

**Bennett Hutchinson**  
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## University Experience

### Lipscomb University

**Dean, College of Natural and Applied Science, 2003 –**

#### **Responsibility for 9 degree programs**

- Biology
- Chemistry/Biochemistry
- Computer and Information Systems
- Electrical and Computer Engineering
- Mathematics
- Mechanical Engineering
- Nursing (BSN Partnership with Vanderbilt University)
- Psychology
- Physics

#### **Highlights**

- Presented poster at 2007 SENCER Institute (Science Education for New Civic Engagements and Responsibilities)
- Improved science instrumentation quality and quantity
- Instituted Undergraduate Research and Creativity Celebration
- Worked with art department to paint an outside wall mural for college
- Worked with science, math and education faculty to develop and write federally-funded grant proposals
- Worked with alumni and board members to form a research support program
- Developed science presentations for elementary schools
- Initiated a robot camp (BERP) for middle and high school students
- Developed the first BEST (Boosting Engineering Science and Technology) program (a robot competition for middle and high school teams) in Tennessee and Kentucky
- Developed Deans' Research Grants for freshman and sophomore students
- Developed fast-growing nursing program with Vanderbilt University

## Professor of Chemistry, 2003 – present

### **Courses developed and taught:**

General Chemistry lecture and laboratory (honors)  
Developed and taught new General Chemistry for  
Engineering lecture and laboratory course  
Implemented Calibrated Peer Review program in chemistry courses  
Presented at American Chemical Society meetings

## **Oklahoma Christian University**

### Dean, College of Science and Engineering, 1998 - 2004

#### **Responsibility for 8 degree programs**Biochemistry

- Biology
- Chemistry
- Computer Science
- Engineering Physics
- Electrical and Computer Engineering
- Mechanical Engineering
- Mathematics

#### **Highlights**

- Worked with 7 department heads
- Supervised 26 full-time and adjunct faculty and 6 staff members
- Recruited, interviewed, evaluated, and reviewed faculty
- Recruited students and developed recruiting materials with Admissions
- Oversaw maintenance, expansion of facilities and equipment
- Developed and managed annual College budgets
- Initiated Undergraduate Research Committee and served as chair/member
- Served as grants officer for College of Science and Engineering
- Consulted with Development Office on college fund-raising
- Established pre-healthcare council utilizing faculty and alumni
- Worked with 13 faculty to encourage and assist them writing grant proposals
- College and faculty received grant funds of over \$500,000
- Oversaw fund-raising/completion of facility for cadaver-based anatomy course
- Proposed and obtained a new animal care facility on campus
- Established student service-learning opportunities locally and in Honduras
- Created forensic science track in biochemistry
- Worked with Oklahoma State Regents developing and operating summer academies and workshops for Oklahoma high school students and teachers
- Assisted with formation of OKBEST, a state high school robotics competition
- Co-coordinated the statewide Oklahoma Science Academy meeting

- Reviewed proposals for the Oklahoma State Regents for Higher Education
- Served as member of Tenure-Development Task Force
- Worked with engineering faculty to conduct successful ABET visit
- Co-coordinated Celebration 2001
- Organized science/math portion of 2002 Scholars Conference
- Improved faculty laboratory work loads
- Served as member of Scholars Conference Executive Committee

### International Programs Sponsor, Fall 2002

#### **Responsibility for Vienna Studies Program**

- Oversight of Vienna facilities
- Coordinator of Vienna faculty
- Supervision and teaching of 29 students

### Professor of Chemistry, 1998 – 2004

#### Courses taught:

- Introduction to Chemistry, lecture and laboratory
- Senior Science Seminar
- General Chemistry, lecture and laboratory
- General Chemistry for Engineers, lecture and laboratory
- Inorganic Chemistry, lecture and laboratory

Developed new General Chemistry for Engineering lecture and laboratory course

Developed “projects” lab course for outstanding freshman students

Implemented Calibrated Peer Review program in chemistry courses

Presented research at state and national American Chemical Society meetings

Developed a chemistry undergraduate research program

Mentored 4 students entering graduate chemistry programs

Co-authored research presentations with students at regional chemistry meetings

Received summer research project grants for work with students

Established modern analytical instrumentation laboratory

Supervised 8 undergraduate research students

### **Seaver College, Pepperdine University**

#### Chair, Natural Science Division, 1992 - 1998

#### **Responsibility for 7 disciplines, 1 program**

- Athletic Training
- Biology
- Chemistry
- Computer science
- Biochemistry
- Mathematics
- Physical education
- Sports Medicine

## **Highlights**

- Division majors increased by 62% in four years
- Established 3/2 engineering major
- Initiated laboratory course evaluations
- Improved science faculty work loads
- Proposed and received \$290,000 in divisional equipment grants
- Organized science division of Christian Scholars Conference
- Proposed and designed new 60,000 sq. ft. science facility

## **Professor of Chemistry, 1990 - 1998**

Courses Taught and Developed:

Basic, general, honors general chemistry

Physical and inorganic chemistry lectures and laboratories

Designed and introduced "honors" general chemistry laboratory

Presented 9 research papers with undergraduate students

Co-authored 3 peer-reviewed research publications in chemistry journals with undergraduate students

Received 4 reassigned time and University Research Council grants

Reviewed NSF research proposals and chemistry journal manuscript

## **International Programs Sponsor, Summer 1998**

### **Responsibility for London Studies Program**

Supervision and teaching of 22 students

## **Abilene Christian University**

### **Professor, 1969 – 1989**

- Courses taught:
  - Honors general science education courses
  - General, honors general, inorganic, physical, advanced inorganic, chemistry lectures and laboratories
- Authored 30 peer-reviewed research publications
- Presented 40 research papers at regional and national chemistry conferences
- Supervised 40 undergraduate research students, 9 masters' theses, and one post-doctoral student
- Received \$300,000 in competitive research grants.
- Elected Chair of Faculty Senate (2 times)
- Elected Member of Faculty Senate (2 times)
- Member of Research Council
- Member of Graduate Council
- Member of Southern Association of Schools and Colleges Executive Committee
- Sponsor, Frater Sodalis Social Club
- Selected Chair of American Chemical Society Meeting-in-Miniature

## **Other University Experience**

### **University of California at Los Angeles**

Sabbatical: study of chemistry education calibrated peer review (CPR)

### **University of Texas at Austin**

Sabbatical: teaching and spectroscopic research.

## **Concurrent Positions-Summer**

Pepperdine University, Chemical Research Institute

Pepperdine University, London Program, Sponsor

University of Texas at Austin, Visiting Professor of Chemistry

## **EDUCATION**

Ph. D., Physical Chemistry, Illinois Institute of Technology

M. A., Inorganic Chemistry, University of Texas at Austin

B. S., Chemistry, Abilene Christian University

Post-doctoral Fellow, Case Western Reserve University

Post-doctoral Fellow, Texas A & M University

## **PROFESSIONAL MEMBERSHIPS**

American Chemical Society

American Association for the Advancement of Science

Sigma Xi Science Honor Society

American Society for Engineering Education

## **COMMUNITY ACTIVITIES**

Nashville Meals on Wheels Volunteer

Nashville Room-at-the-End Volunteer

Francis Tuttle Pre-Engineering Academy, Oklahoma City: Partner/Consultant

Central Oklahoma Habitat for Humanity: Volunteer/Coordinator

Edmond Mobile Meals: Executive Board, Planning Director

Malibu Meals on Wheels: Organizer and Coordinator

Santa Monica/Malibu Meals on Wheels: Executive Board

Meals on Wheels Plus, Abilene: President of Board/Chair Building Committee

Mayor's Task Force Abilene: Chair of Subcommittee on Hunger

Taylor County Foster Parents Association: Member, Foster Parent

## HONORS

Outstanding Professor, College of Natural and Applied Sciences, ACU  
ACU Piper Professor  
Family of the Year Award, Abilene  
Ben Hutchinson Day, Abilene TX  
Helen Pepperdine Award for Outstanding Service  
American Men and Women in Science  
Who's Who in the South and Southwest  
Oklahoma Christian University Research Consortium Award

## RECENT AND FUTURE ACADEMIC PRESENTATIONS

"Teaching Mathematics' Vocabulary Using Hands-On Activities: From an MSP Summer Institute" scheduled 10/07 Pellissippi College Math/ Science Symposium with Dr. Carroll Wells

"Chemistry for Engineers: Background and Learning," at the symposium, "First Year College Chemistry," 19th BCCE Purdue (August 3, 2006) with Dr. Sandra Dudley

"The One-Semester General Chemistry Course for Engineering Students". Southeast/61st Southwest Regional Meeting (November 3, 2005) with Dr. Sandra Dudley

"A One-semester General Chemistry Offering for Engineering Students", 231st ACS National Meeting, Atlanta, GA, March 30, 2006 with Dr. Sandra Dudley

"Titanium Dioxide as a Photocatalyst ", 2003 Oklahoma Academy of Science with Daniel Harris

"Small is Big: Nanoscience, Solar Energy, and Polluted Water: From Research Laboratory to General Chemistry Laboratory" March 2003, OC Colloquium Seminar

## RECENT FUNDED AND PENDED GRANT PROPOSALS

### Lipscomb University

Title	Principal Investigators	Amount	Date	Agency
DNA Sequencer	Hutchinson with Clinger and Lowrance	\$31,000	09 /04	LiCor
Computers and Education	Bill and Becky Tallon with Hutchinson	\$55,800	07/05	Improving Teacher Quality
SEE-Math for High School Teachers	Hutchinson with Wells and Bouldin	\$ 77,000	07/06	Math Science Partnership
SEE-Math for High School Teachers	Ben Hutchinson with Wells and Bouldin	\$ 160,000	07/07	Math Science Partnership
SEE-Math for High School Teachers	Hutchinson with Wells and Bouldin	\$ 160,000	07/08 funded	Math Science Partnership
Nature on a Budget	Klingbyll with Hutchinson	\$ 38,000	08/07	Improving Teacher Quality
SEE-Math for Middle School Teachers	Hutchinson with Wells and Bouldin	\$ 160,741 for 3 years	07/08 pending	Math Science Partnership

## Oklahoma Christian University

<b>Title</b>	<b>Principal Investigators</b>	<b>Amount</b>	<b>Date</b>	<b>Agency</b>
Teaching Mathematics Through Children's Literature	Ben Hutchinson Robert McMillan	\$23,775	3/99	OSHRE
Summer Engineering Academy	Ben Hutchinson Jeff Bigelow	\$23,614	2/99	OSHRE
Christian Education for the 21 <sup>st</sup> Century	Ben Hutchinson Dwayne VanRheenen	\$5,000	12/99	Eli Lilly
Cadaver Dissection Laboratory	Ben Hutchinson Kim Gaither	\$38,000	5/00	Oklahoma Christian alumni
Electrical Engineering EPScoR Internship	Jeremy Emack, David Compton, Lyn Nored	\$10,400	10/99	NSF thru EPScoR
Ike Summer Math Workshop	Ben Hutchinson Jason Holland	\$50,000	6/00	OSRHE
Engineering for the Next Millennium	Ben Hutchinson Jeff Bigelow	\$87,624	6/00	OSRHE
DSP for Undergraduate Labs	Ben Hutchinson David Waldo	\$71,669	6/00	NSF
HPLC	Eric Harris Ben Hutchinson	\$65,000	12/01	Agilent
Exploring Biodiversity in Oklahoma: Fossils, Fish and More	Ben Hutchinson Roger Lemmons	\$48,120	6/02	OSRHE
In Cold Blood	Molly Hill & Kim Gaither with Ben Hutchinson	\$53,850	6/02	OSHRE
Opportunity Bytes: Promoting Computer Science and Mathematics	Ben Hutchinson Jason Holland	\$28,986	2/03	OSRHE
Western Village Math	Jason Holland	\$8,000	1/02	OSRHE
Enhancing the Teaching of PASS objectives thru science/engineering competition	Ben Hutchinson with Jim Cutbirth	\$61,041	3/03	OSRHE

## NON-SCIENCE PUBLICATIONS/PRESENTATIONS

"Hunger to the Headlines," MOW Newsletter, Spring 1984.

"Hunger, Housing & Nutrition Resources in Abilene," Invited Speaker, Resource Review, Abilene Coordinating Council.

"How to Obtain Research Funds," Research, Spring 1984.

"Texas in the 21st Century: Cleaning Up After the 20th Century," Texas Committee for the Humanities--Study Group E., September 1988.

ACU Convocation Presentation, September 1989.

KACU public radio invited participant for Insights: A community information program, August 1989.

Organizer and Chair of Science Division, Christian Scholars Conference, Pepperdine University, Malibu, California, July 1988, July, 1994.

Presenter, Christian Scholars Conference, Pepperdine University, Malibu, California, July 1989, Topic: Change and Continuity in the Science, Church, and the Christian College.

"Service Learning at Oklahoma Christian University: From Western Village Elementary to Western Honduras Mountains", Proceedings of the 1st Annual Oklahoma Association of Service in Schools, November 19, 1999 at Oklahoma Christian University with Rebecca Long.

"Service-Learning in the College of Science and Engineering at Oklahoma Christian University", 2000, publication in Vocations from Baylor University

## SCIENTIFIC PUBLICATIONS

"The Infrared Spectra and Structure of Methylamine Complexes of Pt(II)," G.W. Watt, B. B. Hutchinson, and D. S. Klett, *J. Amer. Chem. Soc.*, 89, 2007 (1967).

"Infrared Spectra of Group VIB Metal Carbonyls Containing Heterocyclic Diamines," B. B. Hutchinson and K. Nakamoto, *Inorg. Chim. Acta*, 3, 591 (1969).

"Use of Metal Isotopes in Assigning Metal-Ligand Vibrations," K. Nakamoto, K. Shobatake, and B. B. Hutchinson, *Chem. Commun.*, 1451 (1969).

"The Infrared Spectra of Transition Metal Bipyridine Complexes," B. B. Hutchinson, Ph.D. Dissertation, Illinois Institute of Technology, Chicago, p. 1136, *Diss. Abr. Intern.* V. 31, pt 2 (1970).

"Use of Metal Isotopes in Assigning Metal-Ligand Vibrations. II. Triscomplexes of 2,2'-Bipyridine and 1,10-Phenanthroline," B. B. Hutchinson, J. Takemoto, and K. Nakamoto, *J. Amer. Chem. Soc.*, *92*, 3335 (1970).

"Contact Shift Studies and Spin Delocalization in Cobalt(I)-tris-(2,2'-Bipyridine) Complexes," R. J. Fitzgerald, B. B. Hutchinson, and K. Nakamoto, *Inorg. Chem.*, *9*, 2618 (1970).

"Effect of Changing Oxidation State on the Metal-Ligand Vibrations of [Cr(2,2'-bipyridyl)<sub>3</sub>]<sup>n+</sup> Type Complexes," J. Takemoto, B. B. Hutchinson, and K. Nakamoto, *Inorg. Chem.*, *9*, 2618 (1970).

"The Effect of Chelate Ring Size on Metal-Ligand Stretching Frequencies," B. B. Hutchinson and A. Sunderland, *Inorg. Chem.*, *11*, 1948 (1972).

"Infrared Studies of Coordination Compounds Containing Low Oxidation-State Metals. I. Tris-(2,2' bipyridine) and Tris-(1,10phenanthroline) Complexes," Y. Saito, J. Takemoto, B. B. Hutchinson, and K. Nakamoto, *Inorg. Chem.*, *11*, 2003 (1972).

"Effect of Magnetic Crossover on the Low-Frequency IR Spectrum of [Fe(1,10-phenanthroline)<sub>2</sub>(NCS)<sub>2</sub>]," J. Takemoto and B. B. Hutchinson, *Inorg. Nucl. Chem. Letters*, *8*, 769 (1972).

"Low Frequency Infrared Spectra of Complexes Which Exhibit Magnetic Crossover. I. Iron(II) Complexes of 1,10-Phenanthroline and 2,2' Bipyridine," J. Takemoto and B. B. Hutchinson, *Inorg. Chem.*, *12*, 705 (1973).

"Far-Infrared Spectra of Some [Fe(1,10-phenanthroline)<sub>2</sub>X<sub>2</sub> Complexes]," J. H. Takemoto, B. Streusand, and B. B. Hutchinson, *Spectrochim. Acta*, *30A*, 827 (1974).

"A Comparison of Three Assignment Techniques for Metal-Ligand Stretching Bands--A Low Frequency Infrared Study of Some Transition Metal Bis-, Tris-, and Tetrakis-Tropolonato Complexes," B. B. Hutchinson, D. Eversdyk, and S. Olbricht, *Spectrochim. Acta*, *30A*, 1605 (1974).

"Photodecomposition of Gas Phase Transition Metal Carbonyl Anions," R. C. Dunbar and B. B. Hutchinson, *J. Amer. Chem. Soc.*, *96*, 3816 (1974).

"A Low-Frequency Infrared Study of Tetranitratometallates of Manganese(II), Iron(III), Cobalt(II), Nickel(II), and Zinc(II)," B. B. Hutchinson and M. Stewart, *Spectrochim. Acta*, *30A*, 2173 (1974).

"Metal-Isotope Measurements of Iron Pentacarbonyl," B. Hutchinson, R. L. Hance, B. B. Bernard, and M. Hoffbauer, *J. Chem. Phys.*, *63*, 3694 (1975).

"Low-Frequency Infrared Spectral Assignments for Transition Metal Poly(1-Pyrazolyl)Borate Complexes," B. Hutchinson, M. Hoffbauer, and J. Takemoto, *Spectrochim. Acta*, 32A 1785 (1976).

"Metal Isotope and Temperature Effects on the Raman Spectra of Di-ironneacarbonyl,  $\text{Fe}_2(\text{CO})_9$ , and Tri-ironedodecacarbonyl,  $\text{Fe}_3(\text{CO})_{12}$ . Identification of Fe-Fe Stretching Frequencies," C. B. Cooper III, S. Onaka, D. F. Shriver, L. Daniels, R. Shipley, R. L. Hance, and B. Hutchinson, *Inorg. Chim. Acta*, L92, 24 (1977).

"High Pressure Reactions of Small Covalent Molecules. II. Synthesis of Transition-metal Carbonyls from Metal Oxides," A. P. Hagen, T. S. Miller, D. L. Terrell, B. B. Hutchinson, and R. L. Hance, *Inorg. Chem.*, 17, 1369 (1978).

"A Freshman Student Opinion Assignment: Attitudes Toward Scientists," B. Hutchinson, R. L. Hance, and D. Lewis, *J. Chem. Ed.*, 56, 110 (1979).

"Metal Isotope Shifts in the Raman Spectrum of  $\text{Mo}_2(\text{O}_2\text{CCH}_3)_4$ ," B. Hutchinson, J. Morgan, C. B. Cooper III, T. Mathey, and D. F. Shriver, *Inorg. Chem.*, 18, 2048 (1979).

"High Pressure Synthesis of Transition Metal Carbonyls," B. Hutchinson, R. L. Hance, L. Daniels, A. P. Hagen, T. S. Miller, and D. L. Terrell, *J. Chem. Ed.*, 56, 479 (1979).  
"Characterization of a High Temperature Spin Equilibrium Compound, Bis[hydror(is)pyrazol-1-yl]borate]iron(II)," B. Hutchinson, E. Henderson, P. Neill, G. Long, and L. Becker, *Chem. Commun.*, 1003 (1979).

"Facile Synthesis of  $^{57}\text{Fe}(\text{CO})_5$ ," B. Hutchinson, R. L. Hance, L. Daniels, and B. Bernard, *Synthesis and Reactivity in Inorganic and Metal-Organic Chemistry*, 10, 1 (1980).

"Iron-Nitrogen Bond Lengths in Low Spin and High-Spin Iron(II) Complexes with Polypyrazolyl Ligands," B. Hutchinson, J. D. Oliver, D. F. Mullica, and W. O. Milligan, *Inorg. Chem.* 19, 165 (1980).

"A Simple Demonstration of the Curie-Weiss Law and a SpinCrossover Compound," B. Hutchinson, R. Hance, E. Hardegree, and S. Russell, *J. Chem. Ed.*, 57,830 (1980).

"Odd-Electron Iron Carbonyl Complexes," P. J. Krusic, J. San Filippo, Jr., B. Hutchinson, R. L. Hance, and L. M. Daniels, *J. Amer. Chem. Soc.*, 103, 2129 (1981).

"A High-Pressure Mossbauer Effect Study of the Spin State in Bis[hydrotris(3,5-dimethyl-1-pyrazolyl)borate]iron(II)," G. J. Long, L. W. Becker, and B. Hutchinson, *Advances in Chemistry*, #194, American Chemical Society, 453 (1981).

"Iron-Sulfur Stretching Band Assignments in High-, Low-, and Mixed Spin Iron(III)dialkyldithiocarbamates," B. Hutchinson, P. Neill, A. Finkelstein, and J. Takemoto, *Inorg. Chem.*, 20, 2000 (1981).

"The Preparation and Characterization of Transition Metal Complexes of Cyclic Hydroxamic Acids," B. Hutchinson, S. Sample, L. Thompson, S. Olbricht, J. Crowder, D. Hurley, D. Eversdyk, D. Jett, and J. Bostick, *Inorg. Chim. Acta*, 74,29 (1983).

"Introducing Chemical History Using the Film 'The Hidden Structure'," B. Hutchinson and D. Lewis, *New England Association of Chemical Teachers Journal*, Spring-Summer (1986).

"Metal-Nitrogen Stretching Assignments in Some Metallophthalocyanines and m-oxo-(Fepthalocyanine)<sub>2</sub>," B. Hutchinson, B. Spencer, R. Thompson, and P. Neill, *Spectrochimica Acta*, 43A, 631 (1987).

"Structural and Vibrational Characteristics of the Tetrasulfatodimolybdenum Ions with Mo-Mo Bond Orders of 3.5 and 4.0," A. Bino, F. A. Cotton, S. Farquaharson, B. Hutchinson, J. Kincaid, D. Marler, and B. Spencer, *Inorg. Chim. Acta*, 133, 295 (1987).

"Spin Equilibrium in Iron(II) Poly(1-Pyrazolyl)borate Complexes: Low Temperature and High Pressure Mossbauer Spectral Studies," G. Long and B. Hutchinson, *Inorg. Chem.*, 26, 608 (1987).

"Slanging with Science," B. Hutchinson and C. Willerton, *J. Chem. Ed.*, 65 (12), 1048-49 (1988).

"Study of the High-Temperature Spin-State Crossover in the Iron(III) Pyrazolyborate Complex Fe(HB(pz)<sub>3</sub>)<sub>2</sub>," F. Grandjean, G. Long, B. Hutchinson, L. Ohlhausen, P. Neill, and D. Holcomb, *Inorg. Chem.*, 28 (1989).

"Infrared, Magnetic, and Structural Characterization of Fe(TPP)OReO<sub>3</sub>toluene," L. Ohlhausen, D. Cockrum, J. Register, K. Roberts, G. Long, and B. Hutchinson, *Inorg. Chem.* 24, 4886, 1990.

"Photocatalytic Destruction of Organic Dyes in Aqueous TiO<sub>2</sub> Suspensions Using Concentrated Simulated and Natural Solar Energy," P. Reeves; R. Ohlhausen; D. Sloan; K. Pamplin; T. Scoggins; C. Clark; B. Hutchinson; *Solar Energy*, 48, 413-420 (1992).

"A Simple, Inexpensive Device for Measuring the Critical Temperature of a High-Temperature Semiconductor." B. Hutchinson, D. Douphner, and D. Green, *J. Chem. Ed.*, 64.4, 343 (1992).

"Photocatalytic Destruction of an Organic Dye Using TiO<sub>2</sub> and Solar Energy: A General Chemistry Experiment", Kim Giglio, David Green, and Ben Hutchinson, *J. Chem. Ed.* 72. 4. 352, (1995).

"The Use of Simulated or Concentrated Natural Solar Radiation for the TiO<sub>2</sub>-Mediated Photodecomposition of Basagran, Diquat, and Diuron", Amy Kinkennon, David Green, and Ben Hutchinson, *Chemosphere*, 31(7), (1995).

## **PRESENTATIONS AT NATIONAL AND INTERNATIONAL CHEMISTRY CONFERENCES**

"Low, Frequency Infrared Spectra of Some Four-Member Chelate Ring Systems Containing Transition Metals," *Abstracts of Papers*, 163rd ACS National Meeting, INOR 66, Boston, February 1972 (with A. Sunderland).

"Vibrational Spectra of Eight-Coordinate Complexes," *Abstracts of Papers*, 165th ACS National Meeting, INOR 101, Dallas, April 1973 (with S. Olbricht).

"A Metal-Isotope Investigation of Iron Carbonyls," *Abstracts of Papers*, 170th ACS National Meeting, PHSY 100, Chicago, August 1975 (with M. Hoffbauer and B. Bernard).

"The Low-Frequency Vibrational Assignments of Polynuclear Iron Carbonyls through Metal-Isotope Substitution," *Abstracts of Papers*, 172nd ACS National Meeting, INOR 17, San Francisco, August 1976 (with M. Hoffbauer, R. Shipley, and L. Daniels).

"The Effect of Metal-Isotope Substitution on the Vibrational Spectra of Metal Carbonyls," *Abstracts of Papers*, 174th ACS National Meeting, INOR 15, Chicago, August 1977 (with R. Shipley and L. Daniels).

"Variable Temperature Magnetic Susceptibility, Infrared, and Mossbauer Data on Bis[Hydrotris(1-pyrazolyl)borate]Iron(II)," *Abstracts of Papers*, 177th ACS National Meeting, INOR 057, Hawaii, April 1979 (with G. Long).

"Spin-Crossover Systems. A Far-Infrared Investigation of Fe(III)(dialkylthiocarbamate)<sub>3</sub> Complexes," *Abstracts of Papers*, 179th ACS National Meeting, INOR 101, Houston, March 1980 (with P. Neill).

"A High Pressure Mossbauer Effect Study of the Spin State in Bis[Hydrotris 3,5-dimethyl-1-pyrazolyl]borate]Iron(II)," *Abstracts of Papers*, 179th ACS National Meeting, NUCL 101, Houston, March 1980 (with G. Long and L. W. Becker).

"The Effect of Metal Isotope Substitution on the Infrared Spectra of Some Metal Carbonyls and Their Derivatives," *Abstracts of Papers*, Second Chemical Congress of the North American Continent, INOR 134, San Francisco, August 1980.

"Intermediate Spin Systems. A Spectroscopic and Variable Temperature Magnetic Susceptibility Study of Several Iron(II) and Iron(III) Complexes Exhibiting S=1 and

S=3/2 Values, Respectively," *Abstracts of Papers*, 183rd ACS National Meeting, Las Vegas, Nevada, March 1982 (with P. Neill).

"Infrared Spectra of the Intermediate Spin Fe(octaethylporphyrin)<sub>4</sub>," *Abstracts of Papers*, Twenty-third International Conference on Coordination Chemistry, Boulder, Colorado, July-August 1984 (with S. Sample).

"Spin-State Changes in Iron-Nitrogen Containing Complexes: An Infrared Study," *Abstracts of Papers*, 1984 International Chemical Congress of Pacific Basin Societies, Honolulu, Hawaii, December 1984 (with S. Sample).

"Infrared, Magnetic, and Structural Characterization of Fe(TPP)OReO<sub>3</sub> toluene," with Hutchinson, G. Powell, L. Ohlhausen, D. Cockrum, K. Roberts, and J. Register; National ACS meeting, Dallas, Texas, April 1989.

Illustrating the Photocatalyst TiO<sub>2</sub> Using Solar Energy: An Outdoor Freshman Chemistry Experiment. August 2-6, 1992, 12th Biennial Conference on Chemical Education, University of California at Davis. (with Shelley Fennekohl, Kim Giglio, and David Green).

"Preparation, Properties, and Analysis of the 1-2-3 YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-x</sub> Superconductor in Freshman Chemistry Laboratory," 1992; 12th Biennial Conference on Chemical Education, University of California at Davis. (With D. Green).

"The Photocatalytic Degradation of Herbicides Using Titanium Dioxide and Solar Energy." National Undergraduate Research Conference, University of Utah, March, 1993. (with Amy Kinkennon and David Green).

"Photocatalytic Destruction of Aromatic- and Non-Aromatic Nitrogen Substituted Nitrogen Containing Compounds Using TiO<sub>2</sub>" 207th ACS National Meeting, San Diego, CA; March 15, 1994. (with D. Green, Greg Rechsteiner, and Ed Moore).

"Illustrating the Photocatalyst TiO<sub>2</sub> Using Solar Energy: An Outdoor Freshman Chemistry Experiment." National Undergraduate Research Conference, University of Utah, March 1993. (with Kimberly D. Giglio, Shelley Fennekohl, Amy Kinkennon and David Green).

"Photocatalytic Destruction of Aromatic and Non-Aromatic Nitrogen Substituted Nitrogen Containing Compounds Using TiO<sub>2</sub>." Southern California Conference on Undergraduate Research, October, 1994. (with David Green, Greg Rechsteiner, and Ed Moore).

## **PRESENTATIONS AT REGIONAL CHEMISTRY MEETINGS**

"Infrared Spectra of Group VI Metals Carbonyls Containing Heterocyclic Diamines," 20th Annual Mid-American Symposium on Spectroscopy, Chicago, Illinois, May 1969 (with K. Nakamoto).

"Far Infrared Spectroscopy of Transition Metal Complexes," 1972 Abilene Christian College Science/Mathematics Symposium, Abilene, Texas, February 1972.

"The Use of Metal Isotopes to Assign Metal-Ligand Stretching Bands in Transition Metal Complexes," Chemistry Seminar at North Texas State University, Denton, Texas, October 1972.

Oxidation State, Coordination Number, Spin State, and Their Effect on Metal-Ligand Bands of Coordination Compounds," 11th National Meeting of Society for Applied Spectroscopy, Dallas, Texas, September 1972.

"Stable Metal Isotopes and Their Use in Assigning Metal-Ligand Bands," ACS Local Section Meeting, Big Spring, Texas, December 1972.

"Infrared Spectroscopy of Metal Complexes Containing Cyclic Hydroxamic Acids," ACS Meeting-in-Miniature, SMU, Dallas, Texas, April 1973 (with S. Olbricht).

"An Infrared Study of Some Molybdenum Chelates," ACS Meeting-in-Miniature, SMU, Dallas, Texas, April 1973 (with D. Beaver).

"Low Frequency Infrared Spectra of Iron Complexes with Hydrotis(1Pyraz<sup>1</sup>olyl)Borate Ligands Exhibiting High and Low Spin States," Southwest Regional Meeting, El Paso, Texas, December 1973 (with J. Takemoto).

"Studies of Metal Complexes of 3-Amino-4-dihydro-1-hydroxycarbostyryl," ACS Meeting-in-Miniature, Abilene Christian University, Abilene, Texas, April 1974 (with J. Bostick).

"Assignment of the Vibrational Spectra of Metal Complexes," Invited Lecture, University of Texas at Arlington, Arlington, Texas, November 1974.

"Vibrational Assignments for Iron Pentacarbonyl Through Iron Isotope Substitution," ACS Meeting-in-Miniature, Texas Wesleyan University, Fort Worth, Texas, April 1975 (with M. Hoffbauer).

"Transition Metal Complexes of N-Hydroxoxindole," ACS Meeting-in-Miniature, University of Texas at Dallas, Dallas, Texas, April 1975 (with S. Sample).

"Understanding the Far-Infrared Spectra of Metal Complexes Employing Metal Isotopes," Chemistry Seminar at Texas Christian University, Fort Worth, Texas, November 1975.

"The Assignment of the Vibrational Spectra of Transition Metal Complexes," Invited Lecture, Texas Christian University, Fort Worth, Texas, November 1976.

"Low-Frequency Assignments of Metal Carbonyls Containing Metal-Metal Bonds," Southwest Regional Meeting, Fort Worth, Texas, December 1976 (with R. Shipley and L. Daniels).

"A Metal Isotope Study of Iron, Nickel, and Molybdenum Carbonyls," ACS Meeting-in-Miniature, East Texas State University, Commerce, Texas, April 1977 (with L. Daniels).

"Some Transition Metal Complexes of Two Cyclic Hydroxamic Acids," ACS Meeting-in-Miniature, East Texas State University, Commerce, Texas, April 1977 (with L. Thompson).

"An Infrared Study of an Intermediate Spin Iron(II) Complex," ACS Meeting-in-Miniature, East Texas State University, Commerce, Texas, April 1977 (with P. Thomas).

"The Low Frequency Vibrational Assignment of Diiron Nonacarbonyl Through Metal-Isotope Substitution," ACS Meeting-in-Miniature, East Texas State University, Commerce, Texas, April 1977 (with R. Shipley).

"The Use of Metal Isotopes in Assigning the Vibrational Spectra of Metal Carbonyl Complexes," ACS Meeting-in-Miniature, Midwestern State University, Wichita Falls, Texas, April 1978 (with R. Hance and L. Daniels).

"A Spectroscopic Study of a Thermochromic Complex, Bis-hydrotris-1-pyrazolyborateiron(II)," ACS Meeting-in-Miniature, Texas Wesleyan University, Fort Worth, Texas, April 1979 (with L. Daniels).

"Variable-Temperature Magnetic Susceptibility of Bis-Hydrotris(1-Pyrazolyl)Borate Iron(II): A Novel Spin-Equilibrium Compound," ACS Meeting-in-Miniature, Texas Wesleyan University, Fort Worth, Texas, April 1979 (with P. Neill).

"The Assignment of Metal-Ligand Stretching Bands in Transition Metal Complexes Using Stable Metal Isotopes," University of Texas Analytical Seminar, Austin, Texas, November 1979.

"The Infrared and Raman Spectra of Dimolybdenumtetraacetate," University of Texas Electron Diffraction Seminar, Austin, Texas, March 1981.

"The Infrared Spectroscopy of Iron(II) and Iron(III) Intermediate-Spin Complexes," ACS Meeting-in-Miniature, Texas Women's University, Denton, Texas, April 1981 (with P. Neill).

"Metal Isotope Substitution Technique for Assigning Metal-Ligand Stretching Bands in Transition Metal Complexes," Baylor University Chemistry Seminar, Waco, Texas, March 1982.

"Metal-Nitrogen Stretching Bands in Metallophthalocyanines," ACS Meeting-in-Miniature, SMU, Dallas, Texas, April 1983 (with R. Thompson).

"Infrared Spectra of an Iron Crossover System,  $\text{Fe}[\text{HB}(\text{pyrazolyl})_3]_2$ ," Undergraduate Research Symposium, Texas A & M University, College Station, Texas, March 1984 (with M. Huebner).

"Infrared Spectra of an Iron Crossover System,  $\text{Fe}[\text{HB}(\text{pyrazolyl})_3]_2$ ," ACS Meeting-in-Miniature, University of Texas at Dallas, Dallas, Texas, April 1984 (with M. Huebner).

"Any Movement in the Trenches? The Role of Inorganic Chemistry at Smaller Universities," Southwest Regional ACS, Lubbock, Texas, December 1984.

"The Wide World of Spectroscopy," Invited Presentation, Saturday Science Series, Texas Tech University, Lubbock, Texas, March 1985.

"Variable Temperature Studies of Bis[Hydrotris(Pyrazol-yl)Borate]Iron(II)," ACS Meeting-in-Miniature, North Texas State University, Denton, Texas, April 1985 (with J. D. Holcomb).

"Infrared Diffuse Reflectance Spectroscopy: Adsorbates on Molybdenum Trioxide," ACS Meeting-in-Miniature, North Texas State University, Denton, Texas, April 1985 (with B. Spencer).

"Infrared Spectroscopy of the Biological Model Compound  $\text{Fe}(\text{octaethylporphyrin})\text{ClO}_4$ ," ACS Meeting-in-Miniature, North Texas State University, Denton, Texas, April 1985 (with J. Register).

"An Investigation of Adsorbates on Molybdenum Trioxide Using Infrared Diffuse Reflectance Spectroscopy," ACS Meeting-in-Miniature, East Texas State University, Commerce, Texas, April 1986 (with B. Spencer).

"Infrared Spectroscopy of  $\text{Fe}(\text{octaethylporphyrin})$ - and  $\text{Fe}(\text{tetraphenylporphyrin})$ -oxyanion Compounds," ACS Meeting-in-Miniature, East Texas State University, Commerce, Texas, April 1986 (with J. Register).

"Characterization of Transition Metal Phthalocyanines and m-oxo(Fe<sub>2</sub>PC)<sub>2</sub> Using Infrared Spectra," First University of Texas Forum on Inorganic Chemistry, May 1986, Poster Session (with B. Spencer).

"Infrared Spectroscopy of Fe(octaethylporphyrin)- and Fe(tetraphenylporphyrin)-oxyanion Compounds," First University of Texas Forum on Inorganic Chemistry, Austin, Texas, May 1986 (with J. Register).

"Spin Crossover Studies of Bis(Hydrotris(Pyrazol-1-yl)Borate)Iron(II) Using Variable Temperature Infrared Spectroscopy, Differential Scanning Calorimetry and Magnetic Susceptibility," First University of Texas Forum on Inorganic Chemistry, Austin, Texas, May 1986 (with L. Ohlhausen and D. Holcomb).

"Teaching Inorganic Chemistry," Invited Lecture, First University of Texas Inorganic Forum, Austin, Texas, May 1986.

"What College Teachers Expect," Panelist, First Welch Conference on High School Chemistry Teachers, May 1987, Workshop, UT Austin.

"Differential Scanning Calorimetry and Magnetic Susceptibility Studies of the Spin-Crossover in Bis-(Hydrotris(1pyrazolyl)Borate)Iron(II)," University of Texas Physical Chemistry Symposium, 1987 (with L. Ohlhausen).

"Magnetic Susceptibility, X-Ray Crystal Diffraction, and Infrared Studies of Perrhenate Iron(III) Porphyrin Complexes," Meeting-in-Miniature, University of Texas at Arlington, April 1988, 1st Place Undergraduate (with L. Ohlhausen).

"Texas in the 21st Century: Cleaning Up After the 20th Century," Presentation at Futurism Honors Colloquium, April 1988.

"History, Synthesis, Structure, & Reactions of the Boranes," Region I Alpha Chi Convention, Presentation by L. Ohlhausen, Texas Lutheran College, April 1988 (with L. Ohlhausen).

Invited Participant on "Celebrity" Panel at First Biennial ACT<sub>2</sub>-Welch Conference for Texas Chemistry Teachers at the University of Dallas, June, 1989, Topic: What do Texas Higher Education Institutions Want from Texas High School Chemistry Courses?

"Photocatalytic Decomposition of Organic Waste", Pepperdine University Science Seminar (1991).

"Filling the Pipeline from the Bottom--Helping Elementary School Teachers Teach Science More Effectively," New Orleans Regional ACS Meeting, December 1990, Division of Chemical Education (with Perry Reeves).

"Photocatalytic Destruction of Toxic Organic Compounds in Aqueous Solution," New Orleans Regional ACS Meeting, December 1990, Organic Chemistry Division, December 1990 (with C. Clark, K. Pamplin, T. Scoggins, D. Sloan, and R. Ohlhausen).

"Photocatalytic Destruction of an Organic Dye Using  $TiO_2$ ", National Educators Workshop, Gaithersburg, Maryland, Nov 7, 1994.

"Revitalizing Introductory Chemistry" 1995 PKAL Workshop, Hendrix College, Conway, Arkansas, October 27, 1995 (with D. Green).

"The Use of Solar Radiation and Titanium Dioxide to Decompose Organic Wastes in Water," February 9, 1996, Los Angeles, 1996 Faculty Conference, Pepperdine University.

"General Chemistry Discovery Experiment involving a Photocatalyst Initiated by Sunlight", 223<sup>rd</sup> National ACS Meeting, April 10, 2002 Orlando (with Jon Hunt)

"NanoScience, Solar Energy and Polluted Water: From The Research Laboratory to the General Chemistry Laboratory," March 2002, submitted to the OC Colloquium Seminar Competition.

"Introducing Analytical Chemistry Techniques in General Chemistry: A Solar Energy Project" Laboratory, Oklahoma Pentasectional ACS Meeting, March 9, 2002 (with Jon Hunt)

"The Production of Nanocrystalline Titanium Dioxide", 2003 Oklahoma Academy of Science (with Jared Kennedy)