DEBBIE C. CRANS

Business Address Department of Chemistry and the Cell and Molecular Biology Program
Colorado State University, Fort Collins, CO 80523-1872, (970) 491-7635

Professional Position Professor of Chemistry and Cell and Molecular Biology, 1998-present.
Professor Laureate College of Natural Sciences (2015-2017)
Fellow of the Faculty Institute for Inclusive Excellence, Colorado State University

ORCID 0000-0001-7792-3450

Research Biological, Bioinorganic, Bioorganic and Bioanalytical Chemistries. Specifically, my interests are in the areas of biological and fundamental chemistries with special emphasis on inorganic and organic chemistry. Currently we are involved in problems related to the mode of action of drugs for diseases such as tuberculosis, Alzheimer's, diabetes, and cancer and these studies often require synthesis and preparatory chemistry. We have interests in a range of different drugs including organic drugs, and transition metal based drugs and understanding their bioprocessing. Currently my group and I are particularly interested in menaquinone, pyrazinamide, metformin, platinum and vanadium derivatives, and characterizing their chemistries. Studies of lipid systems and micro-emulsion environments help us understand how drugs and metabolites interact and penetrate lipid interfaces. Our solution studies are carried out using 1D and non-routine 2D NMR spectroscopies, EPR, UV-vis, IR spectroscopy as well as novel time-resolved methods and extreme ultraviolet microscopy and mass spectral imaging. As life-scientists our studies with vanadium exploit new types of chemistries in biological systems ranging from isolated proteins to cell culture to plants to animals and human beings. We also study the effects of metal ions on signal transduction and potential application in immunotherapy and are interested in drug formulation and delivery.

Education

HARVARD UNIVERSITY
Cambridge, Massachusetts 02138
Ph.D. in Organic Chemistry, 1980-1985
Advisor: Dr. George M. Whitesides
Title of Thesis: Methodology in Enzyme-Catalyzed Organic Synthesis: Glycerol Kinase Catalyzed Phosphorylations

UNIVERSITY OF COPENHAGEN
H. C. Orsted Institute, Copenhagen, Denmark
Cand. Scient. 1. part (BS) 1974-1978
Cand. Scient. 2. part (research) 1978-1980

Postdoctoral Education UNIVERSITY OF CALIFORNIA, LOS ANGELES, 1985-1986
Joint project with Orville L. Chapman and Paul D. Boyer. Research: Mechanistic Enzymology on F_1-ATP Synthase from Chloroplasts and Beef Heart.

Professional Appointments

1998-present	Professor of Chemistry, Colorado State University
2019-present	Chair of the Biological Chemistry Program, Colorado State University
2015-2017	Professor Laureate College of Natural Sciences, Colorado State University
1991-1998	Associate Professor of Chemistry, Colorado State University
1987-1991	Assistant Professor of Chemistry, Colorado State University
1989-present	Member of the Cell and Molecular Biology Program, Colorado State University
1986	Instructor (1 semester) University of California, Los Angeles

Awards

2020	Stanley C. Israel Regional Award for Advancing Diversity in the Chemical Sciences
2020	Violet Diller Award for Professional Excellence, Iota Sigma Pi Womens Honors Society
2019	ACS Award for Distinguished Service and Outstanding Research in the Advancement of Inorganic Chemistry
2019	Office for Undergraduate Research and Artistry Award, CSU
2017	Vice President for Research Interdisciplinary Scholarship Award (Individual award, CSU)
2016	Royal Society Fellow
2016	Dalton Discussions International Team Award (5x5x5)
2015	Fellow of the Faculty Institute for Inclusive Excellence, CSU
2015	Arthur P. Cope Scholar award (Late Career) American Chemical Society
2014	AAAS Fellow
2012	Lectureship Award, Japanese Coordination Chemistry Society
2011	Best Teacher Award, Alumni Association, Colorado State University
2011	American Chemical Society Colorado Section Award
2009	American Chemical Society Fellow (Inaugural Awardee)
2005	CSU Undergraduate Research Mentoring Award
2004	Vanadis Award (first time this award was given)
2003	Margaret Hazaleus Award, Colorado State University
2001	Japan Society of Promotion of Science Fellowship
2000/2001	Alexander von Humboldt Senior Research Awardee
1993-96	Alfred P. Sloan Research Fellow Award
1994	Alberta Heritage Foundation Award
1990-1992	Eli Lilly Young Investigator Award
1989-1994	NIH FIRST Award
1986-1987	American Heart Junior Fellowship
Spring, 1980	Fellowship awarded by the Egmond H. Petersens Fund
1979-1980	Scholarstipendium, University of Copenhagen, Denmark
1976-1977	Exchange Student Fellowship, Washington State University

Professional Service and Honors

2024	Chair, ICCC-45 (International Coordination Chemistry Conference), CO, Aug.1-6.
2021-2023	Councilor, Colorado Section for ACS
2021	Chair, ACS Divisional Officers Council Caucus
2020	Chair, Colorado Section, American Chemical Society (COACS)
2020	Co-Chair, Rocky Mountain Colorado Regional Meeting 2020, Fort Collins, Oct. 28
2020	Program Chair, Rocky Mountain Colorado Regional Meeting 2020, Fort Collins, Oct. 28
2020	ICCC-44 International Advisory Board
2018-present(2021)	New Journal of Chemistry, Associate Editor
2018-present	International Advisory Board for the 1st International Conference on Noncovalent Interactions (ICNI)
2016-present(2022)	Coordination Chemistry Reviews, Associate Editor
2015-18; 2019-21	Chair, Chair-Elect, Past Chair Colorado Section, American Chemical Society (Chair 2016-17, 2020)
2018	ICCC-43 International Advisory Board
2017	Rocky Mountain Regional Meeting 2017 (RMRM17), Local Arrangements Chair
2016-2017	Chair, Colorado Section, American Chemical Society
2018	Associate on the Meetings and Expedition Committee, ACS
2016-2021	Councilor, Division of Inorganic Chemistry, American Chemical Society
2016-2017	Co-Organizer of "Young Talent in Colorado and Beyond Symposium" – received award (see below)
2016	ICCC-42 International Advisory Board
2015-2016	ACS Presidential Task Force on U.S. Employment of Chemists
2013-2015	Chair, Chair-Elect, Past Chair, Div. Inorganic Chemistry, American Chemical Society (Chair 2014)
2014-2022	Chair, Vanadis Award Committee
2014-2028	Advisory Board of the International Coordination Chemistry Conference
2014-2024	Editorial Board, *J. Inorganic Biochemistry*

2013-2017	Assistant Editor, Presentation on Demand, American Chemical Society
2013	Zing Coordination Chemistry Conference Chair
2012-2017	Committee of Science, American Chemical Society (elected for continuation, but declined)
2012-2017	Associate Editor, Presentation on Demand, American Chemical Society
2011	Zing Coordination Chemistry Conference Chair
2011-2012	Bioinorganic Chemistry Subcommittee Chair, Division of Inorganic Chemistry, ACS
2011-present	Editorial Board, *New Journal of Chemistry*
2010-2016	Assistant Program Chair, Division of Inorganic Chemistry, ACS
2010	Chair, Metals in Medicine, Gordon Research Conference
2010-2013	Editorial Board, *Inorganic Chemistry*, American Chemical Society
2010-2011	Bioinorganic Chemistry Chair-Elect, Division of Inorganic Chemistry, ACS
2010-2013	Member, Council of Society for Biological Inorganic Chemists
2008-2012	Editorial Board, *Journal of Biological Inorganic Chemistry*
2009	Zing Coordination Chemistry Conference Chair
2008	Zing Coordination Chemistry Conference Chair
2007-present	Editorial Board, Chemija
1999-2009	Program Chair, Inorganic Division, American Chemical Society
1997-1999	Assistant Program Chair, Inorganic Division, American Chemical Society
1996-2000	Member, Biophysical Biochemistry Study Section, NIH
1996-1998	Advisory Board Member, *Chemical and Engineering News*
1993	Ad hoc Reviewer NIH "Biophysical Biochemistry" Study Section
1992-1993	Nomination Committee, Division of Biological Chemistry, ACS
1992-1993	Ad hoc Reviewer NIH "Biochemistry" Study Section
1991-1993	International Faculty, Danish Research Academy
1991	NSF Panel Member for review of Post-Doctoral Research Grants
1991	Tenth NSF Workshop on Reactive Intermediates (WORI)
1991-1994	BRSG Panel Member for review of Colorado State University Research Grants
1989	Twentieth Annual NSF Workshop on Organic Synthesis and Natural Products Chemistry

Honors and Awards for Colorado Section of ACS (COACS) and ACS Division of Inorganic Chemistry

2020	Partners for Progress & Prosperity Award – P3 award (Collaboration between Chem Club at CSU, CSU Chemistry Department and Colorado ACS; Regional ACS award
2020	ChemLuminary Award finalist for Periodic Table Programming involving Student Organizations
2018	ChemLuminary Award finalists for ACS Senior Award Programming 2018
2017	Partners for Progress & Prosperity Award - P3 award (Collaboration between Colorado ACS and High School Organizations – Colorado Chemistry Teacher Association (CCTA) and the Colorado chapter for the American Association for Chemistry Teachers (AACT))
2017	Young Chemists Committee ChemLuminary Award (for COACS Programming 2017)
2017	Local Section Innovative and Creative Career ChemLuminary Award (for COACS Programming 2017)
2017	COACS Team Salute to Excellence Award for symposium "Young Talent in Colorado and Beyond" Aug. 4-5, 2016 at CSU (co-organizers James Blakemore, Kelly Hassell, and Carlos Olivo-Delgado)
2016	Senior Chemist Award to Local Section (for COACS Programming 2016)
2016	ChemLuminary Award to Division of Inorganic Chemistry for Membership Drive and Increasing Members (for COACS Programming 2015; with Ben Zhu and Michael Johnson)
2015	ChemLuminary Awards to Division of Inorganic Chemistry for Young Investigator Symposia (DIC activities during 2014; nominator and facilitator of organization as Program Chair)
2011-2015	Nominated current ACS Fellows through the Divisional & Local Section

Visiting Professorships

University of Alberta, Alberta, Canada, Nov. 1994

University of Bielefelt, Alexander von Humboldt Senior Research Awardee, Bielefelt, Germany, Jan. through Sep. Humboldt Awardee, 2001

University of Toyama, Osaka and Hiroshima, Toyama, Osaka and Hiroshima, Japan, Japan Society of Promotion of Science Fellowship, the month of November 2001

New Mexico State University, NSF-Advance Visiting Professor, 2002
Invited Fellow of the Medicinal Chemistry Gordon Conference 2008
University National Cheng-Kung University, Taipei; Academia Sinica, Taipei; National Tsing Hua U Taiwan, 2012
University of Wuhan, Wuhan, China, Sep. 2014
University of Vilnis, Lithuania, Nov. 2014
University of Strasbourg, Strasbourg, France, Jun. 2015
International Research Collaboration Awardee, University of Sydney, Australia, 2015
Visiting Professor Technical University of Munchen, Germany, May 2018
Visiting Professor Facultad de Ciencias Exactas, UNLP, La Plata, Argentina Nov. 2018
Visiting Professor Eco-Friendly Applied Materials Laboratory, College of Chemistry, Central China Normal University, Wuhan, China, 2019
Visiting Professor Universidade Federal do Paraná, Curitiba, Brazil, 2021

Plenary and Keynote Lectures, Award Lectures and Named Lectureships

Howard Hughes Lecturer, Dept. Chemistry, William & Mary University, Williamsburg, VA, 1994
Plenary lecture, Annual Alexander von Humboldt meeting, Bamberg, Germany March 2001
NSF-Advance Lecturer, New Mexico State University, 2002
Vanadis Award Lecture, The Fourth International Symposium on Chemistry and Biological Chemistry of Vanadium, Szeged Hungary 2004
Colorado Section Award Lecture, Colorado State University, 2011
Plenary presentation, International Vanadium Symposium, Crystal City, Virginia, 2012
Lectureship Award Japan Society of Coordination Chemistry Conference (JSCC), 2012
Plenary Presentation, Zing Bioinorganic Chemistry Conference, 2013
XIX National Symposium on Organic Chemistry (XIX SINAQO), Mar del Plata, Argentina, 2013
Plenary Presentation. "Undergraduate Research - A Tool to Explore Chemistry and Excite" 209th Two-Year College Chemistry Consortium Conference Front Range – Westminster Campus, Westminster CO, 2015.
Arthur P. Cope Scholar Award lecture in the Cope Scholar Symposium, 250th ACS meeting Aug. 19, 2015
International Research Collaboration Lecture, University of Sydney, Sydney, Australia, Oct.18-Nov. 8, 2015
Australian Chemical Society Lecturer, University of Melbourne, Melbourne, Australia, 2015
Plenary Lecture, MTIC-XVI, Dept. Chemistry, Jadavpur University, India, 2015
Idless Scientific Seminar I, University of New Hampshire, 2016
Idless Broad Interest Seminar II, University of New Hampshire, 2016
Plenary presentation, closing ceremony of the REU program, University of Puerto Rico Rio Piedras Campus (Puerto Rico Chemical Learning Integrated in Materials and Biomolecular applications, PR CLIMB), 2016
Plenary Lecture 10th International Vanadium Symp, Howard International House, Taipei, Taiwan, 2016
Keynote lecture 8th Asian Biological Inorg. Chemistry Conf (AsBIC8) U. of Auckland, New Zealand 2016
Frontier in Science Lectureship, University of Toledo, 2017
Inorganic Chemistry Leader program, University of Puerto Rico Rio Piedras Campus (Puerto Rico Chemical Learning Integrated in Materials and Biomolecular applications, PR CLIMB) 2017
Keynote Speaker, ICBIC-18, Fluorionapolis, Brazil 2017
Keynote Speaker, 9th International Conference on Group IV, V and VI, New Delhi 2017
Keynote Speaker, ICCC-18, Sendei, Japan, 2018
Keynote Speaker, EuroBIC14 Birmingham, UK 2018
Plenary Speaker, XIX Brazilian Meeting on Inorganic Chemistry; VI Latin American Meeting on Biological Inorganic Chemistry; VIII Brazilian Meeting on Rare Earths, Fortaleza, Brazil, 2018
Plenary Speaker, 11th International Vanadium Symposium, Montevideo, Uruguay 2018
Plenary Speaker, ACS Award Symposium, March 31-April 5, Orlando, 2019
Keynote Speaker, 15th International Symposium on Applied Bioinorganic Chemistry, 2019
Keynote Speaker, 7th International Symposium on Metallomics, Warsaw, Poland, 2019
Plenary Speaker, ICBIC-19, Interlaken, Switzerland, c/o University of Zurich
Plenary Speaker, 1st International Conference on Noncovalent Interactions (ICNI), 2nd - 6th September 2019
Keynote Speaker, XXI Mendeleev Congress on General and Applied Chemistry, Saint-Petersburg, 2019
Keynote Speaker, XV International Symposium on Inorganic Biochemistry, June 24-27, Wrodaw, Poland (canceled COVID-19))

Plenary Speaker, Women in Science, Malaga, Jan. 20-24, 2020
Keynote Speaker, CCE-conference in LA, 24-26, 2020
Keynote Speaker, EuroBic, Iceland, August 16-20, 2020 (canceled COVID-19)
Keynote Speaker, Labic, Montevideo, September 22-25, 2020, delayed to December 8, 2020
The Chapman Lecturer for the UCLA Department of Chemistry and Biochemistry, 2020-2021 (delayed)

Publications (in peer-reviewed journals) Total 218, H-index 57; total citations 9.531 (WOS Feb 14, 2020):

1. "cis and trans-Azoalkanes: Force field determination of molecular structures, heats of formation and strain energies," Debbie C. Crans and James P. Snyder, *Chem. Ber.*, **1980**, *113*, 1201-1204.

2. "A theoretical evaluation of the synergetic capto-dative stabilization of free radicals," Debbie C. Crans, Timothy Clark and Paul von R. Schleyer, *Tetrahedron Letters*, **1980**, *21*, 3681-3684.

3. "Tetracoordinate planar carbon: A singlet biradical," Debbie C. Crans and James P. Snyder, *J. Am. Chem. Soc J. Am. Chem. Soc.*, **1980**, *102*, 7152-7154.

4. "A convenient synthesis of disodium acetyl phosphate for use in *in situ* ATP cofactor regeneration," Debbie C. Crans and George M. Whitesides, *J. Org. Chem.*, **1983**, *48*, 3130-3132.

5. "Practical enzymatic synthesis of adenosine-5'-0-(3-thiotriphosphate) (ATP-γ-S,)" Obsidiana Abril, Debbie C. Crans and George M. Whitesides, *J. Org. Chem.*, **1984**, *49*, 1360-1364.

6. "Glycerol kinase: Substrate specificity," Debbie C. Crans and George M. Whitesides, *J. Am. Chem. Soc.*, **1985**, *107*, 7008-7018.

7. "Glycerol kinase: Synthesis of dihydroxyacetone phosphate, syn-glycerol-3-phosphate, and chiral analogs," Debbie C. Crans and George M. Whitesides, *J. Am. Chem. Soc.*, **1985**, *107*, 7019-7027.

8. "Probes of the binding change mechanism and possible rotational catalysis by studies of subunit interactions," P. D. Boyer, T. Melese, Z. Xue, R. J.Kandpal, Debbie. C. Crans and J. D. Wise, *EBEC Reports*, **1986**, *4*, 236.

9. "Enzymatic regeneration of ATP: Acetyl phosphate, phosphoenolpyruvate, methoxycarbonyl phosphate, dihydroxyacetone phosphate, 5-phospho-D-ribosyl-α-1-pyrophosphate, uridine-5'-diphosphoglucose," Debbie C. Crans, Romas J. Kazlauskas, Bernard L. Hirshbein, Chi-Huey Wong, Obsidiana Abril and George M. Whitesides, *Methods Enzymol*., **1987**, *136*, 263-280.

10. "The enantiomeric purity of polar substrates can be determined using chiral lanthanide NMR shift reagents in polar solvents," Linda M. Sweeting, Debbie C. Crans and George M. Whitesides, *J. Org. Chem.*, **1987**, *52*, 2273-2276.

11. "Synthesis of 3-deoxy-D-manno-2-octulosonate-8-phosphate (KDO-8-P) from D-arabinose: Generation of D-arabinose-5-phosphate using hexokinase," Mark D. Bednarski, Debbie C. Crans, Robert DiCosimo, Ethan S. Simon, Philip D. Stein, George M. Whitesides and Marilyn J. Schneider, *Tetrahedron Letters*, **1988**, *29*, 427-430.

Publications at Colorado State University (<u>undergraduate</u> coauthors underlined)

12. "Spontaneous and reversible interactions of vanadium(V) oxyanions with amine derivatives," Debbie C. Crans and Paul K. Shin, *Inorg. Chem.*, **1988**, *27*, 1797-1806.

13. "Reversible and *in situ* formation of organic arsenates and vanadates as organic phosphate mimics in enzymatic reactions: Mechanistic investigation of aldol reactions and synthetic applications," D. G. Drueckhammer, J. R. Durrwachter, R. L. Pederson, Debbie. C. Crans, L. Daniels and C-H. Wong, *J. Org. Chem.*, **1989**, *54*, 70-77.

14. "Interaction of trace levels of vanadium (IV) and (V) in biological systems," Debbie C. Crans, <u>Robin L. Bunch</u> and Lisa A. Theisen, *J. Am. Chem. Soc.*, **1989**, *111*, 7597-7607.

15. "Vanadate monomers and dimers both inhibit the human prostatic acid phosphatase," Debbie C. Crans, Carmen M. Simone, Asish K. Saha and Robert H. Glew, *Biochem. Biophys. Res. Comm*., **1989**, *165*, 246-250.

16. "Vanadate tetramer as inhibiting species in enzyme reactions *in vitro* and *in vivo*," Debbie C. Crans, Ellen M. Willging and Steven K. Butler, *J. Am. Chem. Soc.*, **1990**, *112*, 427-432.

17. "A kinetic method for determination of free vanadium(IV) and (V) at trace level concentrations," Debbie C. Crans, Miri Shaia Gottlieb, Jeanne Tawara, Robin L. Bunch and Lisa A. Theisen, , **1990**, *180*, 53-64.

18. "Application of Time-Resolved V-51 2D NMR For Quantitation of Kinetic Exchange Pathways Between Vanadate Monomer, Dimer, Tetramer, and Pentamer", Debbie C. Crans, Christopher D. Rithner and Lisa A. Theisen, *J. Am. Chem. Soc.*, **1990**, *112*, 2901-2908.

19. "Vanadate dimer and tetramer both inhibit glucose-6-phosphate dehydrogenase from *Leuconostoc mesenteroidex*," Debbie C. Crans and Susan M. Schelble, *Biochemistry*, **1990**, *29*, 6698-6706.

20. "A cyclic vanadium(V) alkoxide – An analog of the ribonuclease inhibitors," Debbie C. Crans, Robert A. Felty and Mary M. Miller, *J. Am. Chem. Soc.*, **1991**, *113*, 265-269.

21. "Structural and kinetic characterization of simple complexes as models for vanadate–protein interactions in aqueous solution," Debbie C. Crans, Per Magnus Ehde, Paul K. Shin and Lage Pettersson, *J. Am. Chem. Soc.*, **1991**, *113*, 3728-3736.

22. "Substituent effects of organic vanadate esters in imidazole buffered aqueous solutions," Debbie C. Crans, Susan M. Schelble and Lisa A. Theisen, *J. Org. Chem.*, **1991**, *56*, 1266-1274.

23. "Nonreductive interaction of vanadate with an enzyme containing a thiol group in the active site: Glycerol-3-phosphate dehydrogenase," Debbie C. Crans and Carmen M. Simone, *Biochemistry*, **1991**, *30*, 6734-6741.

24. "Inhibition of human seminal fluid and *Leishmania donovani* phosphatases by molybdate heteropolyanions," Asish K. Saha, Debbie C. Crans, Michael T. Pope, Carmen M. Simone and Robert H. Glew, *J. Biol. Chem.*, **1991**, *266*, 3511-3517.

25. "Vanadate interactions with bovine copper, zinc-superoxide dismutase as probed by ^{51}V NMR spectroscopy," Lisa Wittenkeller, Aida Abraha, Ravichandran Ramasamy, Duarte Mota de Freitas, Lisa A. Theisen and Debbie C. Crans, *J. Am. Chem. Soc.*, **1991**, *113*, 7872-7881.

26. "NMR, CD and MCD studies of vanadate-nucleosides and vanadate-deoxynucleosides," Debbie. C. Crans, Sven E. Harnung, Eric Larsen, Paul K. Shin, Lisa A. Theisen and I. Trabjerg, *Acta Chem. Scand*., **1991**, *45*, 456-462.

27. "Synthesis and reactivity of oxovanadium(V) trialkoxides of bulky and chiral alcohols," Debbie C. Crans, Haojiang Chen and Robert A. Felty, *J. Am. Chem. Soc.*, **1992**, *114*, 4543-4550.

28. "Chemically induced modification of cofactor specificity of glucose-6-phosphate dehydrogenase," Debbie C. Crans, Carmen M. Simone and John S. Blanchard, *J. Am. Chem. Soc.*, **1992**, *114*, 4927-4928.

29. "Interaction of rabbit muscle aldolase at high ionic strengths with vanadate and other oxoanions," Debbie C. Crans, Katakam Sudhakar and Thomas J. Zamborelli, *Biochemistry*, **1992**, *31*, 6812-6821.

30. "(-)Cryptaustoline. Its synthesis, revision of absolute stereochemistry, and mechanism of inversion of stereochemistry," Albert I. Meyers, Thais M. Sielecki, Debbie C. Crans, Robert W. Marshman and Thank Nguyen, *J. Am. Chem. Soc*., **1992**, *114*, 8483-8489.

31. "Oxovanadium(V) 1,3-propanediolate chloride complexes - tetrameric clusters," Debbie C. Crans, Robert W. Marshman, Miri Shaia Gottlieb, Oren P. Anderson and Mary M. Miller, *Inorg. Chem*., **1992**, *31*, 4939-4949.

32. "Interaction of porcine uterine fluid purple acid phosphatase with vanadate and vanadyl cation," Debbie C. Crans, Carmen M. Simone, Richard C. Holz and Lawrence Que, Jr., *Biochemistry*, **1992**, *31*, 11731-11739.

33. "Comparison of phosphorus metabolites in various extraction procedures of *Phaseolus vulgaris* seeds using ^{31}P NMR spectroscopy," Debbie C. Crans, Milos Mikus and Robert W. Marshman, *Anal. Biochem.*, **1993**, *209*, 85-94.

34. "Structural characterization and solution properties of a dimeric tetrahedral vanadium(V) chloride alkoxide," Debbie C. Crans, Robert A. Felty, Oren P. Anderson and Mary M. Miller, *Inorg. Chem.*, **1993**, *32*, 247-248.

35. "NADV - a new cofactor for alcohol dehydrogenase from *Thermo-anaerobium brockii*," Debbie C. Crans, Robert W. Marshman, Rikke Nielsen and Irene Felty, *J. Org. Chem.*, **1993**, *58*, 2244-2252.

36. "Vanadium(V)-protein model studies: Solid state and solution structure," Debbie C. Crans, Haojiang Chen, Oren P. Anderson, and M. M. Miller, *J. Am. Chem. Soc.*, **1993**, *115*, 6769-6776.

37. "Interaction of polyoxovanadates and selected polyoxomolybdates with proteins," Debbie C. Crans, *Molecular Engineering*, **1993**, *3*, 277-284.

38. "Characterization of vanadium(V) complexes in aqueous solutions: Ethanolamine and glycine derived complexes," Debbie C. Crans and Paul K. Shin, *J. Am. Chem. Soc.*, **1994**, *116*, 1305-1315.

39. "Oxovanadium(V) alkoxide derivatives of 1,2-diols: Synthesis and solid-state ^{51}V NMR characterization," Debbie C. Crans, Robert A. Felty, Haojiang Chen, Hellmut Eckert and Nandini Das, *Inorg. Chem.*, **1994**, *33*, 2427-2438.

40. "The X-ray structure of $(NH_4)_6(Gly\text{-}Gly)_2V_{10}O_{28}\bullet 4H_2O$: Model studies of polyoxometalate-protein interactions," Debbie. C. Crans, M. Mahroof-Tahir, O. P. Anderson and S. M. Miller, *Inorg. Chem.*, **1994**, *44*, 5586-5590.

41. "Phytate metabolism in bean seedlings during post-germinative growth," Debbie C. Crans, Milos Mikus and Blayne R. Friehauf, *J. Plant Physiol.*, **1995**, *145*, 101-107.

42. "A slow exchanging vanadium(V) peptide complex: Vanadium(V)-Gly-Tyr," Debbie C. Crans, Hartmut Holst, Anastasios Keramidas and Dieter Rehder, *Inorg. Chem.*, **1995**, *34*, 2524-2534.

43. "Structure of the dimeric ethylene glycol- vanadate complex and other 1,2-diol-vanadate complexes in aqueous solution. Vanadate-based transition state analog complexes of phosphotransferases," William J. Ray, Jr., Debbie. C. Crans, J. Zheng, James W. Burgner, II, H. Deng, and Mohammed Mahroof-Tahir, *J. Am. Chem. Soc.*, **1995**, *117*, 6015-6026.

44. "Comparison of phytate in radicle, plumula, scutellum and endosperm of *Zea mays* and *Zea diploperennis*," Milos Mikus, Alexander Lux, Debbie C. Crans, Paul K. Shin and Josef Kristin, *Structure and Function of Roots, Proceedings of the 4th International Symposium on Structure and Function of Roots*, Baluska, F.; Cianporova, M.; Gaspariakova; Barlow, O. (Eds.) Kluwer Academic Publishers, **1995**, 175-180.

45. "The effect of vanadate on growth and phospholipid levels in the root and hypocotyl of bean seedlings (*Phaseolus vulgaris L.*)," Milos Mikus, Paul K. Shin and Debbie C. Crans, *Structure and Function of Roots*, *Proceedings of the 4th International Symposium on Structure and Function of Roots*, Baluska, F.; Cianporova, M.; Gaspariakova; Barlow, O. (Eds.) Kluwer Academic Publishers, **1995**, 181-187.

46. "Application of NMR spectroscopy to studies of aqueous coordination chemistry of vanadium(V) complexes," Debbie C. Crans, Paul K. Shin and Kathleen Armstrong, *Mechanistic Bioinorganic Chemistry*, Thorp, H. H.; Pecoraro, V. L. (Eds.) ACS Symposium Series, **1995**, *246*, 303-328.

47. "Vanadium chemistry and biochemistry of relevance for use of vanadium compounds as antidiabetic agents," Debbie C. Crans, Mohammed Mahroof-Tahir and Anastasios D. Keramidas, *Cell Mol. Biochemistry*, **1995**, 17-24.

48. "Organic vanadium compounds - Transition state analogy with organic phosphorus compounds," Debbie C. Crans, Anastasios D. Keramidas and Chryssoula Drouza, *Phosphorus, Sulphur, and Silicon*, **1996**, *109-110*, 245-248.

49. "Factors affecting solution properties of vanadium(V) compounds: X-ray structure of β-*cis*-$NH_4[VO_2(EDDA)]$," Debbie C. Crans, Anastasios D. Keramidas, Mohammad Mahroof-Tahir, Oren P. Anderson, and Susie M. Miller, *Inorg. Chem.*, **1996**, *35*, 34599-34606.

50. "Evidence for distinct vanadyl(+4)-dependent activating system for manifesting insulin-like effects," Jinping Li, Gerard Elberg, Debbie C. Crans, and Yoram Shechter, *Biochemistry*, **1996**, *35*, 8314-8318.

51. "Four- and five-coordinate oxovanadium(V) alkoxides: Do steric effects or electronic properties dictate the geometry?," Jean Yves Kempf, Bernard Maigret and Debbie C. Crans, *Inorg. Chem.*, **1996**, *35*, 6485-6494.

52. "Protein bodies in dry germ of cereals," Alexander Lux, Zora Hanácková, Jozef Kristín, Debbie C. Crans and Milos Mikus, *Acta Universitatis Carolinae Biologica*, **1997**, *41*, 111-119.

53. "Vanadium oxoanions and cAMP-dependent protein kinase: An anti-substrate inhibitor," Scott Pluskey, Mohammad Mahroof-Tahir, Debbie C. Crans and David S. Lawrence, *Biochem. J.*, **1997**, *321*, 333-339.

54. "Insulin-mimetic action of vanadium compounds on osteoblast-like cells in culture," S. B. Etcheverry, Debbie. C. Crans, A. D. Keramidas and A. M. Cortizo, *Arch. Biochem. Biophys.*, **1997**, *338*, 7-14.

55. "Syntheses, X-Ray structures and solution properties of $[V_4O_4\{(OCH_2)_3CCH_3\}_3(OC_2H_5)_3]$ and $[V_4O_4\{(OCH_2)_3CCH_3\}_2(OCH_3)_6]$: Examples of new ligand coordination modes," Debbie C. Crans, Feilong Jiang, John Chen, Oren P. Anderson and Mary M. Miller, *Inorg. Chem.*, **1997**, *36*, 1038-1047.

56. "Solution and solid state properties of [*N*-(2-Hydroxylethyl)Iminodiacetate] Vanadium(IV), -(V) and -(IV/V) complexes," Mohammed Mahroof-Tahir, Anastasios D. Keramidas, Ron B. Goldfarb, Oren P. Anderson, Mary M. Miller and Debbie C. Crans, *Inorg. Chem.*, **1997**, *36*, 1657-1668.

57. "Six-coordinated vanadium(IV) and (V) complexes of benzimidazole and pyridyl containing ligands," Debbie C. Crans, Anastasios D. Keramidas, Shahid S. Amin, Oren P. Anderson and Susie M. Miller, *J. Chem. Soc., Dalton Transactions*, **1997**, 2799-2812. (See also erratum **1997**, 4461)

58. "Synthesis, structure and biological activity of a new insulinomimetic peroxovanadium compound: Bisperoxovanadium imidazole monoanion," Debbie C. Crans, Anastasios D. Keramidas, Helana Hoover-Litty, Oren P. Anderson, Mary M. Miller, Lynn M. Lemoine, Susan Pleasic-Williams, Mark Vandenberg, Anthony J. Rossomando and Laurel Sweet, *J. Am. Chem. Soc.*, **1997**, *119*, 5447-5448. (erratum, 1997, 4461)

59. "Speciation in vanadium bioinorganic systems. 4. Interactions between vanadate, adenosine, and imidazole – an aqueous potentiometric and ^{51}V NMR study," Katarina Elvingston, Debbie C. Crans and Lage Pettersson, *J. Am. Chem. Soc.*, **1997**, *119*, 7005-7012.

60. "Vanadium(V) hydroxylamido complexes: Solid state and solution properties," Anastasios D. Keramidas, Susie M. Miller, Oren P. Anderson and Debbie C. Crans, *J. Am. Chem. Soc.*, **1997**, *119*, 8901-8915.

61. "Chemistry of relevance to vanadium in the environment," Debbie C. Crans, Shahid Amin and Anastasios D. Keramidas, *Vanadium in the Environment, Part I*, J. Nriagu, Ed.; John Wiley & Sons, Inc.: New York, **1998**, *30*, 73-96.

62. "Metal-carbohydrate complexes in solution," Jean-Franqois Verchere, Stella Chapelle, Feibo Xin and Debbie C. Crans, *Prog. Inorg. Chem.*, **1998**, *47*, 837-945.

63. "The chemistry of vanadium in aqueous and nonaqueous solution chemistry," Debbie C. Crans, Alan S. Tracey (Eds.), In *ACS Symposium Series*, Debbie Crans and A. S. Tracey, Eds.; (from the *1997 Fifth Chemical Congress of North America Conference Proceedings* Cancun, Mexico); *ACS Symposium Ser*., **1998**. *711*, 2-29.

64. "Peroxo-, hydroxylamido- and acac-derived vanadium complexes," Debbie C. Crans, Alan S. Tracey, In *ACS Symposium Series*, D. Crans and A. S. Tracey, Eds.; (from the *1997 Fifth Chemical Congress of North America Conference Proceedings* Cancun, Mexico); *ACS Symposium Ser*., **1998**, *711*, 82-103.

65. "Insulin-like effects of vanadium; Reviewing *in vivo* and *in vitro* studies and mechanisms of action," Yoram Shechter, Gerard Elberg, Assia Shisheva, Dov Gefel, Natesampillai Sekar, Sun Qian, Rafi Bruck, Eythan Gershonov, Debbie C. Crans, Y. Toldwasser, Mati Fridkin and Jinping Li, In *ACS Symposium Series*, Debbie. C. Crans and A. S. Tracey, Eds.; (from the *1997*

Fifth Chemical Congress of North America Conference Proceedings Cancun, Mexico); *ACS Symposium Ser*., **1998**, *711*, 308-315.

66. "Vanadium(V) complexes of polydentate Aminoalcohols: Fine-tuning complex properties," Debbie C. Crans and Iman Boukhobza, *J. Am. Chem. Soc.*, **1998**, *120*, 8069-8078.

67. "Stepwise cluster assembly using $VO_2(acac)$ as a precursor: *cis*-$[VO(OCH(CH_3)_2)(acac)_2]$, $[V_2O_2(\mu\text{-}OCH_3)_2(acac)_2(OCH_3)_2]$, $[V_3O_3\{\mu,\mu\text{-}(OCH_2)_3CCH_3\}_2(acac)_2(OC_2H_5)]$, $[V_4O_4(\mu\text{-}O)_2(\mu\text{-}OCH_3)_2(\mu_3\text{-}OCH_3)_2(acac)_2(OCH_3)_2]\bullet 2CH_3CN$," Feilong Jiang, Oren P. Anderson, Susie M. Miller, John Chen, Mohammad Mahroof-Tahir and Debbie C. Crans, *Inorg. Chem.*, **1998**, *37*, 5439-5451.

68. "Speciation in vanadium bioinorganic systems. 5. Interactions between vanadate, uridine and imidazole – an aqueous potentiometric, ^{51}V and ^{17}O NMR Study," Katarine Elvingston, Anastasios D. Keramidas, Debbie C. Crans, and Lage Pettersson, *Inorg. Chem*., **1998**, *37*, 6163-6160.

69. "Dinuclear oxovanadium(IV) (phosphonomethyl)lminodiacetate complexes: $Na_4[V_2O_2\{(O)_2P(O)\text{-}CH_2N(CH_2COO)_2\}_2]\bullet 10H_2O$ and $Na_8[V_2O_2\{(O)_2P(O)Ch_2N(CH_2COO)_2\}_2]_2\bullet 16H_2O$," Debbie C. Crans, Feilong Jiang, Oren P. Anderson and Susie M. Miller, *Inorg. Chem*., **1998**, *37*, 6645-6655.

70. "Effects of vanadium complexes with organic ligands on glucose metabolism: A comparison study in diabetic rats," B. A. Reul, S. S. Amin, J. P. Buchet, L. N. Ongemba, Debbie. C. Crans and S. M. Brichard, *British J. Pharm.*, **1999**, *126*, 467-477.

71. "Solution characterization of vanadium(V) and (IV) N-(phosphonomethyl)iminodiacetate complexes: Direct observation of one enantiomer converting to the other in an equilibrium mixture," Debbie C. Crans, Feilong Jiang, Iman Boukhobza, Istvan Bodi and Tamas Kiss, *Inorg. Chem*., **1999**, *38*, 3275-3282.

72. "Chemistry and insulin mimetic properties of bis(acetylacetonate)oxovanadium(IV) and derivatives," Sean S. Amin, Kirk Cryer, Boyan Zhang, Sandra S. Eaton, Oren P. Anderson, Susie M. Miller, Benedicte A. Reul, Sonia M. Brichard and Debbie C. Crans, *Inorg. Chem*., **2000**, *39*, 406-416.

73. "Chemistry and insulin-like properties of vanadium(IV) and vanadium(V) compounds," Debbie C. Crans, *J. Inorg. Biochem*., **2000**, *80*, 123-131.

74. "Aqueous chemistry of ammonium dipicolinatooxovanadium(V): The first organic vanadium(V) insulin-mimetic compound," Debbie C. Crans, Luqin Yang, Tamas Jakusch and Tamas Kiss, *Inorg. Chem.*, **2000**, *39*, 4409-4416.

75. "Methylation of neutral pseudotetrahedral zinc thiolate complexes: Model reactions for alkyl group transfer to sulfur by Zn-containing enzymes," Chris R. Warthen, Brain S. Hammes, Carl J. Carrano and Debbie C. Crans, *J. Biol. Inorg. Chem.*, **2001**, *6*, 82-90.

76. "Effect of vanadium(IV) compounds in the treatment of diabetes*: in vivo* and *in vitro* studies with vanadyl sulfate and bis(maltolato)oxovanadium(IV)," G. R. Willsky, A. B. Goldfine, P. J. Kostyniak, J. H. McNeill, L. Yang, A. R. Khan and Debbie. C. Crans, *J. Inorg. Biochem.*, **2001**, *85*, 33-42.

77. "Bis(acetylamido)oxovanadium(IV) complexes: Solid state and solution studies," Debbie C. Crans, A. Raza Khan, Mohammad Mahroof-Tahir, Sujit Mondal, Susie M. Miller, Agnete la Cour, Oren P. Anderson, Tamas Jakusch and Tamas Kiss, *Dalton Transactions*, **2001**, 3337-3345.

78. "Cobalt(II) and cobalt(III) dipicolinate complexes: Solid state, solution and *in vivo* insulin-like properties," Luqin Yang, Debbie C. Crans, Susie M. Miller, Agnete la Cour, Oren P. Anderson, Peter M. Kaszynski, Michael E. Godzala, III, LaTanya D. Austin and Gail R. Willsky, *Inorg. Chem*., **2002**, *41*, 4859-4871.

79. "Rational synthesis and X-ray structures of $[Mn^{II}_4(H_2O)_2(As^VW_9O_{34})_2]^{10-}$ from $[As^{III}_4W_{40}O_{140}]^{28-}$, MnO_4^- and Mn^{++}," Cristina Rosu, Debbie C. Crans and Timothy J. R. Weakley, *Polyhedron*, **2002**, *21*, 259-262.

80. "4-hydroxypyridine-2,6-dicarboxylatooxovanadium(V) complexes: Solid state and aqueous chemistry," Luqin Yang, Agnete la Cour, Oren P. Anderson and Debbie C. Crans, *Inorg. Chem*., **2002**, *41*, 6322-6331.

81. "Inelastic neutron scattering on three mixed-valence dodecanuclear polyoxovanadate clusters," Reto Basler, Gregory Chaboussant, Andreas Sieber, Hansperter Andres, Mark Murie, Paul Kögerler, Hartmut Bögge, Debbie C. Crans, Erich Krickemeyer, Stefan Janssen, Hannu Mutka, Achim Müller and Hans-Ulrich Güdel, *Inorg. Chem*., **2002**, *41*, 5675-5685.

82. "Speciation of transition metal ion complexes in alkaline solutions of alditols. 1. Cu(II) complex formation with D-mannitol," E. Norkus, J. Vaiciuniene, J. Reklaitis, E. Gaidamauskas and Debbie C. Crans, *Chemija (Vilnius)*, **2002**, *13, N 3*, 119-128.

83. "Speciation of transition metal ion complexes in alkaline solutions of alditols. 2. Cu(II) complex formation with D-sorbitol," E. Norkus, J. Vaiciuniene, J. Reklaitis and Debbie C. Crans, *Chemija (Vilnius)*, **2002**, *13, N 3*, 129-137.

84. "Transition and heavy metal ions complex formation with 2,5-pyridinedicarboxylic acid," E. Norkus, I. Stalnioniene and Debbie C. Crans, *Chemine technologija (Kaunas)*, **2002**, *N 4(25)*, 9-12.

85. "Cu(II), Pb(II) and Cd(II) complex formation with pyridine-2,6-dicarboxylate and 4-hydroxypyridine-2,6-dicarboxylate in aqueous solutions," E. Norkus, I. Stalnioniene and Debbie C. Crans, *Chemija (Vilnius)*, **2002**, *13, N 4,* 194-202.

86. "(4-hydroxypyridine-2,6-dicarboxylate) oxovanadate(V) - a new insulin-like compound: chemistry, effects on myoblast and yeast cell growth and effects on hyperglycemia in rats with STZ-induced diabetes," Debbie C. Crans, Luqin Yang, Josephine A. Alfano, Lai-Har Chi, Wenzheng Jin, Mohammad Mahroof-Tahir, Karen Robbins, Masoud M. Toloue, Leong K. Chan, Andrew J. Plante, Rebecca Z. Grayson and Gail R. Willsky, *Coord. Chem. Rev*., **2003**, *237*, 13-22.

87. "Interaction of pyridine- and 4-hydroxypyridine-2,6-dicarboxylic acids with heavy metal ions in aqueous solutions," Eugenijus Norkus, Irena Stalnioniene and Debbie C. Crans, *Heteroatom Chemistry*, **2003**, *14(7)*, 625-632.

88. "The membrane transport of vanadium compounds and the interaction with the erythrocyte membrane," Xiaogai Yang, Kui Wang, Jingfen Lu and Debbie C. Crans, *Coord. Chem. Rev.*, **2003**, *237(1-2)*, 103-111.

89. **"**Applications of paramagnetic NMR spectroscopy for monitoring transition metal complex stoichiometry and speciation," Debbie C. Crans, Luqin Yang, Ernestas Gaidamauskas, A. Raza Khan, Wenzheng Jin and Ursula Simonis, *ACS Symposium Series*, **2003**, *858*, 304-332.

90. "Vanadium(IV/V) speciation of pyridine-2,6-dicarboxylic acid and 4-hydroxy-pyridine-2,6-dicarboxylic acid complexes: Potentiometry, EPR spectroscopy and comparison across oxidation states," Tamas Jakusch, Wenzheng Jin, Luqin Yang, Tamas Kiss, Debbie C. Crans, *J. Inorg. Biochem.*, **2003**, *95(1)*, 1-13.

91. "Vanadium(IV) and vanadium(V) complexes of dipicolinic acid and derivatives: Synthesis, X-ray structure, solution state properties and effects in rats with STZ-induced diabetes," Debbie C. Crans, Mohammad Mahroof-Tahir, Michael D. Johnson, Patricia C. Wilkins, Luqin Yang, Karen Robbins, Alison Johnson, Josephine A. Alfano, Michael E. Godzala, III, La Tanya Austin and Gail R. Willsky, *Inorg. Chem. Acta.*, **2003**, *356C*, 365-378.

92. "The permeability and cytotoxicity of insulin-mimetic vanadium compounds," Xiao-Gai Yang, Xiao-Da Yang, Lan Yuan, Kui Wang and Debbie C. Crans, *Pharmaceutical Research*, **2004**, *21(6)*, 1026-1033.

93. "The chemistry and biochemistry of vanadium and the biological activities exerted by vanadium compounds," Debbie C. Crans**,** Jason J. Smee, Ernestas Gaidamauskas and Luqin Yang, *Chem. Rev.*, **2004**, *104(2)*, 849-902. (Cited >1,000 times by 10/28/2020 Web-of-Science)

94. "Inhibition of yeast growth by molybdenum-hydroxylamido complexes correlates with their presence in media at differing pH values", Debbie C. Crans**,** Jason J. Smee, Edita G. Gaidamauskiene, Oren P. Anderson, Susie M. Miller, Wenzheng Jin, Ernestas Gaidamauskas, Etienne Crubellier, Rose Grainda, Lar-Har Chi and Gail R. Willsky, *J. Inorg. Biochem.*, **2004**, *98*, 1837-1850.

95. "Interaction of pyridine-2,5-dicarboxylic acid with heavy metal ions in aqueous solutions," Eugenijus Norkus, Ernestas Gaidamauskas, Irena Stalnioniene and Debbie C. Crans, *Heteroatom Chem.*, **2005**, *16(4)*, 285-291.

96. "Interaction of dipicolinatodioxovanadium(V) with polyatomic cations and surfaces in reverse micelles," Jessica Stover, Christopher D. Rithner, Rae Ann Inafuku, Debbie C. Crans and Nancy E. Levinger, *Langmuir,* **2005**, *21*, 6250-6258.

97. "Evidence of two-step deprotonation of mannitol in aqueous solution," Ernestas Gaidamauskas, Eugenijus Norkus, Jurate Vaiciuniene, Debbie C. Crans, Tapani Vuorinen, Jane Jaciauskiene and Gintaras Baltrunas, *Carbohydrate Res.,* **2005**, *340*, 1553-1556.

98. "Aqueous chemistry of the vanadium^{III} and the V^{III}-dipicolinate systems and a comparison of the effect of three oxidation states of vanadium compounds on diabetic hyperglycemia in rats," Péter Buglyó, Debbie C. Crans, Eszter M. Nagy, Ruby Lisa Lindo, Luqin Yang, Jason J. Smee, Lai-Har Chi, Michael E. Godzala III and Gail R. Willsky, *Inorg. Chem.,* **2005**, *44*, 5416-5427.

99. "Fifteen year of dancing with Vanadium," Debbie C. Crans, *Pure Appl. Chem.,* **2005**, *77, 9*, 1497-1527.

100. "Pulmonary immunotoxic potentials of metals are governed by select physicochemical properties: Chromium agents," M.D. Cohen, M. Sisco, C. Prophete, L. Chen, J.T. Zelikoff, J.J. Smee, A.A. Holder and Debbie C. Crans, *J. of Immunotox.,* **2006**, *3*, 69-81.

101. "Reduction of vanadium(V) by L-ascorbic acid at low and neutral pH: Kinetic, mechanistic and spectroscopic characterization," Patricia C. Wilkins, Michael D. Johnson, Alvin A. Holder and Debbie C. Crans**,** *Inorg. Chem.,* **2006**, *45*, 1471-1479.

102. "Transition state analogues for nucleotidyl transfer reactions: Structure and stability of pentavalent vanadate and phosphate ester dianions," James Borden, Debbie C. Crans and Jan Florian, *J. Phys. Chem. B,* **2006**, *110*, 14988-14999.

103. "Molecule probe location in reverse micelles determined by NMR dipolar interactions," Debbie C. Crans, Christopher D. Rithner, Bharat Baruah, Bridget L. Gourley and Nancy E. Levinger, *J. Am. Chem. Soc.*, **2006**, *128*, 4437-4445.

104. "Spectrometric and electrochemical investigations of vanadium(V) and vanadium(IV) tartrate complexes in solution," Ahmad R. Khan, Debbie C. Crans, Rasa Pauliukate and Eugene Norkus, *J. Brazil. Chem. Soc*., **2006**, *17*, 895-904.

105. "Self-exchange electron transfer in high oxidation state non-oxo metal complexes: Amavadin," Jeremy Lenhardt, Bharat Baruah, Debbie C. Crans and Michael D. Johnson**,** *Chem. Comm.,* **2006**, 4641-4643.

106. "When water is not water? Exploring water confined in large reverse micelles using a highly charged inorganic molecular probe," Baruah, Jennifer M. Roden, Myles Sedgwick, N. Mariano Correa, Debbie C. Crans and Nancy E. Levinger, *J. Am. Chem. Soc.,* **2006**, *128*, 12758-12765. DOI: 10.1021/ja0624319

107. "The permeability and cytotoxicity of insulin-mimetic vanadium (III,IV,V)-dipicolinate complexes," Y. Zhang, X.D. Yang, K. Wang and Debbie C. Crans, *J. Inorg. Biochem., 100 (1)*, **2006**, 80-87.

108. "Oxovanadates: A novel probe for studying lipid-water interfaces," Debbie C Crans, Bharat Baruah and Nancy E Levinger, *Biomedicine & Pharmacotherapy,* **2006**, *60(4)*, 174-181.

109. "Diabetes-altered gene expression in rat skeletal muscle corrected by oral administration of vanadyl sulfate," GR Willsky, LH Chi, Y Liang, DP Gaile, Z Hu, Debbie C. Crans, *Physiological Genomics*, **2006**, *26(3)*, 192-201.

110. "Pulmonary immunotoxic potentials of metals are governed by select physicochemical properties: Vanadium agents," M.D. Cohen, C. Prophete, M. Sisco, L. Chen, J.T. Zelikoff, J.J. Smee, A.A. Holder, A.J. Ghio, J.D. Stonehuerner and Debbie C. Crans, *J. Immunotox.* **2007**, *4(1)*, 49-60.

111. "Simple oxovanadates as multiparameter probes of reverse micelles," Bharat Baruah, Debbie C. Crans and Nancy E. Levinger, *Langmuir,* **2007**, *23*, 6510-6518.

112. "Electron spin lattice relaxation of V(IV) complexes in glassy solutions between 15 and 70 K," Alistair J. Fielding, Dong Bin Back, Michael Engler, Bharat Baruah, Debbie C. Crans, Gareth R. Eaton and Sandra S. Eaton, *ACS Symposium Series,* **2007**, *974*, 364-375.

113. "Do vanadium compounds drive reorganization of the plasma membrane and activation of insulin receptors with lipid rafts," Deborah A. Roess, Steven M. L. Smith, Alvin A. Holder, Bharat Baruah, Alejandro M. Trujillo, Daniel Gilsdorf, Michelle L. Stahla, and Debbie C. Crans, *ACS Symposium Series,* **2007**, *974*, 121-134.

114. "Comparing administration route in rats with streptozocin-induced diabetes and inhibition of myoblast growth of vanadium [V(III), V(IV) and V(V)] dipicolinic acid complexes," Gail R. Willsky, Michael E. Godzalla III, Paul J. Kostyniak, Lai-Har Chi, Rohit Gupta, Violet G. Yuen, John H. McNeill, Mohammad Mahroof-Tahir, Jason J. Smee, Luqin Yang, Aaron Kobernick, Shari Watson, and Debbie C. Crans, *ACS Symposium Series,* **2007**, *974*, 93-109.

115. "Chelation of vanadium(V) by difluoromethylene bisphosphonate, a structural analog of pyrophosphate," Debbie C. Crans, Alvin A. Holder, Tapan Kumar Saha, G. K. Surya Prakash, Muhammed Yousufuddin, Roman Kultyshev, Rehana Ismail, Myron F. Goodman, James Borden and Jan Florian, *Inorg. Chem.*, **2007**, *46*, 6723-6732.

116. "Investigating the vanadium environments in hydroxylamido V(V) dipicolinate complexes using ^{51}V NMR spectroscopy and density functional theory," Kristopher J. Ooms, Stephanie E. Bolte, Jason Smee, Bharat Baruah, Debbie C. Crans and Tatyana Polenova, *Inorg. Chem*., **2007**, *46*, 9285-9293.

117. "4-amino and 4-nitrodipicolinatovanadium(V) complexes and their hydroxylamido derivatives: Synthesis, aqueous and solid state properties," Jason J. Smee, Jason A. Epps, Guillaume Teissedre, Mandy Maes, Nichola Harding, Luqin Yang, Bharat Baruah, Susie M. Miller, Oren P. Anderson, Gail R. Willsky and Debbie C. Crans, *Inorg. Chem.,* **2007** *46*, 9827-9840.

118. "Anti-diabetic effects of cesium aqua (N,N'ethylene(salicylideneimiato)-5-sulfonato) oxovanadium(IV) dihydrate in streptozotocin – induced diabetic rats," Ming Li, D. Wei, Weijin Ding, Bhatat Baruah and Debbie C. Crans, *Biol. Trace Element Res.*, **2008**, *121*, 226-232.

119. "Impairment of ascorbates' anti-oxidant properties in confined media: Inter and intramolecular reactions with air and with vanadate at acidic pH," Debbie C. Crans, Bharat Baruah, Ernestas Gaidamauskas, Brant G. Lemons and Michael D. Johnson, *J. Inorg. Biochem,* **2008**, *102*, 1334-1347.

120. "Sarcoplasmic reticulum calcium ATPase is inhibited by organic vanadium coordination compounds," Manuel Aureliano, v Rui O. Duarte, J.J.G. Moura and Debbie C. Crans, *Inorg. Chem.,* **2008,** *47*, 5677-5684.

121. "Effects of vanadium-containing compounds on membrane lipids and on microdomains used in receptor-mediated signaling," Deborah A. Roess, Steven M. L. Smith, Peter Winter, Jun Zhou, Ping Dou, Bharat Baruah, Alejandro M. Trujillo, Nancy E. Levinger, Xioda Yang, B. George Barisas and Debbie C. Crans, *Chemistry & Diversity*, **2008**, *5*, 1558-1570.

122. "^{1}H NMR studies of aerosol-OT reverse micelles with alkali and magnesium counterions: preparation and analysis of MAOTs," Michelle L. Stahla, Bharat Baruah, Dustin M. James, Michael D. Johnson, Nancy E. Levinger and Debbie C. Crans, *Langmuir*, **2008,** *24*, 6027-6035.

123. "Do probe molecules influence water in confinement?," Bharat Baruah, Laura A. Swafford, Debbie C. Crans and Nancy E. Levinger, *J. Phys. Chem. B,* **2008,** *112*, 10158-10164.

124. "^{51}V NMR and density functional theory studies of vanadium environments in V(V)O_2 dipicolinic acid complexes," Stephanie E. Bolte, Kristopher J. Ooms, Tatyana Polenova, Bharat Baruah, Debbie C. Crans and Jason J. Smee, *J. Chem. Phys.*, **2008,** *128*, 052317/1-052317/11.

125. "Metal complexation chemistry used for phosphate and nucleotide determination: An investigation of the Yb^{3+}-pyrocatechol violet sensor," Ernestas Gaidamauskas, Kanokkarn Saejueng, Alvin A. Holder, Subalita Baruah, Boris A. Kashemirov, Debbie C. Crans and Charles E. McKenna, *J. Biol. Inorg. Chem,* **2008,** *13*, 1291-1299.

126. "Penetration of negatively charged lipid interfaces by the doubly deprotonated dipicolinate," Debbie C. Crans, Alejandro M. Trujillo, Sandra Bonetti, Christopher D. Rithner, Bharat Baruah and Nancy E. Levinger, *J. Org. Chem.,* **2008**, *73*, 9633-9640.

127. "Inhibition of protein tyrosine phosphatase 1B and alkaline phosphatase by bis(maltolato)oxovanadium (IV)," M. Li, W. Ding, B. Baruah, Debbie C Crans and R. Wang, *J. Inorg. Biochem*., **2008**, *102*, 1846-1853. (This paper was highlighted by F1000)

128. "Deprotonation of β-cyclodextrin in alkaline solutions," Ernestas Gaidamauskas, Eugenijus Norkus, Eugenijus Butkus, Debbie C. Crans and Giedre Grinciene, *Carbohydrate Res.*, **2009** *344*, 250-254.

129. "Anti-diabetic effects of sodium 4-amino-2,6-dipicolinatodioxovanadium(V) dihydrate in streptozotocin-induced diabetic rats," Ming Li, Jason J. Smee, Wenjun Ding and Debbie C. Crans, *J. Inorg. Biochem.*, **2009**, *103*, 585-589.

130. "Decavanadate ($V_{10}O_{28}^{6-}$) and oxovanadates: Oxometalates with many biological activities" Manuel Aureliano and Debbie C. Crans, *J. Inorg. Biochem*., **2009**, *103*, 536-546.

131. "Chloro-substituted dipicolinate vanadium complexes: Synthesis, solution, solid-state and insulin enhancing properties," Jason J. Smee, Jason A. Epps, Kristopher Ooms, Stephanie Bolte, Tatyana Polenova, Bharat Baruah, Luqin Yang, Wenjun Ding, Ming Li, Gail R. Willsky, Agnete la Cour, Oren P. Anderson and Debbie C. Crans, *J. Inorg. Biochem*., **2009,** *103*, 575-584.

132. "Anti-diabetic effects of vanadium (III, IV, V) - chlorodipicolinate complexes in streptozotocin-induced diabetic rats," Ming Li, Wenjun Ding, Jason J. Smee, Bharat Baruah, Gail R. Willsky and Debbie C. Crans, *BioMetals*, **2009**, *103*, 585-905.

133. "Electron transfer in non-Oxo vanadium(IV) and (V) complexes: Kinetic studies of an amavadin model" Jeremy M. Lenhardt, Bharat Baruah, Debbie C. Crans and Michael D. Johnson, *Pure Appl. Chem*., **2009**, *81*, 1241-1249.

134. **"**Impact of confinement and interfaces on coordination chemistry: Probing oxovanadate reactions including proton transfer reactions in reverse micelles,**"** Debbie C. Crans, Bharat Baruah, Allison Ross and Nancy E. Levinger, *Coord. Chem. Rev.*, **2009,** *253*, 2178-2185.

135. "What's inside a nonionic reverse micelle? Probing the interior of Igepal reverse micelles using decavanadate," Myles A. Sedgwick, Debbie C. Crans and Nancy E. Levinger, *Langmuir,* **2009**, *25*, 5496-5503.

136. "^{51}V solid-state NMR and density functional theory studies of eight-coordinate non-oxo vanadium complexes: Oxidized amavadin," Kristopher J. Ooms, Stephanie E. Bolte, Bharat Baruah, M. A. Choudhary, Debbie C. Crans and Tatyana Polenova, *Dalton Transactions,* **2009**, 3262-3269 (DOI: 10.1039/b820383k).

137. "Complexation of bisphosphonates with Ytterbium(III): Application of phosphate and ATP detection assay based on Yb^{3+}-pyrocatechol violet," Ernestas Gaidamauskas, Helen Parker, Boris A. Kashemirov, Alvin A. Holder, Kanokkarn Saejueng, Charles E. McKenna and Debbie C. Crans, *J. Inorg. Biochem.*, **2009**, *103*, 1652-1657 (DOI:10.1016/j.jinorgbio.2009.09.006).

138. "Effects of decavanadate and insulin enhancing vanadium compounds on glucose uptake in isolated rat adipocytes," Maria Joao Pereira, Eugenia Carvalho, Jan W. Eriksson, Debbie C. Crans and Manuel Aureliano, *J. Inorg. Biochem.*, **2009**, *103*, 1687-1692.

139. "Effects of metal compounds with distinct physicochemical properties on iron homeostasis and anti-bacterial activity in the lungs: Cr and V," Mitchell D. Cohen, Maureen Sisco, Kotaro Yoshida, Lung-chi Chen, Judith T. Zelikoff, Jason Smee, Alvin A. Holder, Jacqueline Stonehuerner, Debbie C. Crans and Andrew J. Ghio, *Inhalation Toxicology*, **2010,** *22 (2)*, 169-178.

140. "Is vanadate reduced by thiols under biological conditions?: Changing the redox potential of V(V)/V(IV) by complexation in aqueous solution" Debbie C. Crans, Boyan Zhang, Ernestas Gaidamauskas, Anastasios D. Keramidas, Gail R. Willsky and Chris R. Roberts, *Inorg. Chem.*, **2010**, *49*, 4245-4256.

141. "Effect of micellar and reverse micellar interface on solute location: 2,6-pyridinedicarboxylate in CTAB micelles and CTAB and AOT reverse micelles," Ernestas Gaidamauskas, David P. Cleaver, Pabitra B. Chatterjee and Debbie C. Crans, *Langmuir*, **2010**, *26*, 13153-13161.

142. "Coexisting aggregates in mixed Aerosol OT and cholesterol microemulsions," Myles A. Sedgwick, Alejandro M. Trujillo, Noah Hendricks, Nancy E. Levinger and Debbie C. Crans, *Langmuir,* **2011,** *27 (3),* 948-954. DOI: 10.1021/la103875w

143. "Acidification of reverse micellar nanodroplets by CO_2," Nancy E. Levinger, Lauren C. Rubenstrunk, Bharat Baruah and Debbie C. Crans, *J. Am. Chem. Soc.*, **2011**, *133*, 7205-7213. (Highlighted in *Science, 332, (6031), 13 May 2011.*)

144. "Reduced molybenum-oxide-based core–shell hybrids: "Blue" electrons are delocalized on the shell," Ana Maria Todea, Julia Szakacs, Sanjit Konar, Hartmut Bçgge, Debbie C. Crans, Thorsten Glaser, Helene Rousseliere, Rene Thouvenot, Pierre Gouzerh and Achim Muller, *Chem. Eur. J*., **2011,** *17*, 6635-6642.

145. "How environment affects drug activity: Localization, compartmentalization and reactions of a vanadium insulin-enhancing compound, dipicolinatooxovanadium(V)," Debbie C. Crans, Alejandro M. Trujillo, Philip S. Pharazyn and Mitchell D. Cohen, *Coor. Chem. Rev.,* **2011***, 19-20*, 2178-2192.

146. "Anti-diabetic effects of a series of vanadium dipicolinate complexes in rats with Streptozotocin induced diabetes," Gail Ruth Willsky, Lai-Har Chi, Michael E Godzalla, III, Paul J Kostyniak, Jason J Smee, Alejandro M Trujillo, Josephine A Alfano, Wenjin Ding, Zihua Hu and Debbie C. Crans, *Coor. Chem. Rev.,* **2011,** *19-20*, 2258-2269.

147. "Layered structure of room temperature ionic liquids in microemulsions by multinuclear NMR spectroscopic studies," R. Dario Falcone, Bharat Baruah, Ernestas Gaidamauskas, Christopher D. Rithner, N. Mariano Correa, Juana J. Silber, Debbie C. Crans and Nancy E. Levinger, *Chem. Eur. J*., **2011,** *17*, 6837-6846.

148. "Characterization of non-innocent metal complexes using solid–state NMR spectroscopy: o-dioxolene vanadium complexes," Pabitra B. Chatterjee, Olga Goncharov-Zapata, Laurence L. Quinn, Guangjin Hou, Hiyam Hamaed, Robert W. Schurko, Tatyana Polenova, and Debbie C. Crans, *Inorg. Chem.,* **2011,** *50*, 9794-9803. (Contribution invited to the Inorganic Chemistry Forum on Redox Active Ligands)

149. "An AOT-lecithin based gel formulation for intracavitary administration of breast cancer drugs*"* Kellie A. Woll, Elie J. Schuchardt, Claire R. Willis, Christopher D. Ortengren, Noah Hendricks, Mitch Johnson, Ernestas Gaidamauskas, Bharat Baruah, Audra G. Sostarecz, Deanna R. Worley, David W. Osborne and Debbie C. Crans, *Chemistry & Biodiversity*, **2011,** *8 (12)*, 2195-2210.

150. "Antidiabetic vanadium compound and membrane interfaces: Interface facilitated metal complex hydrolysis**"** Debbie C. Crans, Samantha Schoeberl, Ernestas Gaidamauskas, Bharat Baruah and Deborah A. Roess, *J. Biol. Inorg. Chem.,* **2011**, *16*, 961-972.

151. "Quantification of foscarnet with chromogenic and fluorogenic chemosensors: Indicator displacement assays based on metal ion coordination with catechol ligand moiety," Ernestas Gaidamauskas, Debbie C. Crans, Helen Parker, Kanokkarn Saejueng, Boris A. Kashemirov and Charles E. McKenna, *New J. Chem.,* **2011**, *35(12)*, 2877-2883.

152. "Switching off electron transfer reactions in confined media: Reduction of $[Co(dipic)_2]^-$ and $[Co(edta)]^-$ by hexacyanoferrate(II)," Michael D. Johnson, Bret B. Lorenz, Patricia C. Wilkins, Brant G. Lemons, Bharat Baruah, Nathan Lamborn, Michelle Stahla, Pabitra B. Chatterjee, David T. Richens and Debbie C. Crans, *Inorg. Chem.,* **2012**, *51 (5)*, 2757-2765. (dx.doi.org/ 10.1021/ic201247v)

153. "Insulin receptors and downstream substrates associate with membrane microdomains after treatment with insulin or chromium(III) picolinate," Abeer Al-Qatati, Peter W. Winter, Amber L. Wolf-Ringwall, Pabitra B. Chatterjee, Alan K. van Orden, Debbie C. Crans, Deborah A. Roess and B. George Barisas, *Cell Biochem. Biophys*., **2012**, *62 (3)*, 441-450. (DOI 10.1007/s12013-011-9326-x)

154. "Insulin and bis(maltolato)oxovanadium(IV) (BMOV) reduce insulin receptor lateral diffusion and increase receptor confinement in membrane microdomains," Peter W. Winter, Abeer Al-Qatati, Amber Wolf-Ringwall, Samantha Schoeberl, Alan K. Van Orden, B. George Barisas, Deborah A. Roess and Debbie C. Crans, *Dalton Transactions*, **2012**, *41(21)*, 6419-6430.

155. "The conundrum of pH in water nanodroplets: Sensing pH in reverse micelle water pools," Debbie C. Crans and Nancy E. Levinger, *Acc. Chem. Res.*, **2012**, *45*, 1637-1645.

156. "Redox activity in a vanadium(V) o-dioxolene complex is modulated by protonation state as indicated by ^{51}V solid-state NMR and density functional theory calculations," Pabitra B. Chatterjee, Olga Goncharov-Zapata, Guangjin Hou, Tatyana Polenova and Debbie C. Crans, *Eur. J. Inorg. Chem.,* **2012**, 4644-4651.

157. "Solid-to-solid oxidation of a vanadium(IV) to be a vanadium(V) compound: Chemistry of a sulfur containing siderophore," Pabitra B. Chatterjee and Debbie C. Crans, *Inorg. Chem.,* **2012,** *51*, 9144-9146.

158. "Correlating Proton Transfer Dynamics to Probe Location in Confined Environments," Myles Sedgwick, Richard L. Cole, Christopher D. Rithner, Debbie C. Crans and Nancy E. Levinger, *J. Amer. Chem. Soc*., **2012**, *134*, 11904-11907.

159. "Stabilization of a vanadium(V)-catechol complex by compartmentalization and reduced solvation inside reverse micelles," Brant G. Lemons, David Richens, Michael D. Johnson, Ashley Anderson, Myles A Sedgwick, and Debbie C. Crans, *New J. Chem.*, **2013,** *37,* 75-81. (Hot topic issue. Cover Manuscript.)

160. "Counterion affects interaction with interfaces: The antidiabetic drugs metformin and decavanadate," Aungkana Chatkon, Pabitra B. Chatterjee, Myles A Sedgwick, Kenneth J. Haller and Debbie C. Crans, *Eur. J. Inorg. Chem.*, **2013**, *10-11*, 1859-1868.

161. "Raft localization of Type1 Fcε receptor and degranulation of RBL-2H3 cells exposed to decavanadate, a structural model for V_2O_5," Abeer Al-Qatati, Fabio L. Fontes, B. George Barisas, Dongmei Zhang, Deborah A. Roess and Debbie C. Crans, *Dalton Transactions*, **2013**, *2 (33)*, 11912 – 11920.

162. "Using real time RT-PCR analysis to determine gene expression patterns in RBL-2H3 cells in response to insulin, glucose and the anti-diabetic bis(maltolato)oxovanadium(IV)," Abeer Al-Qatati, Amber L. Wolf-Ringwall, Gerrit J. Bouma, Debbie C. Crans, B. George Barisas and Deborah A. Roess, *J. Al Azhar University-Gaza (Natural Sciences)*, **2013**, *15*, 129-152.

163. "Cation exchange, solvent free synthesis and packing patterns of quinolinium nickel(II) dipicolinates," Babulal Das, Debbie C. Crans and Jubaraj B. Baruah, *Inorg. Chim. Acta.*, **2013**, *408*, 204-208.

164. "Coordination chemistry may explain pharmacokinetics and clinical response of vanadyl sulfate in type 2 diabetic patients," Gail R. Willsky, Katherine Halvorson, Michael E. Godzala III, Lai-Har Chi, Mathew Most, Peter Kaszynski, Debbie C. Crans, Allison B. Goldfine and Paul J. Kostnyniak, *Metallomics*, **2013**, *5*, (11) 1491-1502. (DOI:10.1039/C3MT00162H)

165. "Metal speciation in health and medicine represented by iron and vanadium," Debbie C. Crans, Kellie A. Woll, Kestutis Prusinskas, Michael D. Johnson, and Eugenijjus Norkus, *Inorg. Chem.*, **2013**, *52*, 12264-12275. (IC Forum dx.doi.org/10.1021/ic4007873)

166. "Effect of ancillary ligand on electronic structure as probed by ^{51}V solid-state NMR spectroscopy for vanadium-o-dioxolene complexes," Olga Goncharov-Zapata, Pabitra B. Chatterjee, Guangjin Hou, Laurence L. Quinn, Mingyue Li, Jenna Yehl, Debbie C. Crans and Tatyana Polenova, *CrystEngComm*, **2013**, *15*, 8776-8783.

167. "The active form of anti-diabetic vanadium compounds in the organism," Yutaka Yoshikawa, Hiromu Sakurai, Debbie C. Crans, Giovanni Micera and Eugenio Garribba, *Dalton Transactions*, **2014,** *43,* 6965-6972.

168. "Interaction of decavanadate with interfaces and biological model membrane systems: Characterization of soft oxometalate systems," Nuttaporn Samart, Jessica Saeger, Kenneth J. Haller, Manuel Aureliano and Debbie C. Crans, *J. Mol. Eng. Mat.*, **2014**, *2*, 1-21.

169. "Correlation of insulin enhancing properties of vanadium dipicolinate complexes in model membrane systems: Phospholipid langmuir monolayers and AOT reverse micelles," Audra G. Sostarecz, Ernestas Gaidamauskas, Steve Distin, Sandra J. Bonetti, Nancy E. Levinger and Debbie C. Crans, *Chem. Eur. J*., **2014**, *20*, 5149-5159.

170. "Effects of vanadium (III, IV, V)-chlorodipicolinate on glycolysis and antioxidant status in the liver of STZ-induced diabetic rats," Mingxia Xie, Deliang Chen, Fang Zhang, Gail R. Willsky, Debbie C. Crans and Wenjun Ding, *J. Inorg. Biochem.*, **2014**, *136*, 47–56.

171. "Interaction of a biguanide compound with membrane model interface systems; Probing properties of antimalaria and antidiabetic compounds" Nuttaporn Samart, Cheryle Beuning, Kenneth Haller, Christopher D. Rithner and Debbie C. Crans, *Langmuir*, **2014**, *30*, 8697-8706.

172. "Guanylurea metformium double salt of decavanadate, $(HGU^+)_4(HMet^+)_2(V_{10}O_{28}^{6-})\cdot 2H_2O$," Aungkana Chatkon, Alexa Barres, Nuttaporn Samart, Sarah Boyle, Kenneth J. Haller and Debbie C. Crans, *Inorg. Chem. Acta.*, **2014,** *420*, 85-91. http://dx.doi.org/10.1016/j.ica.2013.12.031

173. "Spectroscopic characterization of *L*-ascorbic acid-induced reduction of vanadium(V) dipicolinates: Forming V(III) and V(IV) complexes from V(V) dipicolinate derivatives," Dorothy C. Horton, Don VanDerveer, J. Krzystek, Joshua Telser, Thomas Pittman, Debbie C. Crans and Alvin A. Holder, *Inorg. Chem. Acta.*, **2014,** *420*, 112-119.

174. "Trigonal bipyramidal or square pyramidal coordination geometry? Phosphatase inhibiting vanadium compounds," Debbie C. Crans, Craig C. McLauchlan and Michael L. Tarlton, *Eur. J. Inorg. Chem.*, **2014,** *27*, 4450-4468.

175. "Electron transfer rate enhancements in nanosized waterpools," Bret B. Lorenz, Debbie C. Crans and Michael D. Johnson, *Eur. J. Inorg. Chem.*, **2014,** *27*, 4537-4540.

176. "Novel insights into the mechanism of inhibition of MmpL3, a target of multiple pharmacophores in *Mycobacterium tuberculosis*," Wei Li, Ashutosh Upadhyay, Fabio L. Fontes, E. Jeffrey North, Yuehong Wang, Debbie C. Crans, Anna E. Grzegorzewicz, Victoria Jones, Scott G. Franzblau, Richard E. Lee, Dean C. Crick and Mary Jackson, *Antimicrob. Agents Chemotheraphy*, **2014**, *58 (11)*, 6413-6423. doi: 10.1128/AAC.03229-14. PMID: 25136022

177. "NMR crystallography for structural characterization of oxovanadium(V) complexes: Deriving coordination geometry and detecting weakly coordinated ligands at atomic resolution in the solid state," Mingyue Li, Jenna Yehl, Guangjin Hou, Pabitra B. Chatterjee, Amir Goldbourt, Debbie C. Crans and Tatyana Polenova, *Inorg. Chem.*, **2015**, 54, 1363-1374. doi: 10.1021/ic5022388. PMID: 25590382

178. "Evaluating transition state structures of vanadium-phosphatase protein complexes using shape analysis," Irma Sanchez-Lombardo, Santiago Alvarez, Craig C. McLauchlan and Debbie C. Crans, *J. Inorg. Biochem.* **2015**, *147*, 153-164. doi: 10.1016/j.jinorgbio.2015.04.005. PMID: 25953100

179. "High-frequency and -field electron paramagnetic resonance of vanadium(IV, III, and II) complexes," Jurek Krzystek, Andrew Ozarowski, Joshua Telser and Debbie C. Crans, *Coord. Chem. Rev.*, **2015**, 301-302, 123-133.

180. "Vanadium-protein complexes: Phosphatase inhibitors favor the trigonal bipyramidal transition state geometries," Craig C. McLauchlan, Benjamin J. Peters, Gail R. Willsky and Debbie C. Crans, *Coord. Chem. Rev.*, **2015**, 301-302, 163-199.

181. "Partial Saturation of Menaquinone in Mycobacterium tuberculosis: Function and Essentiality of a Novel Reductase, MenJ," Ashutosh Upadhyay, Fabio Fontes, Mercedes Gonzalez-Juarrero, Michael R. McNeil, Debbie C. Crans, Mary Jackson and Dean C. Crick, *ACS Central Science*, **2015**, 1, 292-302. DOI: 10.1021/acscentsci.5b00212. PMID: 26436137

182. "Antidiabetic, chemical and physical properties of organic vanadates as presumed transition state inhibitors for phosphatases" Debbie C. Crans, *J. Org. Chem.* **2015**, 80 (24), 11899-11915. http://dx.doi.org/10.1021/acs.joc.5b02229. This article was featured on the cover. doi: 10.1021/acs.joc.5b02229. PMID: 26544762

183. "Size and shape trump charge in interactions of oxovanadates with self-assembled interfaces: Application of Continuous Shape Measure analysis to the decavanadate anion" Irma Sánchez-Lombardo, Bharat Baruah, Santiago Alvarez, Katarina R. Werst, Nicole A. Segaline, Nancy E. Levinger and Debbie C. Crans, *New J. Chem.* **2016**, *40*, 962-975. DOI:10.1039/c5nj01788b.

184. "How Interfaces Affect the Acidity for the Anilinium Ion" Jarukorn Sripradite, Susanne Miller, Michael D. Johnson, Anan Tongraar, and Debbie C. Crans, *Chemistry – A European Journal* **2016,** *22*, 3873-3880 DOI: 10.1002/chem.201504804. PMID: 26878992

185. "Synthesis, structural characterization, modal membrane interaction and anti-tumor cell line studies of nitrophenyl ferrocenes' Molecular Structure" Ataf Ali Altaf, Bhajan Lal, Amin Badshah, Muhammad Usman, Pabitra B. Chatterjee, Fazlul Huq, Shafiq Ullah, Debbie C. Crans *J. of Mol. Structure*, **2016**, *1113*, 162-170.

186. "Multinuclear NMR studies of aqueous Vanadium-HEDTA Complexes" Xiao Wu, Benjamin J. Peters, Christopher D. Rithner and Debbie C. Crans, *Polyhedron*, **2016**, *114*, 325–332. DOI: 10.1002/chem.201504804.

187. "Translational Science for Energy and Beyond" James R. McKone, Debbie C. Crans, Cheryl Martin, John Turner, Anil R. Duggal, and Harry B. Gray, *Inorg. Chem.* **2016,** *55*, 9131-9143. doi: 10.1021/acs.inorgchem.6b01097. PMID: 27606600

188. "Differences in interactions of benzoic acid and benzoate with interfaces" Benjamin J. Peters, Allison S. Groninger, Fabio L. Fontes, Dean C. Crick, and Debbie C. Crans *Langmuir* **2016,** *32 (37),* 9451-9459. doi: 10.1021/acs.langmuir.6b02073. PMID: 27482911

189. "Selective speciation improving efficacy and lowers toxicity of platinum anticancer and vanadium antidiabetic drugs" Kaitlin A. Doucette, Kelly N. Hassell and Debbie C Crans, *J. Inorg. Biochem.* **2016**, 165, 56-70. doi: 10.1016/j.jinorgbio.2016.09.013. PMID: 27751591

190. "Selenium speciation in the Fountain Creek water and fish diversity" James Carsella, Igor Melnykov, Sandra Bonetti, Irma Sánchez-Lombardo and Debbie C. Crans *J. Biol. Inor. Chem.* **2017**, 22, 751-763. 10.1007/s00775-017-1457-0. doi: 10.1007/s00775-017-1457-0. PMID: 28447172

191. "Selenium speciation in the Fountain Creek Watershed correlates with water hardness, Ca and Mg levels" James S. Carsella, Irma Sánchez-Lombardo, Sandra J. Bonetti, and Debbie C. Crans, *Molecules,* **2017**, 22, 708, pp 1-16; doi:10.3390/molecules22050708. PMID: 28468296

192. "Does Anion-Cation Organization in Na^+-containing X-ray Crystal Structures Relate to Solution Interactions in Inhomogeneous Nanoscale Environments: Sodium-Decavanadate in Solid State Materials, Minerals and Microemulsions" Debbie C. Crans, Benjamin J. Peters, Xiao Wu and Craig C. McLauchlan, *Coord. Chem. Rev.*, **2017,** *344*, 115-130, http://dx.doi.org/10.1016/j.ccr.2017.03.016

193. "Speciation of metal drugs, supplements and toxins in media and bodily fluids controls *in vitro* activities" Aviva Levina, Debbie C. Crans, Peter A. Lay *Coor. Chem. Rev.* **2017**, *352*, 473-498. http://dx.doi.org/10. 1016/ j.ccr. 2017.01.002 (WOS designated this paper initially as a Hot paper and Highly Cited Paper)

194. "Multi-Modal Potentiation of Oncolytic Virotherapy by Vanadium Compounds" Mohammed Selman, Christopher Rousso, Anabel Bergeron, Hwan Hee Son, Ramya Krishnan, Nader A. El-Sayes, Oliver Varette, Andrew Chen, Fanny Tzelepis, John C. Bell, Debbie C. Crans, and Jean-Simon Diallo, *Molecular Therapy* **2018,** 26, 1, 56-69; doi.org/10.1016/j.ymthe.2017.10.014. PMCID: PMC5763159; PMID: 29175158

195. "A synthetic isoprenoid lipoquinone, menaquinone-2, adopts a folded conformation in solution and at a model membrane interface" Jordan T. Koehn, Estela S. Magallanes, Benjamin J. Peters, Cheryle N. Beuning, Allison A. Haase, Michelle J. Zhu, Christopher D. Rithner, Dean C. Crick and Debbie C. Crans *J. Org. Chem*. **2018**, *83*, 275–288; DOI: 10.1021/acs.joc.7b02649. PMID: 29168636

196. "Health Benefits of Vanadium and Its Potential as an Anticancer Agent" Debbie C. Crans, Lining Yang, Allison Haase and Xiaogai Yang *Met. Ions Life Sci,* **2018,** *18*, 251-279. doi: 10.1515/9783110470734-015. PMID: 29394028

197. "Confined space affect chemical equalibria: Pentacyano(pyrazine)ferrate(II) reactivity changes within nanosized droplets of water" Teofilo Borunda, Alexander J. Myers, Mary J. Fisher, Debbie C. Crans, Michael D. Johnson *Molecules.* **2018**, *23*, 858 (1-14). doi:10.3390/molecules23040858. PMID: 29642558

198. "Probing of Ferrocenyl Anilines on Model Micelle / Reverse Micelle Membrane and their Enhanced Reactivity for Reactive Oxidants" Ataf A Altaf, Amin Badshah, Bhajan Lal, Shahzad Murtaza, Pabitra B Chatterjee, Kamran Akbar, and Debbie C. Crans *Appl. Organometal. Chem.*, **2018**, 32:e4334, (1-9); https://DOI.org/10.1002/aoc.4334.

199. "Measurement of inter-peptidic Cu(II) exchange rate constants by static fluorescence quenching of tryptophan" Cheryle Beuning, Béatrice Mestre-Voegtlé, Peter Faller, Christelle Hureau, Debbie C. Crans *Inorg. Chem.* **2018,** 57, 4791-4794. DOI:10.1021/acs.inorgchem.8b00182. PMID: 29648796

200. "Coordination environment changes of the vanadium in vanadium-depending haloperoxidase enzymes" Craig C. McLauchlan, Heide A. Murakami, Craig A. Wallace, and Debbie C. Crans *J. Inorg. Biochem.* **2018,** *186*, 267-279. doi: 10.1016/j.jinorgbio.2018.06.011. PMID: 29990751

201. "Ru(II) Compounds: Next-generation anticancer metallotherapeutics?" Sreekanth Thota, Daniel A. Rodrigues, Debbie C. Crans, Eliezer J. Barreiro *J. Med. Chem.* **2018,** *61* (14), pp 5805–5821. doi: 10.1021/acs.jmedchem.7b01689. PMID: 29446940

202. "Structure Dependence of Pyridine and Benzene Derivatives on Interactions with Model Membranes" Benjamin J. Peters, Cameron Van Cleave, Allison A. Haase, John Peter B. Hough, Keisha A. Giffen-Kent, Gabriel M. Cardiff, Audra G. Sostarecz, Dean C. Crick, and Debbie C. Crans *Langmuir,* **2018,** 34 (30), 8939-8951. doi: 10.1021/acs.langmuir.8b01661. PMID: 29958493

203. "Ferrocene Based Anilides: Synthesis, Structural Characterization and Inhibition of Butyrylcholinesterase" Ataf Ali Altaf, Muhammad Hamayun, Bhajan Lal, Muhammad Nawaz Tahir, Alvin A. Holder, Amin Badshah, Debbie C. Crans *Dalton* **2018,** 47, 11769-11781; doi: 10.1039/C8DT01726C. PMID: 30117513

204. "Mycobacterial MenJ, an oxidoreductase involved in menaquinone biosynthesis" Ashutosh Upadhyay, Santosh Kumar, Steven Rooker, Jordan T. Koehn, Debbie C. Crans, Michael R. McNeil, J. Shaun Lott and Dean C. Crick *ACS Chem. Biol.* **2018,** *13,* 2498-2507. doi: 10.1021/acschembio.8b00402. PMID: 30091899

205. "Synthesis and characterization of partially and fully saturated menaquinone derivatives" Jordan T. Koehn, Dean C. Crick, and Debbie C. Crans *ACS Omega.* **2018**, *3*, 14889-14901. doi: 10.1021/acsomega.8b02620. eCollection 2018 Nov 30. PMID: 31458155

206. "Decavanadate inhibits microbacterial growth more potently than other oxovanadates" Nuttaporn Samart, Zeyad Arhouma, Santosh Kumar, Heide A. Murakami, Dean C. Crick and Debbie C. Crans, *Frontiers in Chemistry*, **2018,** 6, article #519 (16p). doi: 10.3389/fchem.2018.00519. PMCID: PMC6255961; PMID: 30515375

207. "Developing vanadium as an antidiabetic drug: A clinical and historical perspective" Debbie C. Crans, LaRee Henry, Gabriel Cardiff and Gary Posner, *Met. Ions Life Sci.,* **2019**, *19*, 203-230. doi: 10.1515/9783110527872-014. PMID: 30855109

208. "Investigating Substrate Analogs for Mycobacterial MenJ: Truncated and Partially Saturated Menaquinones" Jordan T. Koehn, Cheryle N. Beuning, Benjamin J. Peters, Sara K. Dellinger, Cameron Van Cleave, Dean C. Crick, and Debbie C. Crans, *Biochemistry*, **2019,** *58* (12), 1596-1615; (Editor highlighted). doi: 10.1021/acs.biochem.9b00007. PMID: 30789743

209. "Hydrophobicity Enhances Membrane Affinity and Anti-Cancer Effects of Schiff Base Vanadium(V) Catecholate Complexes" Debbie C. Crans, Jordan T. Koehn, Stephanie M. Petry*, Caleb M. Glover, Asanka Wijetunga, Ravinder Kaur, Aviva Levina, and Peter A. Lay *Dalton Transactions*, **2019**, *48*, 6383-6395; DOI: 10.1039/c9dt00601j. PMID: 30941380.

210. "A Transition-State Perspective on Y-Family DNA Polymerase eta Fidelity in Comparison with X-Family DNA Polymerases lambda and beta" Keriann Oertell, Jan Florián, Pouya Haratipour, Debbie C. Crans, Boris A. Kashemirov, Samuel H. Wilson, Charles E. McKenna, and Myron F. Goodman, *Biochemistry*, **2019,** *58* (13), 1764-1773. doi: 10.1021/acs.biochem.9b00087. PMID: 30839203

211. "Organometallic and Coordination Rhenium Compounds and their Potential in Cancer Therapy", Elisabeth B. Bauer, Allison Haase, Robert M. Reich, Debbie C. Crans and Fritz E. Kühn *Coord. Chem. Rev.* **2019**, *393*, 79-117.

212. "Speciation and Toxicity of Rhenium Salts, Organometallics and Coordination Complexes" Allison Haase, Elisabeth Bauer, Fritz Kühn and Debbie C. Crans *Coord. Chem. Rev.* **2019,** *394*, 135-161.

213. "Exploring Wells-Dawson Clusters associated with the Small Ribosome Subunit" Debbie C. Crans, Irma Sánchez-Lombardo and Craig C. McLauchlan *Front. Chem.* **2019,** 7, 462 (1-16p). doi: 10.3389/fchem.2019.00462. PMID: 31334216.

214. "Enhancement of oncolytic virotherapy by vanadium(V) dipicolinates" Anabel Bergeron, Kateryna Kostenkova, Mohammed Selman, Heide A. Murakami, Elizabeth Owens, Naveen Haribabu, Rozanne Arulanandam, Jean-Simon Diallo and Debbie C. Crans *Biometals*, **2019**, 32, 545-561. doi: 10.1007/s10534-019-00200-9. PMID: 31209680

215. "The First Row Transition Metals in the Periodic Table of Medicine" Cameron Van Cleave and Debbie C. Crans, *Inorganics* **2019**, *7*, 111; doi:10.3390/inorganics7090111 (a feature article)

216. "Effects of vanadium(IV) compounds on plasma membrane lipids leads to G protein-coupled receptor signal transduction" Duaa Althumairy, Heide A. Murakami, Dongmei Zhang, B. George Barisas, Deborah A. Roess and Debbie C. Crans *J. Inorg. Biochem.* **2020**, *203*, 110873. doi: 10.1021/acs.inorgchem.9b02848. PMID: 31808684.

217. "Light-induced Metal Ion Burst Reactions Allow for Temporally Controlled Zn^{2+} Release from Photocages at the Nanoscale" Cheryle N. Beuning, Noah E. Barkley, Prem N. Basa, Shawn C. Burdette, Nancy E. Levinger, and Debbie C. Crans *Inorg. Chem.* **2020**, 59, 1, 184-188. doi: 10.1021/acs.inorgchem.9b02848. PMID: 31808684.

218. "Application of HPLC to measure vanadium in environmental, biological and clinical matrices" Iman Boukhobza and Debbie C. Crans *Arabian J. Chem.* **2020**, *13*, 1198-1228.

219. "Characterizing the role of SMYD2 in Mammalian Embryogenesis - Future Directions" Dillon K. Jarrell, Kelly N. Hassell, Debbie C. Crans, Shari Lanning and Mark A. Brown *Vet. Sci.* **2020**, *7*, 63 (9pp); doi:10.3390/vetsci7020063.

220. "Initiation of a novel mode of membrane signaling: vanadium facilitated signal transduction" Nuttaporn Samart, Duaa Althumairy, Dongmei Zhang, Deborah A. Roess and Debbie C. Crans *Coord. Chem. Rev.* **2020**, *416*, 213-286.

221. "Location of menaquinone and menaquinol head groups in model membranes" Cameron Van Cleave, Heide A. Murakami, Nuttaporn Samart, Jordan T. Koehn, Pablo Maldonado, Jr., Heidi D. Kreckel, Elana J. Cope, Andrea Basile, Dean C. Crick and Debbie C. Crans *Can. J. Chem.*, **2020**, *98*, 307-317.

222. Polyoxometalates Function as Indirect Activators of a G Protein-Coupled Receptor" Duaa Althumairy, Kahoana Postal, B. George Barisas, Giovana G. Nunes, Deborah A. Roess, and Debbie C. Crans *Metallomics*, **2020,** *12*, 1044-1061, with Front Cover. DOI: 10.1039/D0MT00044B

223. "ESI-MS Study of the Interaction of Potential V^{IV} Drugs and Amavadin with Proteins" Valeria Ugone, Daniele Sanna, Giuseppe Sciortino, Debbie C. Crans, and Eugenio Garribba *Inorg. Chem.* **2020**, 59, 9739-9755. DOI: 10.1021/acs.inorgchem.0c00969

224. "Open questions on the biological roles of first-row transition metals" Debbie C. Crans and Kateryna Kostenkova *Commun. Chem.* **2020**, 3, 104 (p1-4). https://doi.org/10.1038/s42004-020-00341-w (link https://rdcu.be/b58iw)

225. "A Short-Lived but Highly Cytotoxic Vanadium(V) Complex as a Promising Drug Candidate for Brain Cancer Treatment by Intratumoral Injections" Aviva Levina, Adriana Pires Vieira, Asanka Wijetunga, Ravinder Kaur, Jordan T. Koehn, Debbie C. Crans and Peter A. Lay *Angew. Chem. Int. Ed.* **2020**, 59, 15834-15838 with cover. DOI: 10.1002/ange.202005458

226. "Glycoprotein G-protein Coupled Receptors in Disease: Luteinizing Hormone Receptors and Follicle Stimulating Hormone Receptors" Duaa Althumairy, Xiaoping Zhang, Nicholas Baez, B. George Barisas[ac], Deborah A. Roess[d], George R. Bousfield[e] and Debbie C. Crans *Diseases*, **2020**, 8(3), 35; doi:10.3390/diseases8030035

227. "Synthesis of naphthoquinone derivatives, menaquinones, and other vitamin K derivatives" Margeret Braasch-Turi and Debbie C. Crans *Molecules* **2020**, *25*, 4477 (37pp); doi:10.3390/molecules25194477

228. *"Mycobacterium tuberculosis* survival in J774A.1 cells is dependent on MenJ moonlighting activity, not its enzymatic activity" Santosh Kumar, Jordan T. Koehn, Mercedes Gonzalez-Juarrero, Debbie C. Crans, and Dean C. Crick *ACS Infectious Diseases*, 2020, 6(10), 2661-2671 https://pubs.acs.org/doi/10.1021/acsinfecdis.0c00312

229. "In silico/in vitro hit-to-lead methodology yields SMYD3 inhibitor that eliminates unrestrained proliferation of breast carcinoma cells" Ilham M. Alshiraihi, Dillon K. Jarrell, Zeyad Arhouma, Kelly N. Hassell, Jaelyn Montgomery, Alyssa Pasilla, Hend M. Ibrahim, Debbie C. Crans, Takamitsu A. Kato, Mark A. Brown *Int. J. Mol. Sci*. 2020, 21, 9549; https://**doi**.org/**10.3390/ijms21249549**; doi:10.3390/ijms21249549

230. "The acid base equilibrium of pyrazinoic acid drives the pH dependence of pyrazinamide induced *Mycobacterium tuberculosis* growth inhibition" Fabio L. Fontes, Benjamin J. Peters, Debbie C. Crans, Dean C. Crick *ACS Infectious Disease* **2020,** 6(11), 3004-3014. DOI: 10.1021/acsinfecdis.0c00507

231. "The Interfacial Interactions of Glycine and Short Glycine Peptides in Model Membrane Systems" Kaitlin A. Doucette, Prangthong Chaiyasit, Donn L. Calkins, Kayli N. Martinez, Cameron Van Cleave, Callan A. Knebel, Anan Tongraar and Debbie C. Crans *Int. J. Mol. Sci*. 2020, 22, 162. https://doi.org/10.3390/ijms22010162

232. "Vanadium compounds promote biocatalysis in cells through actions on cell membranes" Debbie C. Crans, Mark Brown, and Deborah A. Roess *Catalysis Today*, accepted.

233. "Vanadium(IV)-diamine complex with hypoglycemic activity and a reduction in testicular atrophy" Lidiane M. A. de Lima, Mônica F. Belian, Wagner E. Silva, Kahoana Postal, Kateryna Kostenkova, Debbie C. Crans, Ana Katharyne F. F. Rossiter, Valdemiro A. da Silva Júnior *J. Inorg. Biohem.* 2021, 216, 111312.

234. "Substituted decavanadates inhibit the growth of *Mycobacterium Smegmatis*" Kateryna Kostenkova, Zeyad Arhouma, Kahoana Postal, Ananthu Rajan, Ulrich Kortz, Giovana G. Nunes, Dean C. Crick, Debbie C. Crans *J. Inorg. Biochem*. 2020, 217, 111356. 10.1016/j.jinorgbio.2021.111356

235. "Instability is an Advantage: Potential Applications of Metal-Based Anticancer Drugs for lntratumoral Injections" Aviva Levina, Debbie C. Crans and Peter A. Lay *ChemMedChem* 2020, under revision.

236. "Measurement of Interpeptidic Cu^{II} Exchange Rate Constants of Cu^{II}-Amyloid-beta Complexes to Small Peptide Motifs by Tryptophan Fluorescence Quenching" Cheryle N. Beuning, Luca J. Zocchi, Debbie C. Crans and Christelle Hureau, 2020, *Inorganic Chemistry*, under revision.

237. "Structural Basis for Targeting the SMYD3 Lysine Methyltransferase in the Clinical Management of Cancer" Dillon K Jarrell, Kelly N Hassell, Ilham Alshiraihi, Debbie C Crans and Mark A Brown *Diseases*, 2021, under review

238. "Exploring properties of new hydrophobic and stable non-innocent vanadium(V) compounds" Heide A. Murakami[1], Canan Uslan Yigit, Allison A. Haase, Jordan T. Koehn, Adriana Pires Vieira, D. Jackson Gaebler, John Hagan[1] Cheryle N. Beuning, Victoria R. Bachtell, Nicholas Proschogo, Aviva Levina, Peter A. Lay, Debbie C. Crans *Inorganic Chemistry,* Under Preparation

239. "Exploring properties of new non-innocent vanadium(V) compounds and their anti-cancer activities" Canan Uslan Yigit[1#], Heide A. Murakami, Allison A. Haase, Jordan T. Koehn, Adriana Pires Vieira, D. Jackson Gaebler, John Hagan, Cheryle N. Beuning, Victoria R. Bachtell, Nicholas Proschogo, Aviva Levina, Peter A. Lay, Debbie C. Crans, Under Preparation

240. "Acute toxicity evaluation of non-innocent oxidovanadium(v) Schiff base complex" Lidiane M. A. de Lima, Heide Murakami, Daniel Jackson Gaebler, Wagner E. Silva, Mônica F. Belian, Debbie C. Crans,, Mônica F. Belian and Eduardo C. Lira, Under Preparation

241. "Regiospecific Saturation of the Isoprenyl Side Chain of Truncated Bacterial Menaquinone Analogs Affects Quinone Redox Potentials in Aprotic Solvents" Cheryle N. Beuning, Jordan T. Koehn, Dean C. Crick, and Debbie C. Crans, *Electrochemica Acta*, under revision.

242. "A new insulin-enhancing oxidovanadium(IV)-complex with S_2O_2 donor ligand: Synthesis, characterization and *in vivo* evaluation of antidiabetic and hypolipidemic properties" Lidiane M. A. de Lima, Mônica F. Belian, Wagner E. Silva, Kahoana Postal, Kateryna Kostenkova, Debbie C. Crans, Ana Katharyne F. F. Rossiter, Valdemiro A. da Silva Júnior, Under Preparation

243. "First Principle Studies Exploring the Conformational Preferences of Short-chain Hydrophobic Menaquinone Substrates of Bacterial Electron Transfer Reactions" Jordan T. Koehn, Jacob B. Holmes, Corbin R. Lewis, Leonard J. Mueller, Dean C. Crick, and Debbie C. Crans, To be submitted.

Books / Edited Journal Issues

1. "Vanadium compounds, biochemistry, chemistry, and therapeutic applications," by Alan S. Tracey and Debbie C. Crans, Eds. *ACS Symposium Series Vol. 711*, 1998, American Chemical Society. Developed from the *1997 Fifth Chemical Congress of North America Conference Proceedings* Cancun, Mexico. *ACS Symposium Ser.* **1998**, *711*.

2. "Vanadium: The versatile metal" by Kenneth Kustin, Joao Costa Pessoa, and Debbie C. Crans Eds., *ACS Symposium Series 974,* ***2007,*** American Chemical Society. Developed from the *Fifth International Symposium on Vanadium Chemistry and Biochemistry* at 232th ACS meeting in San Francisco, September 10-14, California.

3. "Modern coordination chemistry and its impact for meeting global challenges" by Debbie C. Crans and Franc Meyer. Developed from the 2011 Zing Coordination Chemistry Conference, Dec. 5-9, 2011. *Eur. J. Inorg. Chem.* **2012.**

4. "Vanadium in inorganic chemistry: excerpts from the 8th International Vanadium Symposium" by Craig C. McLauchlan and Debbie C. Crans, *Daltons Trans.* **2013**, volume 42, Developed from the 2011 International Vanadium Chemistry Conference (V8), August 2011. The volume is featured on the inside cover for the *Daltons Trans.* issue

5. "Forum on metals in medicine and health: New opportunities and approaches to improving health" by Debbie C. Crans, and Thomas J. Meade *Inorg. Chem.* **2013**, IC Forum. The volume is featured on the cover of *Inorg. Chem*.

6. "Modern coordination chemistry 100 years of Werner" by Debbie C. Crans and Ebbe Nordlander. Developed from the 2013 Zing Coordination Chemistry Conference, Dec. 5-9, 2013. *Eur. J. Inorg. Chem.* **2014,** *27.* The volume is featured on the inside cover of *Eur. J. Inorg. Chem*.

7. "Celebrating vanadium science with leading bioinorganic contributions from the 9th International Vanadium Symposium" Debbie C. Crans, Andrew Ghio and Valeria Conte. *J. Inorg. Biochem.* **2015**, *147*. The volume is featured on the cover of *J. Inorg. Biochem.* doi: 10.1016/j.jinorgbio.2015.05.006. PMID: 26077794

8. *"*Emergent Polyoxometalates and Soft-oxometalates*"* by Soumyajit Roy and Debbie C. Crans in *New J. Chemistry*, **2016**, *40***.**

9. **"**Applications of speciation chemistry in a modern society" by Debbie C. Crans, Special Issue Organizer *Coor. Chem. Rev.* **2017,** *352*.

10. "Metal Nanoparticles: Synthesis and Applications in Pharmaceutical Sciences" Ed. Sreekanth Thota and Debbie C. Crans, **2018** Wiley-VCH Verlag GmbH & Co. KGaA, Boschstr. 12, Weinheim, Germany**.**

11. "Polyoxometalates in Biology, Catalysis, Energy and Materials Science" Eds. Soumyayit Roy, Debbie C. Crans and Tatjana N. Parac-Vogt *Frontiers in Chemistry*, **2018-2019.** doi: 10.3389/fchem.2019.00646. PMID:31632946

12. "Coordination compounds and catalysis" Georgiy B. Shul'pin, Debbie C. Crans, Luisa M. Martins and Kamran T. Mahmudov *Coord. Chem. Rev*. **2019**.

13. "Vanadium science: chemistry, catalysis, materials, biological and medicinal studies", Debbie C. Crans, Dinorah Gambino, and Susanna B. Etcheverry. *New J. Chem.*, 2019, **43**, 17535-17537. Developed from presentations presented at the 11th International Vanadium Symposium

Invited Publications (not refereed; undergraduate coauthors underlined)

1. "Interaction of polyoxovanadates and selected polyoxomolybdates with proteins," Debbie C. Crans in "Polyoxometalates: From Platonic solids to anti-retroviral activity" Müller, A.; Pope, M. T. (Eds) Kluwer Academic Publishers, **1993**, 399-406.

2. "Aqueous chemistry of labile oxovanadates: Of relevance to biological studies," Debbie C. Crans in *Comments on Inorganic Chemistry*, **1994**, *16*, 1-33.

3. "Enzyme interactions with labile oxovanadates and other oxometalates," Debbie C. Crans in *Comments on Inorganic Chemistry*, **1994**, *16*, 35-76.

4. "Vanadate-protein interactions," Debbie C. Crans in *Handbook of Metal-ligand Interactions in Biological Fluids*, Berthon, G. (Ed.) Marcel Dekker, Inc., New York, **1995**, Vol. 2, 267-283.

5. "Inhibition of phosphate-metabolizing enzyme by oxovanadium complexes," Paul J. Stankiewicz, Debbie C. Crans, and Alan S. Tracey, in *Vanadium and Its Role for Life*, Sigel, H. and Sigel, A. (Eds.), Marcel Dekker, Inc., New York, Volume 31 in *Metal Ions in Biological Systems*, **1995**, 287-324.

6. "Interactions of vanadates with biogenic ligands," Debbie C. Crans, in *Vanadium and Its Role for Life*, Sigel, H. and Sigel, A. (Eds.), Marcel Dekker, Inc., New York, Volume 31 in *Metal Ions in Biological Systems*, **1995**, 147-209.

7. "Biological chemistry: Representative areas and approaches," Debbie C. Crans, *Women's Contribution to Chemistry and Chemical Engineering*, Puskas, J. E. (Ed.), Polysar, Anaheim, 1**995**, 209th ACS National Meeting, 37-61.

8. "Oxovanadate and oxomolybdate cluster interactions with enzymes and whole cells," Debbie C. Crans and Gail Willsky Adapted from the Proceedings the 25th Steenbock Symposium, June 10-14th, 1997, published by the University of Wisconsin-Madison, **1997,** p. 116-125.

9. "Chemistry of relevance to vanadium in the environment," Debbie C. Crans, Shahid Amin, Anastasios D. Keramidas; in *Vanadium in the environment, Part I*, J. Nriagu, Ed.; John Wiley & Sons, Inc.: New York, **1998**, Vol. 30, pp. 73-96.

10. "Tetravanadate, decavanadate, Keggin and Dawson oxotungstates inhibit growth of S. cerevisiae" Debbie C. Crans, Harvinder S. Bedi, Sai Li, Boyan Zhang, Kenji Nomiya, Noriko C. Kasuga, Yukihiro Nemoto, Keijchi Nomura, Kei Hashino, Yoshiraka Sakai, Yosief Tekeste, Gary Sebel, Lori-Ann E. Minasi, Jason J. Smee and Gail R. Willsky. In "Polyoxometalate chemistry for nanocomposite design" Eds. Toshihiro Yamase and Micheal T. Pope, Kluwer Academic/Plenum Publishers, **2002**, p. 181-196.

11. "Transition and heavy metal ions complex formation with 2,5-pyridinedicarboxylic acid". E. Norkus, I. Stalnioniene and D. C. Crans "Chemistry and Technology of Inorganic Compounds". Conference proceedings (Eds. V. Janickis and V. J. Sukyte), Kaunas **2002**, 107-109.

12. "Identification of gene expression changes in skeletal muscle from diabetic rats corrected by oral administration of vanadyl sulfate" Gail R. Willsky, Lai-Har Chi, and Debbie C. Crans, *BITREL 2002. Proceedings of International Symposium on Bio-Trace Elements 2002* **2003**, 119-124.

13. "Vanadium" in Comprehensive Coordination Chemistry Reviews 2nd edition. Debbie C. Crans, and Jason J. Smee, **2004**, 4.175-239

14. "Recent advances and highlights of the 5th International vanadium symposium" Joao Costa Pessoa, Debbie C. Crans and Kenneth Kustin ACS Symposium Series 974 (Vanadium: The Versatile Metal) **2007** p. xi to xliii

15. "Interaction of decavanadate with model lipid interfaces" in Vanadium Biochemistry, Ed. Manuel Aureliano Alves "Research Signpost" Debbie C. Crans, Bharat Baruah, C. Ryan Murphy **2007**, p. 1-13

16. "Introduction" Debbie. C. Crans and Franc Meyer in *"Modern coordination chemistry and its impact for meeting global challenges"* Debbie C. Crans and Franc Meyer. Developed from the 2011 Zing Coordination Chemistry Conference, Dec. 5-9, 2011. *Eur. J. Inorg. Chem.* **2012,** p. 4521-4523

17. "Preface" for the Forum on metals in medicine and health: New opportunities and approaches to improving health" Debbie C. Crans, and Thomas J. Meade *Inorg. Chem.* **2013**, 52, 12181-12183. IC Forum.

18. "Vanadium in inorganic chemistry: excerpts from the 8th International Vanadium Symposium" Editorial by Craig C. McLauchlan and Debbie C. Crans, *Daltons Trans.* **2013**, 42, 11744-11748**.** Developed from the 2011 International vanadium chemistry conference (V8), August, 2011. We obtained the inside cover for Daltons Transactions issue.

19. "Modern coordination chemistry 100 years of Werner" Editorial by Debbie C. Crans and Ebbe Nordlander. Developed from the **2013** Zing Coordination Chemistry Conference, Dec. 5-9, 2013. *Eur. J. Inorg. Chem.* **2014,** *27*, 4413-4416. The volume is featured on the back cover of *Eur. J. Inorg. Chem*.

20. "Preface: Celebrating vanadium science with leading bioinorganic contributions from the 9th International Vanadium Symposium" Debbie C. Crans, Andrew Ghio and Valeria Conte. *J. Inorg. Biochem.* **2015**, *147*, 1-3.

21. "Introduction" to the New Journal of Chemistry Journal in *"*Emergent Polyoxometalates and Soft-oxometalates, including clusters having related compositions*"* by Debbie C. Crans and Soumyajit Roy in *New J. Chemistry*, **2016**, *40***,** 882-885**.**

22. "Preface: Applications of speciation chemistry in a modern society" Debbie C. Crans in *Coord. Chem. Rev.* **2017,** *352***,** 398-400.

23. "Introduction" in "Metal Nanoparticles: Synthesis and Applications in Pharmaceutical Sciences" Ed. Sreekanth Thota and Debbie C. Crans, **2018**, 1-14.

24. "Time has come for an Overdue Resurgence of "Speciation" Chemistry" Debbie C. Crans in IUPAC Magazine Chemistry International, April, **2018.**

25. "Coordination compounds and catalysis Preface" Georgiy B. Shul'pin, Debbie C. Crans, Luisa M. Martins and Kamran T. Mahmudov *Coord. Chem. Rev*. **2019**, 380, 600-600

26. "Vanadium Compounds as enzyme inhibitors with a focus on anticancer effects" Debbie C. Crans, Noah E. Barkley, Liliana Montezinho and M. Margarida Castro in Metallobiology Series No. 14 "Metal-based Anticancer Agents" Editors Angela Casini, Anne Vassieres and Samuel M. Meier-Menches, **2019** Chap 7, pp 169-195, Royal Society of Chemistry.

27. "Editorial: Polyoxometalates in Biology, Catalysis, Energy and Materials Science" Soumyayit Roy, Debbie C. Crans and Tatjana N. Parac-Vogt *Frontiers in Chemistry*, **2018-2019**

28. "Vanadium Science: chemistry, catalysis, materials, biological and medicinal studies" Debbie. C. Crans, Dinorah Gambino, and Susana B. Etcheverry, *New Journal of Chemistry*, **2019**, 43 (45), 17535-17537

29. "Vanadium compounds as Indirect Activators of a G Protein-Coupled Receptor" Duaa Alhumairy, Heide A. Murakami, Rachel Colclough, B. George Barisas, Deborah Roess and Debbie C. Crans, "Vanadium Catalysis" Editors, **2020** Chap 21, Royal Society of Chemistry.

30. "Vanadium – speciation chemistry is important when assessing health effects on living systems" Chapter 6 in Metal Toxicology Handbook, on behalf of Taylor & Francis Group Debbie C. Crans, Kahoana Postal, and Judith A. MacGregor

31. "2020 Rocky Mountain Virtual Meeting Book of Abstracts: Celebrating 100 Years of Chemistry in the Rockies" Kateryna Kostenkova and Debbie C. Crans

Patents:

United States Patent; Patent Number: 4,701,285; Date of Patent: Oct. 20, 1987. "Acyl Phosphate Salts and Their Use," George M. Whitesides, Debbie C. Crans, and Romas J. Kazlaukas.

Funding:

Crans research projects have strong collaborative aspects thus much funding has been collaborative. Currently funded by NSF, Arthur Cope Foundation, Colorado State University and private corporate sponsors.

Teaching:

Undergraduate

General Chemistry II (CHEM113)
Fundamentals of Inorganic Chemistry (CHEM261)
Introduction to Research (NS 295, NS296)
Organic Chemistry I and II (CHEM341, CHEM343, CHEM345, CHEM346)
Clinical Chemistry (CHEM433)
Senior Seminar (CHEM493 Capstone Class)
Independent Study (CHEM495)
Undergraduate Research (CHEM498)

Graduate

Principles of Chemical Biology (CHEM521)
Organic Molecular Structure Determination (CHEM541)
Structure/Mechanisms in Organic Chemistry (C543)
Physical Organic Chemistry (CHEM547)
Physical Methods in Inorganic Chemistry: Magnetic Spectroscopies (CHEM563D)
Biological Chemistry (CHEM651 Special Topics)
Bioinorganic Chemistry (CHEM651 Special Topics)
Bioinorganic and Medicinal Chemistry (CHEM566)
Introduction to Cell and Molecular Biology (CM510 Cell contribution on metabolism)
Seminar Series, Introduction to the Seminars (C792)

Teaching Innovation

Dr. Crans's teaching innovation is apparent both at the undergraduate and graduate levels. At the undergraduate level she developed teaching materials using i-clickers in CHEM341 Modern Organic Chemistry. Seeing a need to help introduce undergraduates to research, she created NS295 and NS296 Introduction to Research. She incorporated service-learning approaches into CHEM261 Fundamentals of Inorganic Chemistry as well as NS295 and NS296 Introduction to Research classes. She has included inclusionary practices in the CHEM493 Senior Seminar.

At the graduate level she is currently updating CHEM521 Principles of Chemical Biology to have a more general approach that includes ongoing work in the various laboratories at CSU. In the past she developed CHEM541 Organic Molecular Structure Determination, which includes a combination of theory, workshops covering real spectroscopic problems in the department and a hands-on section, where the students determine components of an unknown sample using methods they learned in the course. This class has been taught for more than 20 years and has been become a critical stepping-stone for the incoming beginning organic graduate students. In addition, Dr. Crans has taught C543 Structure/Mechanisms in Organic Chemistry and CHEM547 Physical Organic Chemistry, as well as Bioorganic Chemistry, and Bioinorganic and Medicinal Chemistry as special topics courses

Outreach and Service Learning:

Throughout her career, Dr. Crans has worked to bring state-of-the-art science experiments and college student role models to elementary and middle schools in Colorado. The focus has been on activities in schools that are more distant from universities in Colorado. She has initiated and run school science fairs, special science events as well as assisting 2nd grade teachers in development of science experiments during curriculum changes. Some of these activities comprised a NSF grant and others as part of teaching assignments at CSU. As a result, service-learning components have been included in Fundamentals of Inorganic Chemistry (CHEM261) and in the Introduction to Research Class (NS295, NS296). Occasionally service-learning activities have been used as extracurricular activities in the Organic Chemistry classes

Invited Seminars at Universities and Conferences (* denotes international invitations):

1987

Dept. Biochemistry, Colorado State University, Fort Collins, CO (April 6)
Dept. Chemistry, University of Denver, Denver, CO (June 4)

1988

*Dept. Organic Chemistry, Kemisk Laboratorium II, H. C. Orsted Institut, Copenhagen, Denmark (February 8)
Dept. Chemistry, University of Kansas, Lawrence, KS (April 7)
Dept. Engineering, Colorado State University, Fort Collins, CO (November 4)

1989

"Physical Organic Chemistry Gordon Conference" at Holderness School, Plymouth, NH(June 12-16)
"Twentieth Annual NSF Workshop on Organic Synthesis and Natural Products Chemistry" (WOSNPC-XX)" Minary Conference Center, Plymouth, NH (July 12-16)
*"Fourth International Conference on Bioinorganic Chemistry (ICBIC4)" minisymposium on "Environmental and Trace Element Bioinorganic Chemistry" at MIT, Cambridge, MA (July 24-28)
Cellular and Molecular Biology Program, Colorado State University, Fort Collins, CO (September 21)
Dept. Chemistry, Colorado State University, Fort Collins, CO (November 3)
"Annual Cellular and Molecular Biology Conference," Colorado State University, Fort Collins, CO (November 8)
Dept. Chemistry, Carnegie Mellon University, Pittsburgh, PA (November 30)
Department of Chemistry, Fort Lewis College, Durango, CO (December 8)
*"1989 International Chemical Congress of Pacific Basin Societies" symposium on "Polyoxymetal Cluster Complexes: Reactivity, Structures, and Biological Activity" Honolulu, HI (Dec. 17-22, 1989)
*"1989 International Chemical Congress of Pacific Basin Societies" symposium on "Polyoxymetal Cluster Complexes: Reactivity, Structures, and Biological Activity" Honolulu, HI (Dec. 17-22, 1989)

1990

Sigma Xi, Colorado State University, Fort Collins, CO (February 9)
Dept. Chemistry, Colorado College, Colorado Springs, CO (February 13)
Dept. Chemistry, University of Colorado, Boulder, CO (February 20)
Dept. Chemistry, University of New Hampshire, Durham, NH (April 26)
Dept. Chemistry, Brandeis University, Waltham, MA (April 30)
*Dept. Chemistry, University of Hamburg, Germany (July 30)
Dept. Chemistry, University of Wyoming, Laramie, WY (October 11)
Dept. Chemistry, Syracuse University, Syracuse, NY (November 20)

1991

Dept. Chemistry, Florida State University, Tallahassee, FL (January 10)
Dept. Chemistry and Biochemistry, Emory University, Atlanta, GA (January 11)
Chemistry Division, Los Alamos, NM (January 17)
Dept. Chemistry, University of New Mexico, Albuquerque, NM (January 18)
"Metals in Biology" Gordon Conference, Ventura, CA (January 28-February 1) (short-talk)
Dept. Chemistry, University of Missouri, St. Louis, MO (February 5)
Dept. Chemistry, Southern Illinois University, Carbondale, IL (February 6)
Dept. Chemistry, Eastern Illinois University, Charleston, IL (February 7)
Dept. Chemistry, Bradley University, Peoria, IL (February 8)
Dept. Chemistry, Illinois State University, Normal, IL (February 9)
Dept. Biochemistry, Purdue University, West Lafayette, IN (February 18)
Dept. Chemistry, Purdue University, West Lafayette, IN (February 19)
Dept. Chemistry, University of Illinois, Urbana-Champaign, IL (February 20)
Argonne National Laboratory, Chicago, IL (February 21)
Dept. Chemistry, University of Chicago, IL (February 22)
Dept. Biochemistry, University of California, Berkeley, CA (March 4)
Dept. Chemistry, Santa Cruz, NM (March 6)
Dept. Chemistry, University of California, Los Angeles, CA (March 7)
Dept. Chemistry, University of Reno, NV (March 15)
Dept. Chemistry, Georgetown University, Washington, DC (April 1)
Dept. Chemistry, Johns Hopkins University, Baltimore, MD (April 2)
National Institutes of Health, Washington, DC (April 3)
Dept. Chemistry, University of Georgia, Athens, GA (April 11)
Dept. Chemistry, Georgia State University, Atlanta, GA (April 12)
Dept. Chemistry, University of Utah, Salt Lake City, UT (April 30)
Dept. Chemistry, Utah State University, Logan, UT (May 1)
Dept. Chemistry, Brigham Young University, Provo, UT (May 2)
"Tenth NSF Workshop on Reactive Intermediates (WORI)" Miramar Hotel and Resort, Santa Barbara, CA (May 17-21)
Dept. Chemistry, Stanford University, Stanford, CA (May 22)
Dept. Chemistry, University of Toronto, Ontario, Canada (May 28)
Dept. Chemistry, McGill University, Montreal, Quebec, Canada (May 29)
Dept. Biochemistry, Merck Frosst Centre, Point Claire-Dorval, Quebec, Canada (May 30)
Gordon Conference in Physical Organic Chemistry, Plymouth, NH (June 10-14)

1992

Dept. Chemistry, Southern Illinois University, Carbondale, IL (February 26)
Dept. Chemistry, St. Louis University, St. Louis, MO (February 27)
Dept. Chemistry, University of Missouri, Columbia, MO (MASUA Lecture) (February 28)
Dept. Chemistry, State University of New York, Buffalo, NY (March 16)
Dept. Biochemistry, State University of New York, Buffalo, NY (March 17)
Dept. Chemistry, Nebraska Wesleyan College, Lincoln, NE (April 22)
Dept. Chemistry, University of Nebraska, Lincoln, NE (MASUA Lecture) (April 23)
Dept. Chemistry, University of Nebraska, Lincoln, NE (MASUA Lecture)(April 23)

Dept. Chemistry, University Nebraska, Omaha, NE (April 24)
Dept. Chemistry, Creighton College, Omaha, NE (April 24)
Dept. Chemistry, University of Nebraska, Lincoln, NE (April 25)

1993
Dept. Chemistry, Oregon State University, Corvallis, OR (January 11)
Dept. Chemistry, Southern Oregon State University, Ashland, OR (January 12)
"Bioinorganic Chemistry" Symposium 205th ACS Meeting, Denver, CO (March 28-April 5)
Johnson Matthews, Inc., West Chester, PA (May 19)
Fox Chase Cancer Research Institute, Philadelphia, PA (May 20)
*4th International Symposium on Structure and Function of Roots, Slovak Academy of Sciences, Bratislava (June 20-26)
"Enzymes, Coenzymes and Metabolic Pathways," Gordon Conference, Kimbal Union Academy, Meriden, NH (July 19-23)
"Carbohydrates" Gordon Conference, Tilton College, NH (July 5-10)
"Biochemistry of Vanadium" Symposium in The 45th Southeast Regional Meeting of the American Chemical Society, Johnson City, TN (October 17-20)
Dept. Chemistry, University of Tennessee, Knoxville, TN (October 20)

1994
Dept. Chemistry, William & Mary University, Williamsburg, VA (Howard Hughes Lectureship) (February 25)
Dept. Chemistry, University of Delaware, Newark, DE (February 28)
Dept. Chemistry, University of Alberta, Alberta, Canada (October 7)

1995
Bayer (then Miles) Company, West Haven, CT (January 10-11)
*Department of Chemistry, Simon Fraser University, Vancouver, British Columbia, Canada (February 27)
*University of British Columbia in the Modern Chemistry Lecture Series, Vancouver, British Columbia, Canada (Feb. 28)
*Dept. Chemistry, University of Victoria, Victoria, Canada (March 2)
Dept. Chemistry, University of Washington, Seattle, WA (March 3)
209th ACS meeting, Symposium "Women's Contributions to Chemistry and Chemical Engineering," Anaheim, CA (April 2-7)
209th ACS meeting, "Award Symposium for Margaret Cavenaugh", Anaheim, CA (April 2-7)
*13th International Conference on Phosphorus Chemistry (ICPC) Jerusalem, Israel (July 17-21)
*Pacifichem 1995 International Chemical Congress of Pacific Basin Societies in the symposium, Honolulu, HI (December 17-22)
*Pacifichem 1995 International Chemical Congress of Pacific Basin Societies, in the symposium Honolulu, HI (December 17-22)

1996
13th Rocky Mountain Regional ACS Meeting in the Symposium "Metalloenzymes: Structure, Function, Mechanism and Models," Denver, CO (June 9-12)
*VI World Conference on Clinical Pharmacology and Therapeutics, Buenos Aires, Argentina (August 4-9)

1997
213th ACS Meeting in the Symposium “Redox Reactions in Natural and Engineered Aqueous Systems.” subsections Natural Systems: Inorganics, San Francisco, CA (April 13-17)
25th Steenbock Symposium, Topic: "Biosynthesis and Function of Metal Clusters for Enzymes" University of Wisconsin, Madison, WI (June 10-14)
Orville L. Chapman Symposium, University of California, Los Angeles, CA (July 12)
Inorganic Chemistry Gordon Conference, Salva Regina University, Newport, RI (July 20-24)
*ICBIC8, in the "Vanadium” session, Yokahama, Japan, (July 28-August 1)
*Research Institute, University of Tokyo, Yokohama Campus, Japan (July 30)
*The Fifth Chemical Congress of North America in the Symposium "Chemistry, Biochemistry, and Therapeutic Applications of Vanadium", Cancun, Mexico (November 11-15)

1998
General Electric, Schenectady, NY (January 15)
U. Rochester, Rochester, NY (January 16)
216th ACS Meeting, Boston, Aug. 23-27, 1998 in the Symposium on "H-Bonding in Inorganic Chemistry"
National Minority Research Symposium, New York City, NY (November 11-14)

1999
Dept. Chemistry, University of Indiana (March 10)
Dept. Biochemistry, University of Indiana (March 11)
Dept. Chemistry, University of Louisville (March 12)

2000
Stereochemistry Gordon Conference, Rhode Island, June 2000
New Mexico Institute of Mining and Technology Oct. 13, Socorro, New Mexico
*Polyoxometalate symposium at Pacifichem, Honolulu, Hawaii, Dec. 14-19.

2001
Department of Chemistry, University of Szeged, Hungary (March 5)
Plenary lecture, Yearly Humboldt meeting, Bamberg, Germany (March 29-31)
Department of Chemistry, University of Hamburg, Germany (May 9)
Department of Chemistry, University of Bielefeld, Bielefeld, Germany (July 19)
Vanadium Symposium, ICBIC, Florence, Italy August 26-31
Department of Chemistry, University of Münster, Münster, Germany (Sept. 5)
Department of Chemistry, Nara Women University, Japan (Nov. 9)
Department of Applied Chemistry, Faculty of Engineering, University of Osaka, Japan (Nov. 12)
Mukaishima Marine Biological Laboratory, Faculty of Science and Laboratory of Marine Molecular Biology, Hiroshima University, Hiroshima, Japan (Nov. 15)
Department of Chemistry, Toyama University, Toyama, Japan (Nov. 19)
The 3rd Vanadium Symposium, Osaka, Japan (Nov. 27-29)

2002
223rd ACS meeting, Orlando, Florida, April 7-11, 2002 "Paramagnetic NMR Spectroscopy of Transition Metal Complexes with and without Insulin-Like Properties," Ernestas Gaidamauskas, Luqin Yang, and Debbie C. Crans, Department of Chemistry, Colorado State University, Fort Collins, CA 80523-1872
223rd ACS meeting, Orlando, Florida, April 7-11, 2002 "Effects of Oxotungstates and Oxomolybdates on Growth of S. cerevisiae" Debbie C. Crans, Cristina Rosu, Achim Muller, Gail R. Willsky, and Kenji Nomiya
Metal in Medicine, "Introducing the topic of Chromium and vanadium as nutritional elements" first Gordon Conference on Metals in Medicine, 2002
224rd ACS meeting, Boston, MA, August 18-22, 2002 "Can the coordination chemistry of a series of transition metal dipicolinate complexes predict the restoration of the altered metabolism of diabetes to normal?" Debbie Crans, Luqin Yang, Ernestas Gaidamauskas, Lai-Har Chi, Josephine A. Alfano, and Gail R. Willsky.
Department of Chemistry, Colorado School of Mines, Oct. 8
Cargill Inc. Nov. 12
New Mexico State, Dec. 4. "Making Ice Cream from Milk, Sugar, Vanilla and Liquid Nitrogen: A Strategy to Introduce Science at K-12
New Mexico State, Dec. 5, "Diabetes, Combating one of Americas Heavyweights"
New Mexico State Chemistry Department Dec. 5, "Chemistry and insulin mimetic properties of vanadium and other transition metal complexes"
New Mexico State, Dec. 6 "Mentoring and being Mentored"

2003
Inorganic Reaction Mechanisms, Newcastle, England, Jan. 7-9th, 2003.
University of Southern California

2004
"Anion Recognition Symposium" ACS meeting in Anaheim, March 28-April 1, Anaheim California
NIH, Raleigh, North Carolina July 28
Award Lecture, The Fourth International Symposium on Chemistry and Biological Chemistry of Vanadium, Szeged Hungary 3-5 September
NIH, Charlotte, North Carolina
The Orville L. Chapman Memorial Symposium, UCLA, LA, California, Sept. 27, 04
University of North Carolina, Charlotte Oct. 3, 2004

2005
University of Southern California, February 13, 2005
NIH, Charlotte, North Carolina August 17-18th 2005
ACS meeting in San Diego, March 13-17th, 2005
3rd SFB Congress "Metal Mediated Reactions Modeled after Nature" 2005, Jena, Germany, September 25-29, 2005.*
University of Arkansas, Nov. 21
Pacifichem, Dec. 2005

2006
USC, February 2006
ACS meeting in San Diego, March 2006
Metal in Medicine, Gordon Conference, Oxford, England*
NIH, Charlotte, North Carolina
The fifth International Symposium on Chemistry and Biological Chemistry of Vanadium, ACS meeting in San Francisco, September 2006*
Texas A & M, October 2006

2007
USC, March 2007
ACS Lecturer at Truman University, Fall 2007
Dept. Chemistry, University of Texas, El Paso
"Structure and dynamics at Interfaces in reverse micelles" Nancy E. Levinger, Debbie C. Crans, and Bharat Baruah, 233rd National Meeting of the American Chemical Society, Chicago, IL
"Interactions of oxovanadates with lipid interfaces" Debbie C. Crans and Bharat Baruah, 234th ACS National Meeting, Boston, MA
NIH, Charlotte, Raleigh Summer 2007
ICBIC 13, July 2007*

2008
USC, Spring 2008
ACS meeting in New Orleans, Louisiana, Spring 2008
Medicinal Chemistry Gordon Conference (Invited Fellow)
Dept. Chemistry, University of Southern Florida, Tampa
Dept. Chemistry, New Mexico State University, Las Crucas, NM
"Using the reverse micellar environment to change the coordination chemistry of vanadium" Debbie C. Crans, Bharat Baruah, and Nancy E. Levinger, ACS Philadelphia ACS meeting
"NMR studies of aerosol-OT reverse micelles with alkali and magnesium counterions" Michelle L. Stahla, Debbie C. Crans and Nancy E. Levinger, ACS meeting in New Orleans, 2008
"Probing interactions of insulin enhancing vanadium compounds with lipid interfaces" Debbie C. crans, Muhammad A. Choudhary, Ernestas Gaidamauskas, Bharat Baruah, Sandra Bonetti, Sandra S. Eaton, Nancy E. Levinger, Deborha A. Roess, Gail R. Willsky, Steve Distin, Riki Gordon, Audra G. Sostarecz, ACS meeting New Orleans, 2008

2009

"Diabetes and vanadium compounds" NIH Bridges to the Doctorate Program, CSU/Pueblo Seminar Series, February 19, 2009

"Studies with simple compounds in microemulsions – relevance to the current controversies regarding Overton's rule and lack of compliance with Lipinski's rule" Debbie C. Crans in *Ken Karlin Award Symposium*, ACS meeting, Salt Lake City, Utah, 2009

"51V Solid-state NMR and density-functional theory studies eight-coordinate non-oxo vanadium(V) complexes: Amavadin" Kristopher J. Ooms, Stephanie E. Bolte, Bharat Baruah, Muhammad Aziz Choudhary, Debbie C. Crans, Tatyana Polenova, NO Symposium, ACS meeting, Salt Lake City, Utah, 2009

"Probing interactions of vanadium(IV) dipicolinate in AOT Reverse Micelles" Ernestas Gaidamauskas, Sandra J. Bonetti, Debbie C. Crans and Sandra S. Eaton, in the Undergraduate Symposium, ACS Meeting, Salt Lake City, Utah, 2009

"Complexation of bisphosphonates with ytterbium(III): Application of Yb3+-pyrocatechol complex for solute sensing" Ernestas Gaidamauskas, Kanokkarn Saejueng, Alvin A. Holder, Subalitat Bharat, Helen Parker, Boris A. Kashemirov, Debbie C. Crans, Charles E. McKenna, ACS meeting, Salt Lake City, Utah, 2009

"Insulin enhancing vanadium (and other transition metal) complexes and progresses toward therapeutic treatment", Debbie C. Crans, XXII International Conference on Coordination and Bioinorganic Chemistry, Smolenice, Slovakia, June 7-12, 2009

2010

Bioinorganic Research Conference, Gordon Research Seminar January
Metals in Medicine, Gordon Conference, Chair, July 25-Aug 2
New Mexico State University, MARC Program
International Vanadium Symposium, Toyama, Japan, Oct. 7-9

2011

Award Presentation for the Colorado Section ACS Award, Colorado State University, March 7
University of Southern California, August
ACS Spring meeting, Anaheim, Inorganic Chemistry
ACS Fall meeting, Denver, Colloid Division
National Jewish Health, Denver, Colorado, September
NREL Boulder, November 10
Montana State University, November 21
University of Montana, November 22
Zing Coordination Chemistry Conference 2011

2012

ACS meeting San Diego, Metals in Medicine Spring San Diego
NJC Symposium, The University of Hong Kong April 23
NJC Symposium, East China University of Science and Technology, April 25
NJC Symposium, Institute of Chemistry, Chinese Academy of Sciences, April 27
Metals in Medicine, GRC, July 2012
International Vanadium Symposium, Crystal City, Virginia, USA
ACS meeting Philadelphia, Aug. 19-23 Memorial Symposium for Michelle Millar
ICOM25 Lisboa, Portugal Sept 4
University of Toulouse, Toulouse, France Sept.8
ICCC40 Valencia, Spain, Sept 10
Award Lecture, Symposium of Japan Society of Coordination Chemistry (JSCC), Sept. 21-23
National Cheng-Kung University, Tainan, Sept. 25
Academia Sinica, Taipei, Ty Sept. 26
National Tsing Hua U, Sept. 27
Rocky Mountain Regional ACS Meeting, Oct. 17-19, Multiple talks in the symposium entitled "Reactions in Lipid and Lipid-Environments and applications of the Chemistry"
New Mexico State, Dec. 4, Las Cruces, New Mexico

2013

Zing Bioinorganic Chemistry Conference, February
ACS meeting Anaheim, Spring
"Soft Oxometalates (SOMs): Design and Applications" 15th Asian Chemical Congress (ACC), Aug. 19-23 Singapore
School of Chemistry, University of Science, Suranaree U of Technology, Nakhon Ratchasima 30000, Thailand
Depart Chemistry, National University of Rio Cuarto, Rio Cuarto, Cordoba, Argentina
"Werner Symposium" 247th National ACS meeting in Indianapolis, Sept. 2013
XIX National Symposium on Organic Chemistry (XIX SINAQO), Nov. 16 to 19, 2013 in Mar del Plata, Argentina

2**014**
University of Utah, February, 2014
247th National ACS meeting in Dallas, March 16-20 2013
New J. Chemistry Symposium, Karolinska Institute, Stockholm, Sweden, April 20-22, 2014
New J. Chemistry Symposium, Lund University, Land, Sweden, April 23, 2014
Metals in Medicine Gordon Conference, Procter Academy, June 22-27th 2014
Collaborative Conference for Materials Research, June 23-27th, Songdo Convensia, Incheon/Seoul, South Korea (Declined)
International Vanadium Symposium, June 29-July 2, 2014
Keynote lecture, ICCC-41 Singapore, July 21-25, 2014
248th ACS Meeting in San Francisco, Symposium to honor Kenneth Kustin Aug. 10-14, 2014
Department of Chemistry, University of Vilnus, Lithuania, Nov. 3
The Institute of Chemistry Center for Physical Sciences and Technology, Vilnus, Lithuania, Nov. 4
Dept. Chemistry, Wuhan University, Nov. 24, 2014

2015
Plenary presentation (Section III). "Undergraduate Research - A Tool to Explore Chemistry and Excite" 209th Two-Year College Chemistry Consortium Conference Front Range Community College – Westminster Campus
249th ACS Meeting in Denver, CO March 22-26, 2015 "Interactions of Metal Complexes with Proteins or Nucleic Acids"
249th ACS Meeting in Denver, CO March 22-26, 2015 "Symposium to Honor Kim Dunbar for receiving the 2015 ACS Award for Distinguished Service in the Advancement of Inorganic Chemistry"
249th ACS Meeting in Denver, CO March 22-26, 2015 "Symposium to Honor Jacqueline Kiplinger for receiving the 2015 ACS Albert Cotton award for Synthetic Inorganic Chemistry"
"Data mining transition state complexes of phosphatases: Inhibitor design and mechanistic studies" New Journal of Chemistry, University of Montreal, Montreal, Quebec, June 2
"Chemistry in nanosized water droplets" New Journal of Chemistry, McGill University, Montreal, Quebec, June 3
"Metals in Medicine – anticancer and antidiabetic drugs" New Journal of Chemistry, University of York, Toronto, Canada, June 5
"Electron transfer reactions in confined spaces" North Campus Cronenbourg, Strasbourg, France, 2015
"Drug membrane interactions and uptake as key aspects of drug action" University of Strasbourg, France, 2015
"Is the geometry of vanadium in the active site of phosphatase important to the design and antidiabetic properties of vanadium compounds" University of Strasbourg, France, 2015
"Pyrazinamide and related drugs act through changes in the protomotive force" University of Strasbourg, France, 2015
"Is the geometry of vanadium in the active site of phosphatase important to the design and antidiabetic properties of vanadium compounds" University of Toulouse, June 24, 2015
College of Life Science, Graduate University of Chinese Academy of Sciences, Beijing 100049, China July
National Laboratory of Natural and Biomimetic Drugs, Dept. Chemical Biology, School of Pharmaceutical Sciences, Peking University Health Science Center, HaiDion District, Beijing 100083, P.R. China
Keynote lecture, ICBIC17, Beijing, China 2015
Award lecture, 250th ACS meeting Cope Scholar Symposium "Characterization of the structures and properties of organic vanadium complexes and applying these principles to understand the impact of different coordinated ligands on anti-diabetic activity" Aug. 18
International Research Collaboration Lecture, University of Sydney, Sydney Australia Oct. 30 and Nov. 4th
Inorganic Chemistry Collogium, University of Melbourne, Melbourne, Australia, Nov. 10
Australian Chemical Society Lecturer, Department of Chemistry, University of Melbourne, Melbourne, Australia, Nov. 11
Plenary Lecture, MTIC-XVI, Dept. Chemistry, Jadavpur University, India, 2015

"Speciation and its importance in drug administration and mode of action of metal based drugs" 1st International Symposium on Clinical and Experimental Metallodrugs in Medicine: Cancer Chemotherapy, Dec. 13-15 the Sullivan Center, University of Hawaii Cancer Center, Honolulu, Hawaii.

"Distortions in decavanadates and how that may impact interactions with biological interfaces" Polyoxometalate Symposium, Pacifichem, Honolulu, Hawaii, Dec. 15-20

"Changes in properties of sulfur containing microbial chelator by nanoconfinement" Organo Sulfur Symposium, Pacifichem, Honolulu, Hawaii, Dec. 15-20

2016

University of Texas, El Paso, Feb. 8

University of New Mexico Las Cruces, Feb. 9

"Coordination chemistry of vanadium combined with ligand properties lead to effective phosphatase inhibitors with potential antidiabetic properties" 251st ACS meeting, San Diego, Presidential Symposium, March 13-19th 251st ACS meeting, San Diego, Award Symposium for Vincent Pecoraro, March 13-19th

Dalton Discussions, England, March 29-30

Idless Seminar, University of New Hampshire, April 4, Named lectureship

Idless Seminar, University of New Hampshire, April 5, Named lectureship

New York University, April 22

2016 Metals in Medicine GRC June 26th - July 1; NSF – Power – empowering women

"Design of the geometry of antidiabetic vanadium compounds using phosphatase active site complementarity" ICCC42, Brest, France July 3-8, 2016; http://iccc2016.sciencesconf.org, Keynote lecture

252th ACS meeting, August 21-25, 2016 Philadelphia, Pennsylvania (presented invited lecture Inorganic Lectureship award for Serena Debeer, Division of Inorganic Chemistry)

252th ACS meeting, August 21-25, 2016 Philadelphia, Pennsylvania Symposium (presented an invited Second Sphere Coordination Chemistry symposium, Division of Inorganic Chemistry)

252th ACS meeting, August 21-25, 2016 Philadelphia, Pennsylvania (presented an oral contributed presentation in the Colloid Division)

3rd Int. Symp. on Molecular Neurodegenerative Disease Res. (ISMNDR) at KAIST (Daejeon, South Korea)

10th International Vanadium Symposium, Howard International House, Taipei, Taiwan, Nov. 8-10, 2016, plenary lecture

Catalysis and Fine Chemicals (C&FC) 2016, Howard International House, Taipei, Taiwan, Nov. 10-14, Bioinorganic and bioorganic chemistry section – Topic: Benzoic acid

Catalysis and Fine Chemicals (C&FC) 2016, Howard International House, Taipei, Taiwan, Nov. 10-14, Catalysis – topic: Vanadium chemistry

8th Asian Biological Inorganic Chemistry Conference (AsBIC8) U. of Auckland, New Zealand Dec. 4–9, 2016, Keynote lecture

2017

ACS Leadership Institute Facilitator, "Communication Strategies", Dallas Jan 23

UC Denver, The School of Pharmacy, CU Medical Anschutz campus, Jan. 26, 2017

Frontier in Chemistry Lecturer, University of Toledo, Feb. 5, 2017, named lectureship

University of Lousiana, Baton Rouge, March 11, 2017

253rd ACS meeting, San Francisco, 60 year anniversary for the Division of Inorganic Chemistry, April 2-6

Inorganic Chemistry Leader program, University of Puerto Rico Rio Piedras Campus (Puerto Rico Chemical Learning Integrated in Materials and Biomolecular applications, PR CLIMB) on May 9th, 2017

14th Int. Symp. on Applied Bioinorganic Chemistry (ISABC14), Toulouse, France, June 7 - 10th 2017

6th Asian Conference on Coordination Chemistry (ACCC6) and RACI Centenary Congress in Melbourne, Australia 23-28, July 2017 (invited, declined)

18th International Conference on Biological Inorganic Chemistry (ICBIC18) Keynote Lecture July 31st to August 4th in 2017, http://icbic18.weebly.com/

254rd ACS meeting, Washington, Aug. 20-24

2017 Rocky Mountain Regional Meeting, Oct. 25-27 Nanoscience Symposium

2017 Rocky Mountain Regional Meeting, Oct. 25-27 Medicinal Chemistry and Inhibitor Design Symposium, "Phosphatase inhibition by Vanadium Compounds" (coauthored by Craig McLauchlan)

2017 Rocky Mountain Regional Meeting, Medicinal Chemistry and Inhibitor Design Symposium, on "Immunotherapy enhancement by vanadium compounds" (coauthored by Jean-Simon Diallo)
9th Symposium on Group Five Elements, Keynote speaker, Delhi from November 22-24, 2017

2018

ACS Leadership Conference, Presenting the "Young Talent in Colorado and Beyond Symposium" – the ChemLuminary Awards Jan 19
ACS Leadership Institute Facilitator, "Fostering Innovation" Dallas Jan 20
University of Missouri, Science and Technology, Rolla Jan 25
Keystone Immunotherapy Conference (presentation declined)
255th ACS meeting, New Orleans, LA, March 18-22, 2018 Bader (for Alison Butler) Award Symposium
Metals in Medicine Gordon Research Conference Jun 24-29, 2018
Keynote Speaker, ICCC43 Sendai, Keynote Speaker, Japan July 30-August 4,
256th ACS meeting, Boston, Massachusetts, Aug. 19-23, 2018
Keynote Speaker, EuroBIC14 Birmingham, Keynote Speaker, UK Aug. 26-30, 2018
Keynote Speaker, N-Ligands, Lisbon, Portugal, Sept 3-5, 2018
Plenary Speaker, XIX Brazilian Meeting on Inorganic Chemistry; VI Latin American Meeting on Biological Inorganic Chemistry; VIII Brazilian Meeting on Rare Earths, Fortaleza, Brazil, September 25-28, 2018
Plenary Speaker, 11th International Vanadium Symposium, Montevideo, Uruguay Nov 5-8 2018

2019

Colorado State University-Pueblo Jan. 31, 2019
University of Massachusets, Amherst, Feb. 14th, 2019
Plenary Speaker, ACS Award Symposium, Orlando, March 31-April 5th, 2019
Garvin Medalist Award Symposium, Orlando, March 31-April 5th, 2019
Memorial Symposium for Elena Rybak-Akimova, March 31-April 5th, 2019
Local ACS Columbus Section, HS Awards, The Periodic Table of Medicines, April 23, 2019
Keynote Speaker, 15th International Symposium on Applied Bioinorganic Chemistry, June 2-5, Nara, Japan 2019
Nara International Conference on Applied Bioinorganic Chemistry (NICABC), Nara June 6th, 2019
Summit forum on innovative drug development, Nanjing, China, June 25, 2019
2019 Mini-Symposium on Supramolecular Chemistry and Catalysis Center for Supramolecular Chemistry and Catalysis, Shanghai University, June 28th, 2019
Keynote Speaker, 7th International Symposium on Metallomics, Warsaw, Poland, 30 June-3 July, 2019
Summer Lecturer, Helmholtz-Zentrum Dresden-Rossendorf Inst. of Radiopharmaceutical Cancer Research, 7-5-2019
Plenary Speaker, ICBIC-19, Interlaken, Switzerland, c/o University of Zurich
Plenary Speaker, 1st International Conference on Noncovalent Interactions (ICNI), 2nd - 6th September 2019
Keynote Speaker, XXI Mendeleev Congress on General and Applied Chemistry, Saint-Petersburg, Sept. 9-12, 2019
COACS meeting at Adam State, Alamosa; "The Periodic Table of Medicines", Sept. 18, 2019
Technical Seminar and class for undergraduate students, Wuhan, China
ACC2019 Taipei, Taiwan, Dec. 2019

2020

Women in Science, Malaga, Jan. 9-15, 2020
Royal Society of Chemistry Editors Symposium, Feb. 22-24, 2020, canceled
CCE-conference (Chemical Catalysis and Engineering) in LA, 24-26, 2020, keynote speaker
ACS meeting, Mar. 22-26, 2020, Bursten Symmposium; Karlin Symposium, Frantz Symposium (canceled, COVID-19)
Seminars to China and Israel were canceled because of COVID
Keynote Speaker, XV International Symposium on Inorganic Biochemistry, June 24-27, Wrodaw, Poland (canceled COVID-19)
ICCC-2020, Rimini, July 5-10 (delayed COVID-19)
Award Recipient, Iota Sigma Si July 15-19 (delayed COVID-19)
Metals in Medicine Symposium, ACS Meeting, Aug 16-20, oral presenter at the virtual meeting
Keynote Speaker, EuroBic, Iceland, August 16-20, 2020 (delayed, COVID-19)

International Symposium for Heterogeneous Catalysis (ISHC) Lisbon, Sept 6-10 (delayed to 2021)
Keynote Speaker, Labic, Montevideo, September 22-25, 2020; delayed to December 8, 2020 (delayed COVID-19)
Orville L. Chapman lecture at University of California, Los Angeles, October 2020 (delayed COVID-19)
International Vanadium Symposium and Group Five Elements Nov. 3-6, 2020 (delayed COVID-19)
Pacifichem, Innovative applications in medicine and diagnostics, Dec. 15-20, 2020 (delayed COVID-19)

2021
16th International Symposium on Applied Bioinorganic Chemistry (ISABC) June 6-9
Keynote Speaker, XV International Symposium on Inorganic Biochemistry, June 24-27, Wrodaw, Poland (canceled COVID-19)
Award Recipient, Iota Sigma Si July 15-19 (Canceled COVID-19)
Keynote Speaker, ICCC-2020, Rimini, July 5-10 (canceled COVID-19)
EuroBic, Iceland, August 16-20, 2020 (canceled, COVID-19)
ICBIC, Australia
International Symposium for Heterogeneous Catalysis (ISHC) Lisbon, Sept 6-10

2022
CCE-conference (Chemical Catalysis and Engineering), 21-23, 2022, keynote speaker

Contributed Posters or Talks Presented at Conferences (* denotes international meetings)**:**

1987 - 2	**1998 - 5 (*1)**	**2009 - 5**
1988 - 1	**1999 - 5**	**2010 – 8**
1989 - 8 (*2)	**2000 - 7 (*2)**	**2011 – 18 (4*)**
1990 - 9 (*1)	**2001 - 4**	**2012 – 17 (4*)**
1991 –	**2002 - 8 (3*)**	**2013 – 11 (5*)**
1992 - 12 (*2)	**2003 – 3**	**2014 – 11 (5*)**
1993 – 19	**2004 - 7 (2*)**	**2015 - 9**
1994 - 4 (*3)	**2005 - 5 (1*)**	**2016 – 9 (5*)**
1995 - 2 (*1)	**2006 - 6 (5*)**	**2017 – 9(RMRM)7(ACS)3**
1996 – 4	**2007 - 4**	**2018 - (2)**
1997 - 3 (*1)	**2008 – 9 (6*)**	**2019 - 9(ACS)**

Professional Societies:
American Chemical Society
American Association for Advancement of Science
Society for Bioinorganic Chemists
International EPR (ESR) Society
Society for Vanadium Chemists
Royal Society of Chemistry

Other Professional Activities:
a. Workshops/Programs:
ACS Leadership Institute (Foster Innovation, 2017)
Ohio State University (Oct. 3-4, 2015)
NSF-Advance workshop on “Mentoring” (December 6, 2002)
As program Chair for the Inorganic Chemistry Program, American Chemical Society planned annual ACS meetings from 1999-present; in this capacity recruited organizers for various programs at these meetings.
Designed and conducted a workshop on "Enzyme Catalyzed Synthesis" for Syntex Chemical Company, Summer 1987.
Women in Science Program - 1993-1996
Faculty Teacher Outreach Program (Howard Hughes Foundation); Pikes Peak Boozes, Colorado Springs, 1990

b. Reviewer of candidates for tenure and/or promotion
1995 (2), 1996 (1), 1997 (1), 1998 (1), 2000 (1), 2001 (1), 2002 (2), 2003 (2), 2004 (1), 2005 (2), 2006 (3), 2007 (1), 2008 (2), 2009 (2), 2010 (3), 2011 (2), 2012 (2), 2013 (1), 2014 (3), 2015 (2), 2016 (3), 2017 (3)

c. Reviewer of Manuscripts:
Inorganic Chemistry, J. Am. Chem. Soc., Daltons Transactions, J. Organic Chemistry, Langmuir, Eur. J. Inorganic Chemistry, New J. Chemistry, Arch. Biochem. Biophys., Biochemistry, Biochimica Biophysica Acta, Bioorganic and Medicinal Chemistry Letters, Can. Chem., Carbohydrate Res., Chem. Reviews, Z. Allgem. Inorg. Chem., Inorg. Chim. Acta, J. Inorg. Biochem., J. Coll. Sci. Tech., J. Computational Chem., J. Coor. Chem. Rev., *Mol. Cell Biochem, Nature, Science, Synthesis and Reactivity in Inorganic Metal-Organic Chemistry*

d. Reviewer of Proposals:
NSF Instrumentation, NSF Biochemistry, NSF Chemistry, NSF fellowships, PRF, also review grants for Canadian Medical Research Council, Stanford Syncroton, North Carolina's Biotechnology Program, NIH ad hoc, Postdoctoral Panel, NIH, NSGRP

e. Conception, Planning and Organization of Symposia and Meetings:
Planned a local ACS meeting (Colorado-Wyoming section). Speaker Alfred Bader, Aldrich Chemicals (1988).
Organized a Symposium entitled "Shattering the Glass Ceiling Through Research Accomplishments" 205th ACS Meeting, Denver, 1993.
Cell and Molecular Biology Program Student-Poster Competition and Seminar, CSU,1994 and 1995.
Organized a Symposium entitled "Metalloenzymes: Structure, Function, Mechanism and Models," 13th Rocky Mountain Regional ACS Meeting, 1996, Lakewood, CO.
Organized a Symposium with Alan S. Tracey entitled "Chemistry, Biochemistry, and Therapeutic Applications of Vanadium," Fifth Chemical Congress of North America , 1997, Cancun, Mexico.
Planned 2000 INOR-ACS program 219th ACS meeting in San Francisco, California.
Planned 2001 INOR-ACS program 221st ACS meeting in San Diego, California.
Planned 2002 INOR-ACS program 223rd ACS meeting in Orlando, Florida.
Co-planned 2002 INOR-ACS program 224th ACS meeting in Boston, Massachusetts.
Co-planned 2003 INOR-ACS program at 225th ACS meeting in New Orleans, Louisiana.
Planned 2004 INOR-ACS program at 227th ACS meeting in Anaheim, Anaheim California
Co-planned 2004 INOR-ACS program at 228th ACS meeting in Philadelphia, Philadelphia, PA.
Planned 2005 INOR-ACS program at 229th ACS meeting in San Diego, San Diego, California
Co-planned 2005 INOR-ACS program at 230th ACS meeting in Washington, DC.
Planned 2006 INOR-ACS program at 231th ACS meeting in Atlanta, Georgia
Co-planned 2006 INOR-ACS program at 232th ACS meeting in San Francisco, California.
Organized "Fifth International Symposium on Vanadium Chemistry and Biochemistry" at 232th ACS meeting in San Francisco, CA
Planned 2007 INOR-ACS program at 233th ACS meeting in Chicago, IL
Planned 2007 INOR-ACS program at 234th ACS meeting in Boston, MA
Organized the Zing Coordination Chemistry Conference, 2008.
Planned 2008 INOR-ACS program at 235th ACS meeting in New Orleans, LA.
Planned 2008 INOR-ACS program at 236th ACS meeting in Philadelphia, PA.
Organized the Zing Coordination Chemistry Conference, 2009.
Planned 2009 INOR-ACS program at 237th ACS meeting in Salt Lake City, UT.
Planned 2009 INOR-ACS program at 238th ACS meeting in Washington DC.
Planned 2010 INOR-ACS program at 239th ACS meeting in San Francisco, CA.
Organized the "Metals in Medicine Gordon Conference" 2010.
Planned 2010 Bioinorganic and Coordination Chemistry INOR-ACS program at 240th ACS meeting in Boston, MA.
Planned 2011 Coordination Chemistry INOR-ACS program at 241th ACS meeting in Anaheim, CA.
Planned 2011 Coordination Chemistry INOR-ACS program at 242nd ACS meeting in Denver, CO.
Organized the Zing Coordination Chemistry Conference, 2011.
Planned 2012 Coordination Chemistry INOR-ACS program at 243th ACS meeting in San Diego, CA.

Planned 2012 Coordination Chemistry INOR-ACS program at 244th ACS meeting in Philadelphia, PA.
Organized the symposium in the "Reactions at Lipid and Lipid-like surfaces" Rocky Mountain Regional Meeting 2012 (RMRM12)
Planned 2013 Coordination Chemistry INOR-ACS program at 245th ACS meeting in New Orleans, LA.
Planned 2013 Coordination Chemistry INOR-ACS program at 246th ACS meeting in Indianapolis, IN.
Organized the Zing Coordination Chemistry Conference, 2013.
Planned 2014 Coordination Chemistry INOR-ACS program at 247th ACS meeting in Dallas,TX.
Planned 2014 Coordination Chemistry INOR-ACS program at 248th ACS meeting in San Francisco, CA.
Planned 2015 Coordination Chemistry INOR-ACS program at 249th ACS meeting in Denver, CO.
Planned the Young Talent in Colorado and Beyond Symposium 2016
Planned 2017 Celebrating the 60-year anniversary of DIC for the San Francisco meeting, Spring 2017
Planned Medicinal Chemistry and Inhibitor Design Symposium for RMRM17
Planned the Young Scholar Symposium for the RMRM17
Planned the Speciation Symposium for the ICCC-18 in Japan 2018

f. Vanadis Award administration (2014-2022)
Administered and Presented the 8th Vanadis Award to Armando Pombeiro in Monte Video, Uruguay
Administered and Presented the 7th Vanadis Award to Tamas Kiss and to Ron Wever in 2016 in Taipei, Taiwan

g. Participation in Meetings (other than presenting research):
Chairperson of Bioorganic Section Physical Organic Chemistry Gordon Conference, June 12-16, 1989.
Panel Member. Topic: "Gender in Science: A Panel Exploring the Issues of Gender in Science and Research." Sponsoring Organization: Colorado State University/Fort Collins Chapter, Association for Women in Science, 1989.
Chairperson, Physical Organic Section 199th National ACS Meeting in Boston, April 22-27, 1990.
Chairperson, Bioinorganic Section 200th National ACS Meeting in Washington, August 26-31, 1990.
Chairperson, Bioorganic Section 201st National ACS Meeting, Atlanta, April 14-19, 1991.
Chairperson, Bioorganic Section of the 205th National ACS Meeting, Denver, March 28-April 3, 1993.
Chairperson, Bioinorganic Section of the 213th National ACS Meeting, San Francisco, April 13-17, 1997
Chairperson, Bioinorganic Section of the 220th National ACS Meeting, Washington DC, Aug. 20-24, 2000
Chairperson, Bioinorganic Section of the 222th National ACS Meeting, Chicago, Aug. 26-30, 2001
Chairperson, Metal in Medicine, Gordon Conference, 2002
Planning Meetings for ACS; P2C2 Conference and Long Term Planning Committee 2004
Monitor, Metals in Medicine Gordon Conference, 2004
Planning Meetings for ACS; P2C2 Conference and Long Term Planning Committee 2005
Chairperson, ICBIC 12, Ann Arbor, Michigan, 2005
LSAMP Planning Committee Member 2006
Chairperson, Metal in Medicine, Gordon Conference, 2008
ACS Leadership Conference, Jan 2013, 2014
AAAS Induction, Chicago Feb. 15, 2014
Chairperson, Metal in Medicine, Gordon Conference, 2014
Chairperson, Poster award committee, 2014
Chairperson, Oxometalates, ICCC, 2014
ICCC-41, poster award committee, Singapore, 2014
Polyoxometalate Symposium, Pacifichem, Honolulu, Hawaii, Dec. 15-20, 2015
Chairperson, Metals in Medicine Gordon Conference, 2016
Chairperson, 10th Vanadium Symposium, 2016
Chairperson, Asian Biological Inorganic Chemistry Conf (AsBIC8) University of Auckland, New Zealand, 2016
Chairperson for multiple events for the COACS activities during 2016 and 2017

h. Current Department and University Committee Service
Chair, Faculty Awards Committee, Department of Chemistry (2014-present)
Graduate Recruiting and Admissions Committee, Department of Chemistry 2017-present
Commission on Women and Gender Equity (2015-present)

Research Group (current):

Crans has mentored > 250 students. Approximately 200 of these students have been undergraduates and 60 students have been graduate or postgraduate students.

Current Graduate and Post-Graduate Students (*CMB designates Graduate Program in Cell and Molecular Biology)*

Zeyad Arhouma (CMB graduate student 2014 - present), Kaitlin Doucette (CMB graduate student 2015- present; COACS Travel Award), Kelly Hassell (CMB graduate student 2015 - present; Poster Prize Best of Show, CSU Ventures; COACS Travel Award), Allison Haase (Chemistry graduate student 2016 - present; COACS Travel Award), Heide Murakami (Chemistry graduate student 2016 - present; COACS Travel Award), Cameron van Cleave (Chemistry graduate student 2016 - present; COACS Travel Award), Maggi Braasch-Turi (Chemistry graduate student 2016 – present), Kate Kostenkova (Chemistry graduate student 2018 – present; Chemistry Dept. and COACS Travel Award), Sam Zhang (Chemistry graduate student 2019 – present), Nathan Gasparovic (Chemistry graduate student 2019 – present), Gaia Bublitz (Biochemistry graduate student 2019 – present), Riley Spilar (Toxicology graduate student 2020 – present)

Current Undergraduate Students

Sarah Sanders (chemistry, 2018 - present), Jackson Gaebler (chemistry, 2018 - 2020), John Hagen (chemistry, 2018 - present), Brian Heritage (chemistry, 2019 - present), Evan McManigal (chemistry, 2019 – present), Vi Tran (chemistry, 2019 – present), Matthew Yohannes (chemistry, 2019 – present), Nicholas Baez (chemistry, 2020 – present), Alejandra Chavez (chemistry, 2020), Beth Trent-Ringler (chemistry, 2020 –present).