACADEMIC activities

I have many years experience teaching General Chemistry and Biochemistry in traditional lecture style as well as creating and conducting laboratories.

I have developed more interactive classes, incorporating technology and computers into the classes and labs. Labs have all incorporated multi-week research projects. One of these was an accelerated General Chemistry. I taught this class twice and found it easier to avoid lectures and to create a dialog with the students when we meet in the same room for both laboratory and class. Having a small class of only 15 or so students fosters this dialog. I am leading a course for the active-learning-based general curriculum. This course topic is energy and water. This class serves non-science majors but has a research laboratory project requirement.

I taught a section of the first year introductory college experience class. All Loras first-year students take this class, called Modes of Inquiry, in the fall semester. The class combines adjustment to college skills, academic advising, study skills, critical thinking skills, and a service project. The theme of my section was "Biotechnology" particularly the controversy surrounding GMO. I taught in the January term session one course focused on "Career Options". We engaged in a variety of activities including student reports about careers, Mock interviews, resume writing, sessions with campus resource persons, presentations by local professionals and tours of laboratories in industries, graduate, and professional schools. The other was Caveman Chemistry a course that traces great advances in chemistry from fire to polymers.

I have served on many Loras committees;

- As Division Chair in the past and faculty representative I serve on the Academic Council which oversees the curriculum and operation of the academic activities of the college.
- I was a presidential appointee to Wellness Committee, this group was charged with preparing a wellness plan for the institution.
- I participate in the *ad hoc* committee to prepare a plan for remodeling of the science hall and have organized site visits to other campuses to investigate new facility ideas.
- I lead the Humanity in the Physical Universe task force. This group created the master syllabus for general education science classes, we now assess course activities and share teaching ideas.
- I was appointed by Academic Council to the Honors Committee in April 2006, this

group oversees the All College Honors Program. My term ended in 2009

- I was elected by the faculty to the Assessment Committee in 2010. This committee oversees assessment activities related to the general education requirements and the incorporation of lifelong learning skills in majors courses
- I was elected by the faculty in 2004 and again in 2007 to the Faculty Development Committee. In 2007 I took over responsibility for organizing the Student/Faculty Research and Scholarly Activity Colloquium and in 2008 I took a leadership role in the committees planning of New Faculty Orientation.
- I am involved in the Loras Council on Undergraduate Research advocacy group and have organized local meetings and lead teams to National CUR meetings.

Administrative Experience

I was the Chair of the Molecular and Life Sciences Division. This is the merger of the Chemistry Department, biology Department and the DNA Lab. Besides me, 9 faculty and a technician serve in this division. The Chair has budget and supervisory responsibilities. I was the PI and administrator for the recent equipment grants in the division, the Spectrometry grant from 2007, and the 2010 Medical Associates grant for the plate reader. I also helped obtain a high field NMR and other instrumentation through equipment and research grants before and during the time I served as Chair.

In 1999 we created a Biochemistry major distinct from the Chemistry major. I was team leader at the PKAL conference in Minneapolis on Biochemistry majors. That experience has helped us design the major. More recently I have been team leader at SENCER, PKAL, and CUR conferences as we changed our teaching pedagogy and have emphasized student/faculty research in the curriculum. Since 2002, I have served on review panels for the National Science Foundation Biology Major Research Instrumentation program and Chemistry CCLI program.

PUBLICATIONS: Undergraduates indicated by *

- Lester*, L., L. Rusch*, G. Robinson*, and D. Speckhard "Mapping the Active Sites of 3-Phosphoglycerate Kinase and Glycerol Kinase with Monoammine chromium (III) ATP" *Biochemistry* vol 37, No. 16, p5349-5355 (1998)
- Xie, P., S. Parsons, D. Speckhard, W Bosron, and T. Hurley "X-Ray structure of human Class IV $\sigma\sigma$ alcohol dehydrogenase: structural basis for substrate specificity" (1997) *J. Biol. Chem.* 272 18558-18563
- Rawlings, Jill, D. Speckhard, and W. W. Cleland "Characterization of the Isomers of Monoamminechromium-ATP and Their Use in Mapping Enzyme Active Sites" *Biochemistry* vol 32 p 11204-11210 (1993)
- Edens*, W., J. Rawlings, D. Speckhard, and W.W. Cleland "CHARACTERIZATION OF A CHROMIUM PYROPHOSPHATE SERIES WITH AN ION EXCHANGE COLUMN" *J. Inorganic Biochemistry* Vol 49 p 49-54 (1993)
- Speckhard, D., Rawlings, J, Pecoraro, V., and Cleland, W., "Triamminechromium(III) Complexes of Tripolyphosphate and Adenosine Tri- and Diphosphate" *J. Inorganic Biochemistry* vol 41 p 105-116 (1991)
- Speckhard, D., "Recognition" (1989) *Loras Faculty Review* Vol. 1, number 1, pages 77-79
- Speckhard, D., Knight, W., Rawlings, J., and Cleland, W., "Triammineaquocobalt (III) Complexes of pyrophosphate and adenosine diphosphate (ADP)." (1989) *J. Inorganic Biochemistry* vol36 p. 99-106
- Speckhard, D., Pecoraro, V., Knight, W. and Cleland, W., "Determination of the Absolute Configuration of the Isomers of Triamine-cobalt(III) Adenosine Triphosphate" *JACS* 108 (1986) 4167-4171
- Apfel, M., Ikeda, B., Speckhard, D., and Frey, P., "E.coli Pyruvate Dehydrogenase Complex: Thiamine Pyrophosphate-

dependent Inactivation by 3-bromopyruvate" (1984) J. Biol. Chem. 259 2905-2909
Frey, P., Ikeda, B., Gavino, G., Speckhard, D., and Wong, S., "E.coli Pyruvate Dehydrogenase Complex: Site Coupling in Electron and Acetyl Group Transfer Pathway" (1978) J. Biol. Chem. 253 7234-7241
Wu, C., Wu, F., Speckhard, D., "Subunit Location of Intrinsic Divalent Metal Ions in RNA Polymerase" (1977) Biochemistry 16 5454-5460
Speckhard, D., Wu, C., Wu, F., "Role of Intrinsic Metal in RNA Polymerase from E.coli" (1977) Biochemistry 16 5228-5234
Speckhard, D., Ikeda, B., Wong, S., Frey, P., "Acetylation Stoichiometry of E.coli Pyruvate Dehydrogenase Complex" (1977) Biochem. Biophys. Res. Com. 77 708-713
Speckhard, D., and Frey, P., "E.coli Pyruvate Dehydrogenase Complex: Improved Purification and Flavin Content" (1974) Biochem. Biophys. Res. Com. 62 614-619

Presentations and Posters 2009-present Undergraduate Students Indicated by *

Allison McClain and David Speckhard "Temperature Dependent Stability Study Concerning the PDZ Domain of TIAM 1 Wild Type" **National ACS meeting Dallas, Monday March 17, 2014**

Chris Lewis and David Speckhard "A structural analysis of ubiquitin using HSQC NMR for application in undergraduate biochemistry laboratories" **National ACS meeting Dallas, Monday March 17, 2014**

Speckhard, David "Structure and function studies of a Tiam1 PDZ specificity mutant" Invited speaker at the University of Dubuque Natural Sciences Seminar November 8, 2013 and Loras Legacy Symposium April 30, 2014

Reena Dev* and David Speckhard "**An NMR study of the thermal denaturation of TIAM PDZ domains**" **Presented at the National ACS meeting in New Orleans, 2013**

Specificity, Structure and Dynamics of Tiam1 PDZ Domain Ligand-Bound Complexes

Ernesto J. Fuentes, Xu Liu, Tyson R. Shepherd, David C. Speckhard,
Ann M. Murray

[Full Text](#) | [PDF](#) (40 kb)

Biophysical Journal, 102(3)
31 January 2012

David Speckhard, Tyson Shepherd, Xu Liu, Ann Murray, Sarah Hengel, Ernesto Fuentes,
"What's shaking? A preliminary look at Tiam1 quadruple mutant dynamics." **Presented at Iowa Structural Biology meeting November 17, 2011**

Priyanka Parajuli* and David Speckhard "Is Coronin-1 involved in *Danio rerio* cell mobility in a ubiquitin dependent fashion?" McElroy Symposium May 6th 2011

Justin Kuiper*^{1,3}, XuLiu¹, David Speckhard^{1,4}, John Kirby² and Ernesto J. Fuentes¹,
University of Iowa 1Department of Biochemistry and 2Department of Microbiology Roy J. and Lucille A. Carver
College of Medicine, Iowa City, IA 52242 3Simpson College, Indianola, IA 50125 and 4Loras College, Dubuque, IA 52001
Interaction of Chemotaxis Proteins CheD and McpC in *B. subtilis* Presented at the
Summer Research Symposium July 30, 2010 Iowa City Iowa.

David Speckhard and Edward Maslowsky, "**Applying Spectroscopy in General Education, Introductory, and Advanced Science Courses**" **National ACS meeting San Francisco, Sunday March 21, 2010**

Sujan Devbhandari* , David Speckhard, Robert Piper¹ “**Traveling the DUBway: Studying Ubiquitin Dependent Protein Trafficking**” poster presented at the **FUTURE** in Biomedicine symposium July 31, 2009 ¹Molecular Physiology and Biophysics, University of Iowa, Iowa City, IA, USA.

David Speckhard and Robert Piper* “Exploring the Role of Ubiquitin in Cellular Protein Recycling“ presented at the **FUTURE** in Biomedicine symposium July 31, 2009 *Molecular Physiology and Biophysics, University of Iowa, Iowa City, IA, USA.

Kelli Theisen* and David Speckhard, *Biological synthesis of the P4 gene and insertion into the p21a vector* Presented at the ACS meeting in Salt Lake City 2009