

Curriculum Vitae—Richard E. Norman
Chair and Professor of Chemistry

Sam Houston State University
Department of Chemistry
Box 2117
Huntsville, TX 77341

Phone: (936)294-1527
Email: norman@shsu.edu

Education

- 1981-1985 Ph.D. in Chemistry, 10/85; M.S. in Chemistry, 3/83 University of Washington, Seattle, Washington. Ph.D. supervisor Norman J. Rose
Dissertation: "The Synthesis and Structure of Copper Complexes Derived From Glycine, 1-Methylimidazole, and Dehydroascorbic Acid."
- 1976-1981 B.S. cum laude with Distinction in Chemistry, 3/81 University of Washington, Seattle, Washington

Research Experience

- 1987-1989 Post-doctoral associate of Lawrence Que, Jr. at the University of Minnesota

Syntheses of Fe(III) complexes as models for non-heme dinuclear iron metalloproteins (including hemerythrin, ribonucleotide reductase, and methane monooxygenase). Investigations of reactions of these complexes with peroxides. The development of a series of complexes which allow the study of the spectroscopic effects of **inherently dissimilar** Fe(III) sites. Techniques used include gc, electronic, resonance Raman, and esr spectroscopies and proton NMR applied to paramagnetic systems.

- 1985-1987 Post-doctoral associate of Peter J. Sadler at Birkbeck College, University of London
Post-doctoral Fellowship from Smith Kline and French Laboratories

Investigations into the **design of metal compounds as drugs**, and studies of the bioinorganic chemistry of existing metallodrugs. The development of a new approach to the testing of metal complexes for biological activity, using high resolution, high field proton NMR spectroscopic techniques to probe the reactions of metal complexes in cell culture media. Techniques used include non-aqueous potentiometric titrations and multinuclear (^1H , ^{13}C , ^{14}N , ^{15}N , ^{31}P , and ^{195}Pt) NMR.

- 1981-1985 Doctoral Research with Norman J. Rose, University of Washington

Synthetic investigations of the copper, glycine, dehydroascorbic acid system, including the syntheses, characterization, and x-ray crystallographic structural determinations of five compounds of three different classes: (1) the tetranuclear copper cluster $[\text{Cu}_4\text{OCl}_6(1\text{-MeIm})_4]$; (2) the tertiary copper(II) complexes $[\text{CuCl}(\text{glycine})(\text{methanol})]$ and $[\text{CuCl}(\text{glycine})(1\text{-methylimidazole})]$, and (3) $[\text{Cu}_9(\text{X})_2(\text{CPA})_6(\text{H}_2\text{O})_3]_n^{2-} \cdot n\text{H}_2\text{O}$, where $\text{X} = \text{Cl}$ and Br , and $\text{CPA} = 2\text{-C-carboxypentionate}$, derived from dehydroascorbic acid--the first examples of metal complexes of this early decomposition product of vitamin C.

Professional Employment History

2005-now	Professor and Chair	Sam Houston State University
2004	Professor	University of Louisiana at Monroe
2000	granted tenure	University of Louisiana at Monroe
1999-2004	Associate Professor	University of Louisiana at Monroe (note name change)
1997-1999	Assistant Professor	Northeast Louisiana University, Monroe, LA
1990-1996	Assistant Professor	Duquesne University, Pittsburgh, PA
1989-1990	Assistant Professor	University of Arkansas at Little Rock
1987-1989	Postdoctoral Associate	University of Minnesota, Minneapolis
1985-1987	Postdoctoral Fellow	University of London, London, U.K.
1981-1985	Graduate Assistant (Teaching Assistant, Research Associate, Predoctoral Lecturer)	University of Washington, Seattle

Grant History

Date	Award Program	Title
11/16/89	Faculty Research Award UALR Applied for \$5,000	The synthesis and characterization of heterobimetallic complexes as potential anti-cancer agents. Funded for \$5,000--returned upon departure.
1/29/90	Basic Research Grant Arkansas Science and Technology Authority Applied for \$45,774	Diplatinum complexes as potential anticancer drugs. Application withdrawn upon departure from Arkansas.
3/20/90	AMOCO Foundation Applied for \$28,841	Purchase of an FT-IR for undergraduate teaching. (Co-PI) Unfunded
12/10/90	Faculty Development Fund Duquesne University Applied for \$5,000	The investigation of heterobimetallic complexes as possible anticancer drugs. Funded for \$5,000
12/20/90	NSF (Small Grants for Exploratory Research) Applied for \$47,760	The investigation of heterobimetallic complexes as possible anticancer drugs. Unfunded
5/1/91	Eppley Foundation Applied for \$32,922	Investigations of Diiron and Tetrairon Clusters. Models for the Initial States of Ferritin Core Formation? Unfunded

10/2/91	Petroleum Research Fund American Chemical Society	Heterobimetallic Complexes as Possible Anticancer Drugs
	Applied for \$18,000	Unfunded --not reviewed
3/13/92	Samuel and Emma Winters Foundation	Heterobimetallic Complexes as Possible Anticancer Drugs
	Applied for \$10,000	Unfunded
6/26/92	Petroleum Research Fund American Chemical Society	Investigations of Tetrairon Clusters: Syntheses, Characterizations and Reactivity Studies
	Applied for \$20,000	Unfunded
2/15/93	Jacob A. and Frieda M. Hunkele Charitable Trust	Heterobimetallic Complexes as Possible Anticancer and AIDS Drugs
	Applied for \$11,700	Funded for \$11,925
3/1/93	Jacob A. and Frieda M. Hunkele Charitable Trust	Purchase of Videotape Equipment for General Chemistry
	Applied for \$1,500	Unfunded
3/12/93	Samuel and Emma Winters Foundation	Heterobimetallic Complexes as Possible Anticancer Drugs
	Applied for \$10,000	Unfunded
9/15/93	National Science Foundation REU Site	Bioinorganic Research Experiences for Undergraduates at Duquesne University
	Applied for \$313,331	Unfunded
9/14/94	National Science Foundation REU Site	Bioinorganic Research Experiences for Undergraduates at Duquesne University
	Applied for \$94,575	Unfunded
9/17/97	Research Corporation	μ -Sulfido μ -Carboxylato Diiron Complexes: Synthesis and Characterization
	Applied for \$64,550 (\$38,000 from RC)	Unfunded
11/3/97	Northeast Louisiana U.	Development Grant to Enable Research in CNSB 125 and 126
	Applied for \$5,000	Unfunded
11/5/97	Board of Regents Support Fund	Initiation of Studies on μ -Sulfido μ -Carboxylato Diiron Complexes: Structures and Properties
	Applied for \$185,050 (\$132,440 from BRSF)	Unfunded

10/24/98	Board of Regents Support Fund Co-PI with Bala Ramachandran of Louisiana Tech Applied for \$143,082	A Joint Proposal to Enhance the Computational Content in Chemistry Courses Funded for \$16,893 from BRSF (\$16,390 match) (\$5,094 from BRSF for ULM, \$2,127 match)
2/28/00	ULM Foundation Applied for \$265,000	Purchase of a Single Crystal X-ray Diffractometer Recommended for funding
3/29/00	STAP Funding Co-PI with G.L. Findley, F.H. Watson, A. M. Findley, T. W. Sasek and J. A. Knesel Applied for \$8,000	Molecular Sciences Web Server Unfunded
4/6/00	STAP Funding Applied for \$5,175	Centrifuges for Qualitative Inorganic Analysis Unfunded
4/7/00	STAP Funding Co-PI with A. M. Findley, T. W. Sasek, J. A. Knesel, G.L. Findley and F.H. Watson Applied for \$17,500	Multimedia Projection Equipment for the Chemistry and Natural Sciences Building Unfunded
10/12/00	STAP Funding Applied for \$5,175	Centrifuges for Qualitative Inorganic Analysis Funded for \$5,175
11/1/00	Board of Regents Support Fund Applied for \$231,050 (\$144,658 from BRSF)	Initiation of Studies on μ -Sulfido μ -Carboxylato Diiron Complexes: Structures and Properties Unfunded
9/7/05	The Welch Foundation Applied for \$120,000	Departmental Research Grant Funded for \$120,000
6/26/06	NSF Consortium Member—James D Irvin (Texas State University – San Marcos) was PI. Applied for \$163,100	CRIF:MU Acquisition of a Cyber-enabled Benchtop Single Crystal X-ray Diffractometer for Small Molecule Structure Analysis for Research and Educational Purposes Unfunded
2/1/07	The Welch Foundation Applied for \$150,000	Diiron Clusters with a Bridging Sulfur and a Bridging Carboxylate Unfunded

1/24/08	NSF	MRI: Acquisition of a Cyber-enabled Benchtop Single Crystal X-Ray Diffractometer for Small Molecule Structure Analysis for Research and Educational Purposes
	Consortium Member—Benjamin R Martin (Texas State University – San Marcos) was PI.	
	Applied for \$124,880	Funded for \$124,880
1/24/08	NSF	MRI: Acquisition of A Magnetic Property Measurement System for Study of Magnetic and Superconducting Materials
	Consortium Member—Gan Liang (SHSU, Department of Physics) was PI.	
	Applied for \$359,090	Unfunded
9/10/08	The Welch Foundation	Departmental Research Grant
	Applied for \$135,000	Funded for \$135,000
9/19/11	The Welch Foundation	Departmental Research Grant
	Applied for \$40,000	Funded for \$40,000
9/4/12	The Welch Foundation	Departmental Research Grant
	Applied for \$40,000	Funded for \$40,000
9/12/13	The Welch Foundation	Departmental Research Grant
	Applied for \$40,000	Funded for \$40,000
9/18/14	The Welch Foundation	Departmental Research Grant
	Applied for \$40,000	Funded for \$40,000 with a 2-year \$80,000 extension
9/15/17	The Welch Foundation	Departmental Research Grant
	Applied for \$120,000	Funded for \$135,000

Students Supervised

Ph.D. Student Graduated

Ji-Ren Tzou, Summer 1995

"Syntheses and Properties of μ -Alkoxo, μ -Oxo, μ -Hydroxo, and μ -Carboxylato Binuclear and Tetranuclear Iron(III) Complexes."

M.S. Students Graduated

John Whalen, Summer 1994

"Studies of the Reactions of K_2PtCl_4 with $EDTA(Et-Cys)_2$, H_4-EDTA , and H_2-EDDA . Crystal Structure Determination of $Pt(H_4-EDTA)Cl_2 \cdot 5H_2O$."

Yolanda Davidson, Summer 1995

"Studies of the Reactions of K_2PtCl_4 with $EDTA(Me-Met)_2$ and L-Methionine under Basic Conditions. Crystal Structure Determination of $Pt_3(L-HMet)_3 \cdot H_2O$."

Yelda Hangün, Fall 1995

"Structural Characterization of a Series of Iron Tris-(2-pyridylmethyl)amine Complexes."

Yanhua Yang, Spring 1996

"Studies of Cr(III)-Amino Acid Complexes."
(Research directed by Anne E. True; I directed the thesis write-up and served as first reader.)

Jia Xue, Summer 1996

"Structural Characterization of Iron(III) Tris(2-pyridylmethyl)amine Complexes with the Formulas $[Fe(TPA)X_2](ClO_4)$ & $[Fe(TPA)X_2O](ClO_4)_2$."

Matthew Mullaney, Fall 1996

"1- and 2-D 1H , ^{13}C , and ^{195}Pt NMR Studies of $Pt(H_4-EDTA)Cl_2 \cdot 6H_2O$ in D_2O Solution and Structural Characterization of Several Fe(III) Tris(2-pyridylmethyl)amine Complexes"

Bing Tong, Summer 1998

"Spectral and Structural Characterization of a Series of Nickel(II) Tris(2-pyridylmethyl)amine Complexes"

Ming Xie, Fall 2000

"Spectral and Structural Characterization of Nickel(II) Ethylenediamine, 1,10-Phenanthroline, 2,2'-Dipyridyl and *Tris*(2-aminoethyl)amine Complexes"

W. G. Piyal Ariyananda, Fall 2003

"Structural Characterization of a Series of Nickel(II) Complexes of (2-Aminomethyl)pyridine, (*N,N'*-Dimethyl)ethylenediamine, and Phenylenediamine"

L. Mihiri D. Ariyananda, Fall 2003

"Structural and Spectroscopic Studies of Cr(III), Mn(II), Fe(III), Fe(II) and Ni(II) Complexes with Nitrogenous Ligands"

Shamila S. Gunatilleke, Fall 2003

"Structural Characterization of Iron Complexes and Potential Ligand Synthesis"

Christine M. Henry, Summer 2007

"Structural characterization of diiron(III) bis(tris(2-pyridylmethyl)amine) complexes with oxo-bridges and attempted preparation of sulfido-bridge"

Sajini R. Randeniya, Spring 2009

"Studies of Potential Ligands, Nickel(II) and Iron(III) Complexes"

Naleen Jayaratna, Summer 2010

“Structural and spectroscopic characterization of Fe(III) and Ni(II) complexes and potential ligand synthesis.”

Harshani Jayabahu Arachchillage, Summer 2015

“Synthesis and structural characterization of (μ -oxo)(μ -modified benzoate)diiron(III)tris(2-pyridyl-methyl)amine complexes.”

Undergraduate Students

Summer 1992	Helen Sile	M.D. U. Pittsburgh 1998
Summer 1992	David Passerini	M.D. Ohio State 2000
1992-1993	Alexis Shaulis (Nagengast)	Ph.D. Case Western—now at Widener U.
Spring 1993	Leonard Vuocolo	Ph.D. Carnegie Mellon—Teaching Prof at CMU.
Summer 1993	Genevieve Trudeau (Minick)	M.D. MCP-Hahnemann School of Medicine 2002
Summer 1993	Angela Kullman (Mohrhaus)	(employed)
Summer 1995	Victor Vilchiz	Ph.D. U. Southern Cal.—now at Virginia State
Summer 1995	Norman Peterson	(employed)
2003-2004	R. Seth Baker	(Chemistry major ULM)
2003-2004	Craig Eubanks	(Chemistry major ULM)
2003-2004	Courtney Walker	(Pharmacy major ULM)
Fall 2004	Ann Lee	(Chemistry major ULM)
Fall 2004	J. Cody Lewis	(Pre-Pharmacy major ULM)
Summer 2005	Katherine S. Williams	(Biology major SHSU)
Fall 2005	Rachel L. Kelley	(Biology major SHSU)
Fall 2005	Lawrence E. Moore, Jr.	(Biology major SHSU)
Fall 2005	Derrica Y. Walker	(Biology major SHSU)
Spring 2006	Stacey H. Sannes	(Kinesiology major SHSU)
Spring 2006	Hideyuki Honjo	(Chemistry major SHSU)
Summer 2006	Daniela M. M. Ide	(Chemistry major SHSU)
Spring 2008	J. Kelly Forson	(Biology major SHSU)
Summer 2009	Jessica Hussion	(Chemistry major SHSU)
Summer 2010	Christopher John	(Forensic chemistry major SHSU)
Summer 2010	Joe Treviño	(Forensic chemistry major SHSU)
Summer 2010	Brittany Winner	(Forensic chemistry major SHSU)
Summer 2011	Christopher John	(Forensic chemistry major SHSU)
Fall 2015	Dwight Cassell	(Chemistry major SHSU)

Presentations

Talks

- (1) Norman, R. E.; Stenkamp, R. E.; Rose, N. J.; "The Crystal and Molecular Structure of Chloro (glycinato)(methanol)copper(II); a Mono Amino Acid Copper Complex"; 39th Northwest Regional Meeting of the American Chemical Society, University of Idaho, Moscow, Idaho, 1984.
- (2) Que, L., Jr.; Kumar, V.; Murch, B. P.; Brennan, B. A.; Chen, Q.; "Structure and Reactivity of Binuclear Iron Peroxide Complexes"; Third Chemical Congress of North America & 195th National Meeting of the American Chemical Society, Toronto, Ontario, Canada 1988. INOR 674. I gave the talk for LQ.
- (3) Que, L., Jr.; Cox, D. D.; Norman, R. E.; "Modelling the Chemistry of Nonheme Iron Oxygenases."; 4th International Conference on BioInorganic Chemistry, Boston, U.S.A., 1989. *J. Inorg. Biochem.*, **1989**, 36, 309.
- (4) Norman, R. E.; "And Now for Something Completely Different...Metallodrugs!"; Pittsburgh BioInorganic Chemistry Sessions at Carnegie Mellon University, December, 1991.
- (5) Norman, R. E.; Tong, B.; "Structures of Nickel(II) Tris(2-pyridylmethyl)amine Complexes."; 54th Southwest Regional Meeting of the American Chemical Society, Baton Rouge, Louisiana, 1998. 268.
- (6) Norman, R. E.; Ariyananda, W. G. P.; Xie, M.; "Magnetostuctural Studies of Halo-bridged Dinickel Complexes."; 58th Southwest Regional Meeting of the American Chemical Society, Austin, Texas, 2002. 320.
- (7) Loeffler, P. A.; Plishker, M. F.; Norman, R. E.; "Development of the forensic science and forensic chemistry programs at Sam Houston State University."; 233rd National Meeting of the American Chemical Society, Chicago, Illinois, 2007. CHED 1684.

Posters

- (1) Norman, R. E.; Stenkamp, R. E.; Rose, N. J.; "Crystal Structure of a Copper Complex of 2-C-carboxypentonic Acid; A Decomposition Product of Ascorbic Acid."; 23rd International Conference on Coordination Chemistry, University of Colorado, Boulder, Colorado, 1984. THa44-4.
- (2) Bell, J. D.; Norman, R. E.; Sadler, P. J.; "Problems Associated With Testing Metal Complexes In Vitro: Reactions of Au(III) with Cell Culture Media."; 24th International Conference on Coordination Chemistry, University of Athens, Athens, Greece, 1986. *Chimika Chronika, New Series*, **1986**, Special Issue, 818.
- (3) Bell, J. D.; Norman, R. E.; Sadler, P. J.; "Problems Associated with Testing Metal Complexes In Vitro: Reactions of AuCl₄⁻ with Cell Culture Media."; 192nd American Chemical Society Meeting, Anaheim, California, 1986, INOR 202.
- (4) Bell, J. D.; Norman, R. E.; Sadler, P. J.; "Reactions of Platinum Antitumor Complexes with Cell Culture Media and Blood Plasma: ¹H NMR Studies."; Fifth International Symposium on Platinum and Other Metal Coordination Compounds in Cancer Chemotherapy, Abano Terme (Padua), Italy, 1987, 115-117.

- (5) Bell, J. D.; Norman, R. E.; Sadler, P. J.; "Reactions of Platinum Antitumour Drugs with Biologically Relevant Fluids: Cell Culture Medium and Blood Plasma."; 3rd International Conference on BioInorganic Chemistry, Noordwijkerhout, the Netherlands, 1987. *Recl. Trav. Chim. Pays-Bas*, **1987**, 106, 383.
- (6) Bell, J. D.; Norman, R. E.; Ranford, J. D.; Sadler, P. J.; "Multinuclear NMR Studies of Platinum Methionine Complexes: Relevance to Anticancer Activity."; Ninth International Meeting on NMR Spectroscopy, Coventry, U. K., 1989.
- (7) Kubal, G.; Norman, R. E.; Sadler, P. J.; Pue, M. A.; Reid, D. G.; Ross, D. A.; "NMR Studies of Hepatocytes: Glutathione Conjugation Pathways."; Ninth International Meeting on NMR Spectroscopy, Coventry, U. K., 1989.
- (8) Norman, R. E.; Yan, S.; Que, L., Jr.; "Spectroscopic Studies of Iron(III) Complexes of TPA (Tris(2-pyridylmethyl)amine). Models for Nonheme Iron Proteins."; 4th International Conference on BioInorganic Chemistry, Boston, U.S.A., 1989. *J. Inorg. Biochem.*, **1989**, 36, 321.
- (9) Ranford, J. D.; Sadler, P. J.; Norman, R. E.; "Multinuclear NMR Studies of Platinum(II) Methionine Complexes: Relationship to Cisplatin Metabolism."; 1989 International Chemical Congress of the Pacific Basin Societies. BIOS 88.
- (10) Ranford, J. D.; Sadler, P. J.; Norman, R. E.; "Multinuclear NMR Studies of Pt(II) Methionine Complexes: Metabolites of Cisplatin."; 5th International Conference on BioInorganic Chemistry, Oxford, U.K., 1991. *J. Inorg. Biochem.*, **1991**, 43, 603.
- (11) Tzou, J.-R.; Chang, S.-C.; Norman, R. E.; "Syntheses and Properties of Alkoxo Binuclear and Tetranuclear Iron(III) Complexes."; 6th International Conference on BioInorganic Chemistry, San Diego, U.S.A., 1993. *J. Inorg. Biochem.*, **1993**, 51, 480.
- (12) Tzou, J.-R.; Chang, S.-C.; Norman, R. E.; "Studies of Alkoxo Binuclear and Tetranuclear Iron(III) Complexes. The "Dangers" of DMSO."; 208th American Chemical Society Meeting, Washington, D.C., 1994, INOR 294.
- (13) Steward, O. W.; Yaukey, T. S.; Chang, S.-C.; Norman, R. E.; Tokii, T.; Matsushima, H.; Nakashima, M.; "Structural Studies of Triphenylacetato Cobalt(II) and Nickel(II) Complexes Crystallized from Aqueous and Alcoholic Solutions."; 31st International Conference on Coordination Chemistry, Vancouver, British Columbia, Canada, 1996.
- (14) Norman, R. E.; Xue, J.; Hangan, Y.; Mullaney, M.; "Structures of Iron(III) Tris-(2-pyridylmethyl)-amine Complexes. Trends in Lewis Acidities."; Fifth Chemical Congress of North America, Cancun, Mexico, 1997, 2289.
- (15) Ramachandran, B.; Norman, R. E.; Truhlar, D. G.; "Structure and energetics of halide-bridged binuclear complexes of Ni(II): A computational study."; 10th Conference on Current Trends in Computational Chemistry, Jackson, MS, 2001, 189.
- (16) Ariyananda, W. G. P.; Norman, R. E.; "Structural Studies of 2-Pyridylmethylamine Complexes of Nickel."; 76th Annual Meeting of the Louisiana Academy of Sciences, Baton Rouge, LA, 2002.
- (17) Baker, R. S.; Norman, R. E.; "Synthesis and X-ray Crystal Structure Determination of Di- μ -bromo-bis{[tris(2-aminoethyl)amine- κ^4N]nickel(II)} Diperchlorate."; 2003 Student Research Symposium, University of Louisiana at Monroe.

- (18) Baker, R. S.; Norman, R. E.; “Syntheses and X-ray Crystal Structure Determinations of Di- μ -halo-bis{[tris(2-aminoethyl)amine]nickel(II)} Diperchlorate.”; 59th Southwest Regional Meeting of the American Chemical Society, Oklahoma City, 2003, 6.
- (19) Henry, C. M.; Norman, R. E.; “X-Ray Crystal Structure and Properties of [Fe₂(TPA)₂O(SO₄)]-(ClO₄)₂•CH₃CN”; 62nd Southwest Regional Meeting of the American Chemical Society, Houston, 2006, 465.
- (20) Ide, D.; Norman, R. E.; “Synthetic Studies and X-Ray Crystal Structure of *trans*-[Ni(*N,N*-dmen)₂(H₂O)₂]Cl₂•2H₂O”; 62nd Southwest Regional Meeting of the American Chemical Society, Houston, 2006, 320.
- (21) Arachchilage, H. J.; Norman, R. E.; “Crystal structure of (μ -oxo)(μ -4-methylbenzoato)diiron(III) bis(tris(2-pyridylmethyl)amine) perchlorate”; 70th Southwest Regional Meeting of the American Chemical Society, Fort Worth, 2014, 267.

Data Deposition (Private Communication to the Cambridge Crystallographic Data Centre)

- Randeniya, S. R.; Norman, R. E.; Fronczek, F. R. “Tris((2-pyridinium)methyl)ammonium perchlorate.” CCDC 678386.
- Randeniya, S. R.; Norman, R. E.; Fronczek, F. R. “2-{[*N*-(Pyridinium-2-ylmethyl)-*N*-(pyridin-2-ylmethyl)amino]methyl}-1-(pyridin-2-ylmethyl)pyridinium diperchlorate.” CCDC 734859.

Publications

- (1) Berners-Price, S. J.; Norman, R. E.; Sadler, P. J.; “The Autoxidation and Proton Dissociation Constants of Tertiary Diphosphines: Relevance to Biological Activity.” *J. Inorg. Biochem.*, **1987**, *31*, 197-209.
- (2) Norman, R. E.; Rose, N. J.; Stenkamp, R. E.; “Crystal Structure of a Copper Complex of 2-Carboxypentonic Acid; a Decomposition Product of Dehydroascorbic Acid.” *J. Chem. Soc., Dalton Trans.*, **1987**, 2905-10.
- (3) Bell, J. D.; Norman, R. E.; Sadler, P. J.; “Coordination Chemistry in Biological Media: Reactions of Antitumor Pt(II) and Au(III) Complexes with Cell Culture Media.” *J. Inorg. Biochem.*, **1987**, *31*, 241-6.
- (4) Bell, J. D.; Brown, J. C. C.; Newell, D. R.; Norman, R. E.; Sadler, P. J.; “Factors Affecting ¹H NMR Spectra of Blood Plasma: Cancer, Diet, and Freezing.” *NMR in Biomedicine*, **1988**, *1*, 90-94.
- (5) Norman, R. E.; Sadler, P. J.; “¹⁴N NMR Studies of Amine Release from Platinum Anticancer Drugs: Models and Human Blood Plasma.” *Inorg. Chem.*, **1988**, *27*, 3583-3587.
- (6) Norman, R. E.; Stenkamp, R. E.; Rose, N. J.; “Simple, Direct Synthesis and Structure of Hexa- μ -chloro-tetrakis(1-methylimidazole)- μ_4 -oxo-tetracopper(II).” *Acta Cryst.* **1989**, *C45*, 1707-1713.
- (7) Norman, R. E.; Rose, N. J.; Stenkamp, R. E.; “Mono-Amino-Acid-Copper Complexes: Syntheses and Structures of Chloro(glycinato)(methanol)copper(II) and Chloro(glycinato)(1-methylimidazole)-copper(II).” *Acta Cryst.* **1990**, *C46*, 1-6.
- (8) Norman, R. E.; Stenkamp, R. E.; “Structure of a Copper(II) Complex of 2-C-Carboxypentonic Acid (H₃CPA); [Cu₉Br₂(CPA)₆]_n²⁻•xH₂O.” *Acta Cryst.* **1990**, *C46*, 6-8.

- (9) Norman, R. E.; Yan, S.; Que, L., Jr.; Backes, G.; Ling, J.; Sanders-Loehr, J.; Zhang, J. H.; O'Connor, C. J.; “(μ -Oxo)(μ -carboxylato)diiron(III) Complexes with Distinct Iron Sites. Consequences of the Inequivalence and Its Relevance to Dinuclear Iron-Oxo Proteins.” *J. Am. Chem. Soc.* **1990**, *112*, 1554-1562.
- (10) Leising, R. A.; Norman, R. E.; Que, L., Jr.; “Alkane Functionalization by Nonporphyrin Iron Complexes: Mechanistic Insights.” *Inorg. Chem.* **1990**, *29*, 2553-2555.
- (11) Norman, R. E.; Holz, R. C.; Menage, S.; O'Connor, C. J.; Zhang, J. H.; Que, L., Jr.; “Structures and Properties of Dibridged (μ -Oxo)diiron(III) Complexes. Effects of the Fe-O-Fe Angle.” *Inorg. Chem.* **1990**, *29*, 4629-4637.
- (12) Britton, D.; Norman, R. E.; Que, L., Jr.; “[(2-pyridinium)methyl]amine perchlorate.” *Acta Cryst.* **1991**, *C47*, 2415-17.
- (13) Norman, R. E.; Ranford, J. D.; Sadler, P. J.; “Studies of Pt(II) Methionine Complexes: Metabolites of Cisplatin.” *Inorg. Chem.* **1992**, *31*, 877-888.
- (14) Davidson, Y. Y.; Chang, S.-C.; Norman, R. E.; “Synthesis and Crystal Structure of a Novel Cyclic Trinuclear Platinum(II) Complex, Pt₃(L-Methionine)₃•H₂O.” *J. Chem. Soc., Dalton Trans.*, **1995**, 77-81.
- (15) Kubal, G.; Meyer, D. J.; Norman, R. E.; Sadler, P. J.; “Investigations of Glutathione Conjugation *In Vitro* by ¹H NMR Spectroscopy. Uncatalyzed and Glutathione-Transferase-Catalyzed Reactions.” *Chem. Res. Toxicol.* **1995**, *8*, 780-791.
- (16) Tzou, J.-R.; Mullaney, M.; Norman, R. E.; Chang, S.-C.; “Hexakis(dimethylsulfoxide-*O*)iron(III) Trinitrate.” *Acta Cryst.* **1995**, *C51*, 2249-2252.
- (17) Whalen, J. T.; Chang, S.-C.; Norman, R. E.; “Dichloro(ethylenediaminetetraacetic acid-*N,N*) platinum(II) water(1:6).” *Acta Cryst.* **1996**, *C52*, 297-300.
- (18) Vilchiz, V. H.; Norman, R. E.; Chang, S.-C.; “L-Histidine Methyl Ester Dihydrochloride.” *Acta Cryst.* **1996**, *C52*, 696-698.
- (19) Tzou, J.-R.; Huang, A.; Fleming, F. F.; Norman, R. E.; Chang, S.-C.; “1-Cyanomethyl-6,7,8-trioxabicyclo[3.2.1]octane.” *Acta Cryst.* **1996**, *C52*, 1012-1014.
- (20) Hussain, Z.; Fleming, F. F.; Norman, R. E.; Chang, S.-C.; “3-Cyano-1-[4-(1,3-dithian-2-yl)butyl]-1,4,5,6-tetrahydropyridine.” *Acta Cryst.* **1996**, *C52*, 1010-1012.
- (21) Hussain, Z.; Fleming, F. F.; Norman, R. E.; Chang, S.-C.; “(9*S*, 9*aR*)-1,3,4,6,7,8,9,9*a*-Octahydro-2*H*-quinolizine-1-spiro-2'-(1',3'-dithiane)-9-carbonitrile.” *Acta Cryst.* **1996**, *C52*, 1296-1298.
- (22) Fleming, F. F.; Hussain, Z.; Mullaney, M.; Norman, R. E.; Chang, S.-C.; “(8*R*, 8*aS*)-Indolizidine-1-spiro-2'-(1',3'-dithiane)-8-carbonitrile.” *Acta Cryst.* **1996**, *C52*, 2849-2851.
- (23) Norman, R. E.; Peterson, N. L.; Chang, S.-C.; “ μ -Acetato-*O*:*O*- μ -oxo-bis[tris(2-pyridylmethyl)amine-*N,N',N'',N'''*]diiron(III) Tris(trifluoromethanesulfonate) Dihydrate.” *Acta Cryst.* **1997**, *C53*, 452-453.
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- (27) Patterson, R. E.; Gordon-Wylie, S. W.; Woomer, C. G.; Norman, R. E.; Weintraub, S. T.; Horwitz, C. P.; Collins, T. J.; "Electron-Transfer Oxidation by Phase-Separating Reagents." *Inorg. Chem.* **1998**, 37, 4748-4750.
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- (29) Tong, B.; Norman, R. E.; Chang, S.-C.; "Di- μ -chloro-bis{[tris(2-pyridylmethyl)amine- κ^4N]nickel(II)} bis(triethylammonium) tetraerchlorate." *Acta Cryst.* **1999**, C55, 1236-1238.
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- (31) Fleming, F. F.; Pu, Y.; Norman, R. E.; Chang, S.-C.; "Crystal structure of [2-(*tert*-butyldimethylsilyloxy)-6-phenyl]-1-cyclohexene-1-carbonitrile, C₁₉H₂₇NOSi." *Z. Kristallogr. NCS* **2001**, 216, 647-648.
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- (36) Ariyananda, W. G. P.; Norman, R. E.; "Tris(2-ammonioethyl)amine tribromide." *Acta Cryst.* **2003**, E59, o1601-o1603.
- (37) Norman, R. E.; Xie, M.; "Nickel(II) 1,10-phenanthroline complexes: *cis*-[aqua(bromo)*bis*(1,10-phenanthroline)nickel(II)] bromide trihydrate and [*tris*(1,10-phenanthroline)nickel(II)] bromide octahydrate." *J. Coord. Chem.* **2004**, 57, 425-434.
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- (39) Ariyananda, W. G. P.; Norman, R. E.; "Tetrakis(1,2-diaminobenzene)- κ^2N ; κ^4N,N' -nickel(II) dichloride." *Acta Cryst.* **2005**, E61, m187-m189.

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- (41) Ariyananda, L. M. D.; Norman, R. E.; “2- $\{[N$ -(Pyridinium-2-ylmethyl)- N -pyridin-2-ylmethylamino]-methyl}-1-(pyridin-2-ylmethyl)-pyridinium diperchlorate.” *Acta Cryst.* **2005**, *E61*, o2679-o2681.
- (42) Xie, M.; Norman, R. E.; “Di- μ -bromo-bis[bis(1,2-diaminoethane- κ^2N,N)nickel(II)] dibromide.” *Acta Cryst.* **2006**, *E62*, m408-m410.
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- (46) Ide, D. M. M.; Norman, R. E.; “*Trans*-Diaqua-bis(N,N -dimethylethane-1,2-diamine- κ^2N,N')nickel(II) dichloride dihydrate: a redetermination at 90 K.” *Acta Cryst.* **2007**, *E63*, m558-m560.
- (47) Smith, C. M.; Norman, R. E.; “ μ -Sulfato-1 κO :2 κO - μ -oxo-bis[tris(2-pyridylmethyl)amine- κ^4N,N',N'',N''']diiron(III) diperchlorate acetonitrile/water (0.75/0.25) solvate.” *Acta Cryst.* **2007**, *E63*, m2480-m2481, Sm2480/1-Sm2480/15.
- (48) Randeniya, S. R.; Norman, R. E.; “Bis(thiocyanato- κN)[tris(2-pyridylmethyl)amine- κ^4N,N',N'',N''']nickel(II) methanol hemisolvate” *Acta Cryst.* **2009**, *E65*, m771, Sm771/1-Sm771/12.
- (49) Jayaratna, N. B.; Norman, R. E.; “Crystal Structure of [N,N' -bis(pyridin-2-yl)benzylidene]-butane-1,4-diamine, $C_{28}H_{26}N_4$ ” *Z. Kristallogr. NCS* **2010**, *225*, 179-180.
- (50) Jayaratna, N.B.; Norman, R. E.; “2-Phenyl-2-(pyridin-2-yl)-hexahydropyrimidine” *Acta Cryst.* **2010**, *E66*, o3149, So3149/1-So3149/9.

Teaching Experience

Undergraduate Level

Chemistry for Non-Science Majors—lecture (2 times) and lab (2 sections)
 Chemistry for Health Scientists and Nurses I—lecture (3 times) and lab (1 section)
 General Chemistry I—lecture (31 times), lab (5 sections) and small discussion groups (7 sections)
 General Chemistry II—lecture (34 times), lab (17 sections) and small discussion groups (4 sections)
 Organic Chemistry I—lecture (3 times) and lab (3 sections)
 Junior level Inorganic Chemistry—lecture (15 times) and lab (2 sections)
 Senior level Inorganic Chemistry—lecture (5 times)
 Undergraduate Seminar—1 time

Graduate Level

First Semester of Inorganic Chemistry—5 times
 Transition Metal Chemistry—15 times
 Physical Inorganic Chemistry—1 time
 Special Topics in Inorganic Chemistry: NMR Spectroscopy—4 times
 Physical Bioinorganic Chemistry—1 time

Departmental Service

- 1989-1990 Library Liaison
Awards, Recruitment and Scholarship Committee--Chair
Freshman Programs Committee--Member
Graduate Programs Committee--Member
Health of the Department Committee--Member
Awards Committee, College of Science & Engineering Technology--member
- 1990-1991 Faculty Search Committee for an Analytical Position
Faculty Search Committee for an Open Position
Graduate Handbook Committee
Graduate Student Admissions Committee--Member
NMR Committee (sole member)--visited 4 NMR demonstration facilities, negotiated bids, selected the Bruker ACP 300, oversaw renovation and installation.
Second Reader of Cristen Colantoni-Gilmore's Master's thesis.
- 1991-1992 Faculty Search Committee for an Organic Position
Faculty Search Committee for a Department Chair
Graduate Handbook Committee
Graduate Student Admissions Committee--Member
NMR Committee (sole member)--trained ≈ 15 graduate students to use the NMR.
Second Reader of Jie Sun's Ph.D. Dissertation
Ph.D. Committee member of Jose Workman of Carnegie Mellon University
- 1992-1993 Faculty Search Committee for a Department Chair
Graduate Student Admissions Committee--Chair
NMR Committee (sole member)--trained ≈ 10 graduate students to use the NMR
TA Stipend Committee, College of Liberal Arts and Sciences--member
- 1993-1994 Faculty Search Committee for a Department Chair
Faculty Search Committee for an Analytical Position
Graduate Student Admissions Committee--Chair
NMR Committee (sole member)--trained ≈ 5 graduate students to use the NMR
- 1994-1995 Faculty Search Committee for a Biochemistry Position
Faculty Search Committee for an Inorganic/Physical Position
Library Committee--Member
NMR Committee (sole member)
Second Reader of Dake Tian's Master's thesis.
Ph.D. Committee member of Mary Angela Fernandez
Ph.D. Committee member of Peter Walter
- 1995-1996 Graduate Advising Committee--Chair
Graduate Admissions Committee--Member
NMR Committee (sole member)
Second Reader of Huajun Guan's Master's thesis.
Ph.D. Committee member of Mary Angela Fernandez (Finished Fall 1995)
Ph.D. Committee member of Peter Walter (Finished Spring 1996)

Fall 1996	Library Committee (sole member) NMR Committee (sole member)
Spring 1997	Library Liaison Policy & Personnel Committee--Chair Curriculum Committee--Member Graduate Programs Committee--Member
1997-1998	Library Liaison Graduate Programs Committee--Chair Policy & Personnel Committee--Member Curriculum Committee--Member Master's Committee member of Qing Chen Master's Committee member of Cherice Evans (Finished Spring 1998)
1998-1999	Library Liaison Graduate Programs Coordinator Graduate Programs Committee--Chair Curriculum Committee--Member Advisement Committee--Member Master's Committee member of Qing Chen (Finished Spring 1999)
1999-2000	Library Liaison Graduate Programs Coordinator Graduate Programs Committee--Chair Curriculum Committee--Member Advisement Committee--Member Faculty Senate (Academic Standards Committee, Constitution & By-Laws Committee)
2000-2001	Library Liaison Graduate Programs Coordinator Graduate Programs Committee--Chair Curriculum Committee--Member Advisement Committee--Member Faculty Senate (Academic Standards Committee, Constitution & By-Laws Committee) (Ad hoc Committee on Faculty Issues) Master's Committee member of Shamila Wijeskera
2001-2002	Library Liaison Graduate Programs Coordinator Graduate Programs Committee--Chair Curriculum Committee--Member Advisement Committee--Member Master's Committee member of Prabodhika Mallikaratchy Master's Committee member of Nadi Wickramasekera Master's Committee member of Xiaojun Cai Faculty Senate (Academic Standards Committee--chair, University Environment Committee)

2002-2003	<p>Library Liaison Graduate Programs Coordinator Graduate Programs Committee--Chair Policy & Personnel Committee--Member Advisement Committee--Member</p> <p>Master's Committee member of Prabodhika Mallikaratchy (Finished Summer 2003) Master's Committee member of Nadi Wickramasekera Master's Committee member of Xiaojun Cai</p> <p>Faculty Senate (Secretary-Elect, Constitution & By-Laws Committee--chair, Academic Standards Committee)</p>
2003-2004	<p>Library Liaison Graduate Programs Coordinator Graduate Programs Committee--Chair Policy & Personnel Committee--Member Advisement Committee--Member</p> <p>Faculty Senate (Secretary, President-elect) Electronic Learning Committee (member, Course Evaluation subcommittee—member) Parking Committee (Secretary)</p>
Fall 2004	<p>Library Liaison Graduate Programs Coordinator Graduate Programs Committee--Chair Policy & Personnel Committee--Member Advisement Committee--Member</p> <p>Faculty Senate (President) Parking Committee (Secretary)</p>
2005	<p>Chairman of the Department of Chemistry</p> <p>Farrington Building Addition/Renovation Committee Academic Affairs Council Master of Science in Forensic Science Committee</p>
2006	<p>Chairman of the Department of Chemistry</p> <p>Academic Affairs Council Master of Science in Forensic Science Committee</p> <p>Master's Committee member of Hudson P. Pace</p>
2007	<p>Chairman of the Department of Chemistry</p> <p>Academic Affairs Council Master of Science in Forensic Science Committee</p> <p>Master's Committee member of Hudson P. Pace (Finished Summer 2007) Master's Committee member of Bala K. Pathem (Finished Summer 2007)</p>
2008	<p>Chairman of the Department of Chemistry</p> <p>Academic Affairs Council Master of Science in Forensic Science Committee</p>

2009 Chairman of the Department of Chemistry
 Academic Affairs Council
 Master of Science in Forensic Science Committee

 Master's Committee member of Radhika Burra (Finished Fall 2009)

2010 Chairman of the Department of Chemistry
 Academic Affairs Council
 Master of Science in Forensic Science Committee

 Master's Committee member of Shirangi Fernando (Finished Summer 2010)
 Master's Committee member of Suchithra Senevirathne (Finished Spring 2011)

2011 Chairman of the Department of Chemistry
 Academic Affairs Council
 Master of Science in Forensic Science Committee

 Master's Committee member of Trisha O'Bryon

2012 Chairman of the Department of Chemistry
 Academic Affairs Council
 Master of Science in Forensic Science Committee

 Master's Committee member of Trisha O'Bryon (Finished Summer 2012)
 Master's Committee member of Gayan Adikari Appuhamillage

2013 Chairman of the Department of Chemistry
 Academic Affairs Council
 Master of Science in Forensic Science Committee

 Master's Committee member of Gayan Adikari Appuhamillage (Finished Summer 2013)

2014 Chairman of the Department of Chemistry
 Academic Affairs Council
 Council of Department Chairs
 Medical/Dental School Evaluation Committee

 Master's Committee member of Poorna Tharaka Wansapura (Finished Summer 2014)
 Master's Committee member of Nuwan Rammawadu (Finished Fall 2014)
 Master's Committee member of Nilan Kammathewatta (Finished Fall 2014)
 Master's Committee member of Harshani Rathnaweera
 Master's Committee member of Sajini Hettiarchchi

2015 Chairman of the Department of Chemistry
 Academic Affairs Council
 Medical/Dental School Evaluation Committee

Master's Committee member of Harshani Rathnaweera (Finished Summer 2015)
Master's Committee member of Sajini Hettiarchchi (Finished Summer 2015)
Master's Committee member of Sobiya George
Master's Committee member of Reny Jacob Roy
Master's Committee member of Hemantha Siyambalagoda
Master's Committee member of Md Nure Alam
Master's Committee member of Udana Ariyaratne

2016 Chairman of the Department of Chemistry
 Academic Affairs Council

Master's Committee member of Sobiya George (Finished Summer 2016)
Master's Committee member of Reny Jacob Roy (Finished Summer 2016)
Master's Committee member of Hemantha Siyambalagoda (Finished Summer 2016)
Master's Committee member of Md Nure Alam
Master's Committee member of Udana Ariyaratne (Finished Summer 2016)

2017 Chairman of the Department of Chemistry
 Academic Affairs Council

Master's Committee member of Md Nure Alam (Finished Spring 2017)
Master's Committee member of Nilakshi Devi

2018 Chairman of the Department of Chemistry
 Academic Affairs Council

Master's Committee member of Nilakshi Devi