

## CURRICULUM VITAE

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### AREAS OF SPECIALIZATION

Magnetic Resonance (NMR & ESR) - imaging, spectroscopy, spin relaxation, and hardware  
Imaging Science - classification, segmentation, and imaging system analysis  
Physical Chemistry - quantum mechanics and kinetics  
Analytical Chemistry - spectroscopy and scientific instrumentation  
Scientific Publishing - web and hardcopy

### EDUCATION

B.S. (Honors)	Chemistry	Utica College of Syracuse University, Utica, NY
M.S.	Physical Chemistry	Purdue University, W. Lafayette, IN
Ph.D.	Chemistry	University of Notre Dame, Notre Dame, IN
Post Doc.	ESR Spectroscopy	Cornell University, Ithaca, NY

### WORK EXPERIENCE

#### Current Appointments:

1993-Present **Professor with Tenure**, Departments of Chemistry, Materials Science & Engineering, and Imaging Science, RIT, Rochester, NY

2010-Present **Director, Chemistry Master's of Science Program**, RIT, Rochester NY

2013-Present **Chairman, RIT Graduate Council**, RIT, Rochester NY

#### Previous Appointments:

2009 **Adjunct Professor**, Henan Univeristy, Kaifend, Henan, China

2005 **Guest Researcher**, Leibniz Institut für Polymerforschung, Dresden, Germany

2001 **Visiting Professor**, Consiglio Nazionale delle Ricerche (CNR) - Centro per la Medicina Nucleare, Universita degli Studi di Napoli - Federico II, Naples, Italy

2000-2010 **Principal Investigator**, New York State Center for Emerging and Innovative Sciences, Rochester, NY

1999-2003 **Advisory Board**, Imaging Science Initiative, Pacific NW National Laboratory, Pasco, WA

1997-2002 **Editor-in-Chief**, Encyclopedia of Imaging Science and Technology, John Wiley & Sons, Hoboken, NJ

1992-2002 **Adjunct Associate Professor**, Radiology Department, University of Rochester (UR) Medical School, Rochester, NY

1991-1993 **Associate Professor** of Imaging Science and Materials Science, RIT

1990, 1992 **Visiting Professor**, Radiology Department, University of Birmingham, Birmingham, AL

1989-1991 **Wiedman Professor of Imaging Science**, RIT, Rochester, NY

1988-1993 **Associate Professor**, Chemistry Department, RIT, Rochester, NY  
1982-1985 **Visiting/Adjunct Assistant Professor**, Biophysics Department, UR, Rochester, NY  
1985 **Visiting Scientist**, Department of Chemistry, Cornell University, Ithaca, NY  
1984-1988 **Assistant Professor**, Chemistry Department, RIT, Rochester, NY  
1982-1984 **Post Doctoral Associate**, Chemistry Department, Cornell University, Ithaca, NY  
1978-1982 **Graduate Research Assistant**, Chemistry Department, University of Notre Dame, South Bend, IN

### Honors, Awards, and Recognition

1. Dean's Summer Research Fellow, 1985, 1987, and 1988, RIT College of Science.
2. Wiedman Professor of Medical Imaging, 1989-1991, RIT Center for Imaging Science.
3. Member of Rochester Chapter of Sigma Xi, 1985-Present.
4. Honor Society of Phi Kappa Phi, 1990-Present.
5. Invited Keynote Speaker, Annual Meeting of The American Association for Clinical Chemistry, Anaheim, CA, July 1995.
6. Editor-in-Chief of the John Wiley & Sons, Inc. Encyclopedia of Imaging Science and Technology, New York, NY, 1997-2002.
7. Royal Society of Chemistry's Choice Award for *The Basics of NMR*, 1999.
8. Advanced Chemistry Development Labs Star Pick Educators' Award for the hypertext book *The Basics of NMR*, July 2000.
9. Association of American Publishers Professional and Scholarly Award for Multivolume Science Reference work: *The Encyclopedia of Imaging Science and Technology*, 2002.
10. Invited Plenary lecture at the GIDRM XXXVI Italian National Congress on NMR, Vietri sul Mare, Salerno, Italy, September 2006.
11. Google Rating of 2<sup>nd</sup> in 21,000,000 for Magnetic Resonance Imaging, *The Basics of MRI*, 2007.
12. Google Rating of 2<sup>nd</sup> in 25,100,100 for Nuclear Magnetic Resonance, *The Basics of NMR*, 2007.
13. Invited Keynote Speaker at the meeting of the CT/MRI Society of the American College of Veterinary Medicine, Chicago, IL, November 2007.
14. RIT Trustees Faculty Scholarship Award, 2010.
15. RIT Million Dollar PI Club, 2014.

### TEACHING EXPERIENCE

#### Courses Developed at RIT:

1. Basics of Pulsed NMR (1014-740) - A one credit hour graduate course designed to introduce the basics of pulsed or Fourier Transform NMR spectroscopy, including basic pulse sequences, experimental techniques, and physical and spectral measurements. The course provides students with an understanding of the workings and theory of a modern day NMR spectrometer when a spectrum is acquired. The course also serves as an introduction to other advanced magnetic resonance courses such as Magnetic Resonance Imaging (1014-730) and Principles of Magnetic Resonance (1014-747).
2. Magnetic Resonance Imaging (1014-730) - An introduction to the principles of magnetic resonance imaging (MRI). The course covers spin physics, Fourier transforms, basic imaging principles, Fourier imaging, imaging hardware, imaging techniques, image processing, image artifacts, safety and advanced imaging techniques.
3. Building Scientific Apparatus Lecture (1008-620) - Basic skills associated with the construction of scientific laboratory apparatus, some of which is not commercially available are covered: machine shop skills, working with glass, vacuum technology, optics and electronics. Special emphasis on function-structure relationship between an instrument and its intended use. Several references on construction techniques are provided, and information about current manufacturers and suppliers of necessary components is given.
4. Building Scientific Apparatus Laboratory (1018-621) - Basic skills associated with the construction of scientific laboratory apparatus, some of which is not commercially available, are covered:

machine shop skills, working with glass, vacuum line technology, optical spectrometer design and instrument electronics.

5. Graduate Chemical Writing (CHEM-670) - Basic skills writing skills needed by chemists.

#### **Undergraduate Courses Taught at RIT:**

1. General Chemistry Lecture and Laboratory, Department of Chemistry
2. Scientific Glassblowing, Department of Chemistry
3. Undergraduate Chemical Research, Department of Chemistry
4. Instrumental Methods of Analysis Lecture and Laboratory, Department of Chemistry
5. Spectroscopy, Department of Chemistry
6. Quantum Mechanics Laboratory, Department of Chemistry
7. Kinetics Lecture and Laboratory, Department of Chemistry
8. Chemical Separations Laboratory, Department of Chemistry
9. Technical Communication & Research Practices, Imaging Science Department
10. Senior Research, Imaging Science Department
11. Magnetic Resonance Imaging, Medical Science Department

#### **Graduate Courses Taught at RIT:**

1. Instrumental Methods of Analysis Lecture and Laboratory, Department of Chemistry
2. Magnetic Resonance Imaging, Department of Chemistry and Imaging Science
3. The Basics of Pulsed NMR, Department of Chemistry
4. Principals of Magnetic Resonance, Departments of Chemistry and Imaging Science
5. Graduate Research, Department of Chemistry
6. Graduate Research, Imaging Science Department
7. Graduate Chemical Writing, Chemistry MS Program
8. Chemistry Seminar, Chemistry MS Program

#### **Other Teaching Experience:**

1. General Chemistry Laboratory, Mohawk Valley Community College, Utica, NY.
2. General Chemistry Laboratory and Recitation, Purdue University, West Lafayette, IN.

#### **CONSULTING**

1. VirtuaScopics, Inc. Pittsford, NY, MRI Quality Control.
2. INVIVO Corp., Gainesville, FL, Phantom Filler Materials.
3. Biophan Technologies, Inc., Henrietta, NY, MRI Compatible Devices.
4. Eastman Kodak Company, Rochester, NY, MRI of Materials.
5. ConverTec Corporation, Newtown, PA. Non destructive testing apparatus.
6. ChevronTexaco, TX, NMR Trace Analysis of Organics in Sea Water.
7. Bausch & Lomb, Rochester, NY, Magnetic Resonance Imaging of Materials.
8. Coudert Brothers, New York, NY, Technical Advice on MRI Litigation.
9. Critical Solutions International, Inc., Dallas, TX, Nuclear Quadruple Resonance.
10. Teradyne, Inc., North Reading, MA, MRI Hardware.
11. Qmetrics, Rochester, NY, Phantom Filler Materials.

#### **RESEARCH INTERESTS**

1. Low Frequency Electron Paramagnetic Resonance (LFEPR) Spectroscopy of Studying Objects with Cultural Heritage Significance.  
LFEPR spectroscopy is a form of electron paramagnetic resonance (EPR) spectroscopy. Unlike conventional EPR which can only examine objects less than  $\sim 125 \text{ mm}^3$ , LFEPR can examine objects of several liters in volume. Because of the size limitation of EPR, EPR of objects with cultural heritage significance is limited to shards or a sample of a larger object removed in the least invasive and destructive manner. Because LFEPR spectroscopy can accommodate much larger objects, it can be used to study intact large objects non invasively and non destructively. We are examining the LFEPR signals from paramagnetic transition metal ions and stable free radicals in the ceramics, marble, pigments, and glazes associated with cultural heritage objects.

These signals may be able to tell the origin of the ceramic or marble object as well as the age of ceramic objects based on the firing temperature. [See publication: 47]

## 2. Sub-Surface MRI

Millions of dollars are lost annually due to utility strikes during construction related excavation. Ground penetrating radar (GPR) is the most widely used geophysical imaging tool to locate buried utilities, however, its performance in high water content, high conductivity soils is limited. Magnetic resonance imaging (MRI) may hold promise as a near-surface imaging modality in those conditions where GPR fails. An MRI based technique would produce images of voids from buried anthropogenic objects in a signal rich background from water in the soil. We are experimenting with various methods for unilateral MRI. One method, called the rastered projection method, has been used to build a 1/30 scale prototype. We are also studying the NMR signal from various synthetic and natural sands to predict the magnetic resonance signal from fully hydrated soils. [See publications: 34, 35, 37, 38, 39, 41, 44, 45]

## 3. MRI Phantoms and Quality Control

Phantoms are anthropogenic objects used to test the performance of an MRI system. Phantoms are filled with an NMR signal bearing material with specific spatial and spectral characteristics. We have developed unique phantoms to measure the  $B_0$  and RF field homogeneity, fat suppression sequence efficiency, gradient linearity, resolution, point spread function, and the minimum detectable signal change. The unique homogeneity phantom design minimizes the standing wave and conductivity artifacts. The resolution phantom can measure can determine the point spread function, resolution, and gradient linearity at multiple locations in a three-dimensional space without the need to reposition the phantom. The fat suppression phantom is composed of a biologically inert and chemically stable material. The NMR signal from the minimum detectable signal phantom can be switched between levels by the application of an electric field. [See publications: 18, 27, 28, 40, 43, 46, 48]

## 4. Targeted MRI Contrast Agents

Targeted contrast agents are molecules or complexes that change their relaxivity on exposure to another substance. A gadodiamide solution was determined to be a targeted contrast agent for  $\text{Cu}^{+2}$ , changing its relaxivity of 4080 in the absence of  $\text{Cu}^+$  to  $12030 \text{ s}^{-1}\text{M}^{-1}$  in the presence of  $\text{Cu}^+$ . We are currently investigating the sensitivity of this contrast agent to other metal ions.

## 5. Multispectral tissue classification and segmentation using $R_1$ , $R_2$ , $\rho$ , $\delta$ , and PCA

Several studies were undertaken to determine if normal tissues and pathology could be identified and segmented in magnetic resonance images using calculated spin-lattice relaxation rate ( $R_1$ ), spin-spin relaxation rate ( $R_2$ ), spin density ( $\rho$ ), and chemical shift ( $\delta$ ) images. Normal tissues of the brain could easily be segmented with calculated  $R_1$ ,  $R_2$ , and  $\rho$  images. Some breast pathology could be identified with the same images. Muscle, adipose tissue, and bone could be readily identified and segmented with chemical shift imaging ( $\delta$ ). Principal component analysis (PCA) proved to be another viable way for segmenting normal tissues of the brain. [See publications: 19, 21, 22, 23, 26, 29, 30, 43, 45]

## 6. High-Efficiency Transmit and Receive RF Coils for MRI of Extremities.

The single-turn solenoid (STS), a class of transmit and receive magnetic resonance imaging coil was developed for imaging extremities on clinical and specimens on research MRI systems. STS coils were developed for imaging a finger, hand, wrist, forearm, shoulder, head, breast(s), testicles, knee, ankle, and foot. The STS produces images with a very favorable signal-to-noise ratio with a fraction of the power necessary for other coils. One design called the asymmetric STS is capable of creating a 90 degree RF pulse with only 130 mW compared to hundreds of Watts needed from other coils. [See publications: 9, 10, 11, 13, 14, 15, 25]

## 7. Magnetic Resonance Imaging of Materials.

MRI has been used extensively in medicine but to a lesser extent for the study of materials. We are exploring new applications of MRI and ESR in Materials Science and Engineering. [See publication: 36]

8. Low Frequency Electron Spin Resonance (LFESR)

LFESR has two major advantages over conventional electron spin resonance (ESR) operating at 9 GHz. LFESR can accommodate larger samples and avoids the dielectric heating associated with conventional ESR in lossy samples. We have developed a LFESR operating at 300 MHz suitable for studying the clays, glazes, and pigments used in ceramics. The technique holds promise for non invasively and non destructively examining the authenticity of objects with cultural heritage significance. [See publications: 20, 24]

## FELLOWSHIPS AND GRANTS

### Support Received:

1. 1.5T MRI Imaging Time, UR Medical Center and Ide Radiology, 1985-1989, 200 Hours, Value \$100,000.
2. Teaching MRI Using Computer Animation. RIT Productivity Grant, 1987-1988, \$11,690.
3. Modeling of RF Magnetic Fields in MRI Resonators. IBM RSP, 1988-1989, \$26,900.
4. Development of Low Field ESR Spectroscopy as an Analytical Technique. RIT College of Science Project Initiation Grant, 1989, \$5,300.
5. 200 MHz NMR Spectrometer. Eastman Kodak Company, 1989, valued at \$200,000.
6. Teaching NMR Using Computer Animation. RIT Productivity Grant, 1989-1990, \$17,000.
7.  $T_1$ - $\rho$  Correlations in MR Breast Images. University of Rochester Magnetic Resonance Center, GE Signa Magnetic Resonance Imaging Time, 1990-1991, \$5,400.
8. NMR Imaging of Gelatin. Eastman Kodak Company, 1990, \$500.
9. NMR Computer Instrumentation. Eastman Kodak Company, 1990-1991, \$30,000.
10. Volume Rendering Algorithms for the Hippocampus. University of Rochester Radiology Dept., 1990-1991, \$12,000.
11. ESR Imaging without DC Magnetic Field Gradients. NSF, 1991-1992, \$44,419.
12. The Value of MRI and the Use of Gd Contrast in Pre-Operative Evaluation of Patients with Partial Epilepsy. (M.J. Berg, P.I.) University of Rochester, 1991-1992, \$17,000.
13. Purchase of a Data System Upgrade for an NMR Spectrometer. NSF, 1991-1992, \$27,333.
14. NMR and ESR Studies of Diffusion in Gelatin. Eastman Kodak Company, 1991-1992, \$10,000.
15. Multispectral Tissue Classification of Brain Pathology. RIT COS PI Grant, 1992, \$5000.
16. Computer Based Teaching Package on MRI. RIT Productivity Grant, 1993-1994, \$15,000.
17. MRI Phantom Design. General Electric Medical Systems, 1993-1994, \$29,000.
18. Physical & Chemical Properties of Macromolecules, (T. Gennett, P.I.) NSF REU, 1995-1997, \$149,500.
19. Use of FT NMR in the Undergraduate Chemistry Laboratory, NSF, 1995-1997, \$100,000; RIT match, \$200,000.
20. Imaging of Water in Photographic Paper. Eastman Kodak Company, 1997-1999, \$4,000.
21. 1.5T MRI Imaging Time, UR Medical Center and University Medical Imaging, 1990-1999, 400 Hours, Value \$200,000.
22. Imaging the NMR Signal from Water in Topsoil, Vermeer Mfg. Co., 2000-2001, \$190,320.
23. NMR Detection of Low Concentrations of Oil-in-Water, Chevron, 2001, \$6,000.
24. Tissue Classification using  $R_1$ ,  $R_2$ , and  $\rho$  Images, Consiglio Nazionale delle Ricerche (CNR) International Short Term Mobility Program, and Centro di Medicina Nucleare, Università degli Studi di Napoli Federico II, May-June 2001, £25,000,000.
25. Subsurface MRI for Locating Utilities, NYSTAR, 2001-2002, \$5,000.
26. US ARMY Red Team, Critical Solutions International, 2002, \$6,033.
27. NMR Detection of Low Concentrations of Oil in Flowing Water, Chevron, 2003, \$45,000.
28. Daniel Pasto Undergraduate Fellowship, RIT Chemistry, S.L. Ianapolo, 2004, \$3,000.
29. Magnetic Resonance Imaging of Materials, Bausch & Lomb, 2004, \$27,227
30. Fast Micro MRI, Leibniz Institute for Polymer Research, Dresden, Germany, 2005, €45,000

31. Lithographic RF Coil Design Study for a Sub-Surface MRI System, RIT CIS-Kodak New Collaboration Research Grant, 2005, \$6,000.
32. Penetration depth study for a Sub-Surface MRI System, RIT CIS Innovative Graduate Student Grant, 2005, \$4,200.
33. Quantitative MRI: System Performance Testing CEIS/NYSTAR CAT, 2006-2007, \$9,000
34. Quantitative MRI: System Performance Testing, VirtualScopics, 2006-2007, \$21,020
35. Magnetic Resonance Synthetic Image Generator, (M. Helguera, P.I.), CEIS/NYSTAR CAT, 2006-2007, \$11,000.
36. Magnetic Resonance Synthetic Image Generator, (M. Helguera, P.I.), VirtualScopics, 2006-2007, \$22,000.
37. MRI Phantom Filler Materials: Exploratory Phase, INVIVO Corp., 2006, \$9,600.
38. Development of MRI Phantom Filler Materials, INVIVO Corp., 2007, \$60,000.
39. A Study of the Magnetic Resonance Properties of a Gadolinium-Copper MRI Phantom, RIT College of Science Undergraduate Summer Research Grant, 2007, \$3000.
40. Quantitative MRI: A 3D Resolution Phantom, RIT CIS-Kodak Research Grants, 2007, \$5,000.
41. The Structure of the Component of a Mixture of Cu Plus Gd(DTPA-BMA), RIT College of Science Undergraduate Summer Research Grant, 2008, \$3000.
42. An NMR Study of the Interaction of Metal Ions with Gd(DTPA-BMA), RIT College of Science Undergraduate Summer Research Grant, 2008, \$3000.
43. EXAFS Study of Aqueous Gadodiamide-Copper Sulfate Solution, CHESS, Cornell University, Ithaca, NY, 2008, 48 Hrs of C1 beam time.
44. Operator Assisted 1.5T MRI Imaging Time, UR Medical Center and University Medical Imaging, 2000-2008, 20 Hours, Value \$20,000.
45. Plum Pox Virus Screening Laboratory. USDA, 2012, \$629,116.
46. Development of a  $T_1, T_2, T_1-\rho$  Phantom for MRI. VirtualScopics, 2012, \$10,000.
47. Development of Low Frequency Electron Paramagnetic Resonance Spectroscopy for Studying Objects with Cultural Heritage Significance. RIT College of Science DRIG, 2015, \$15,000.
48. Development of an assessment plan for the new MS Chemistry Curriculum. RIT, 2015, \$1,250.

## PUBLICATIONS

### Peer-Reviewed Scientific Journal Articles:

1. R.W. Fessenden, J.P. Hornak, B. Venkataraman, Electron Spin-Lattice Relaxation Times of Transient Free Radicals, *J. Chem. Phys.* **74**:3694-3704 (1981).
2. D. Behar, R.W. Fessenden, J.P. Hornak, ESR and Pulse Radiolysis Investigation of the Radiolysis of Sodium Vinyl Sulfonate, *Radiat. Phys. Chem.* **20**:267-273 (1982).
3. J.P. Hornak, Spin Relaxation Times and Chemically Induced Dynamic Electron Spin Polarization of Transient Free Radicals, Ph.D. Thesis, University of Notre Dame, 1982, University Microfilms, Ann Arbor, MI.
4. J.P. Hornak, J.H. Freed, ELDOR Spin-Echoes and Slow Motions, *Chem. Phys. Lett.* **101**:115-119 (1983).
5. J.P. Hornak, J.H. Freed, Electron Spin Echoes with a Loop-Gap Resonator, *J. Magn. Reson.* **62**:311-313 (1985).
6. P.G. Barkley, J.P. Hornak, J.H. Freed, Surface-Suppressed Electron Spin Resonance Spectroscopies, *J. Chem. Phys.* **84**:1886-1900 (1985).
7. J.P. Hornak, J.K. Moscicki, D.J. Schneider, J.H. Freed, Diffusion Coefficients in Anisotropic Fluids by ESR Imaging of Concentration Profiles, *J. Chem. Phys.* **84**:3387-3395 (1986).
8. J.P. Hornak, J.H. Freed, Spectral Rotation in Pulsed ESR Spectroscopy, *J. Magn. Reson.* **67**:501-518 (1986).
9. J.P. Hornak, T.L. Ceckler, R.G. Bryant, Phosphorous-31 NMR Spectroscopy Using a Loop-Gap Resonator, *J. Magn. Reson.* **68**:319-322 (1986).
10. J.P. Hornak, J. Szumowski, D. Rubens, J. Janus, R.G. Bryant, Breast MR Imaging With Loop-Gap Resonators, *Radiology* **161**:832-834 (1986).
11. J.P. Hornak, J. Szumowski, R.G. Bryant, Elementary Single Turn Solenoids Used as the Transmitter and Receiver in Magnetic Resonance Imaging, *Magn. Res. Imag.* **5**:233-237 (1987).

12. T.L. Ceckler, R.G. Bryant, J.P. Hornak, Noise Reduction in Wide Bore Magnets Using a Patient Cage, *Magn. Reson. Med.* **5**:173-174 (1987).
13. J.P. Hornak, J. Szumowski, R.G. Bryant, Magnetic Field Mapping, *Magn. Reson. Med.* **6**:158-163 (1988).
14. J.P. Hornak, E. Marshall, J. Szumowski, R.G. Bryant, MRI of Extremities Using Perforated Single Turn Solenoids, *Magn. Reson. Med.* **7**:442-448 (1988).
15. E.A. Marshall, J.J. Listinsky, T.L. Ceckler, J. Szumowski, R.G. Bryant, J.P. Hornak, Magnetic Resonance Imaging Using a Ribbonator: Hand and Wrist, *Magn. Reson. Med.* **9**:369-378 (1989).
16. D.S. Browne, P.E. Ellsworth, J.P. Hornak, Teaching MRI Using Computer Animation, *J. Chem. Ed.* **66**:647-648 (1989).
17. S. Totterman, S.L. Weiss, J. Szumowski, R.W. Katzberg, J.P. Hornak, H.M. Proskin, J. Eisen, MR Fat Suppression Technique in the Evaluation Of Normal Structures Of The Knee, *J. Comput. Assist. Tomogr.* **13**:473-479 (1989).
18. J.P. Hornak, A.C. Smith, J. Szumowski, Relaxation Time Studies by CSI - Phantom Studies, *Magn. Reson. Med.* **13**:398-406 (1990).
19. J.P. Hornak, A. Blaakman, D. Rubens, S. Totterman, Multispectral Image Segmentation of Breast Pathology, *SPIE Image Processing* **1445**:523-533 (1991).
20. J.P. Hornak, M. Spacher, R.G. Bryant, A Modular Low Frequency ESR Spectrometer, *Meas. Sci. Technol.* **2**:520-522 (1991).
21. J. Gong, J.P. Hornak, A Fast T<sub>1</sub> Algorithm, *Magn. Reson. Imag.* **10**:623-626 (1992).
22. Y. Chen, E.R. Dougherty, S.M. Totterman, J.P. Hornak, Classification of Trabecular Structure in Magnetic Resonance Images Based on Morphological Granulometries, *Magn. Reson. Med.* **29**:358-370 (1993).
23. L.M. Fletcher, J.B. Barsotti, J.P. Hornak, A Multispectral Analysis of Brain Tissues, *Magn. Reson. Med.* **29**:623-630, (1993).
24. E. Szczepaniak, J.P. Hornak, ESR Imaging Based on the Modulation Field Phase, *J. Magn. Reson.* **104A**:315-320 (1993).
25. S.D. Szeglowski, J.P. Hornak, Asymmetric Single-Turn Solenoid for MRI of the Wrist, *Magn. Reson. Med.* **30**:750-753 (1993).
26. X. Li, J.P. Hornak, Accurate Determination of T<sub>2</sub> Images in MRI, *Imaging Science and Technology* **38**:154-157 (1993).
27. J.E. Roe, W.E. Prentice, J.P. Hornak, A Multipurpose MRI Phantom Based on a Reverse Micelle Solution, *Magn. Reson. Med.* **35**:136-141(1996).
28. J.E. Roe, D.D. Ramanan, J.P. Hornak, M. Kotlarchyk, Applications of Dense Microemulsions to Magnetic Resonance Imaging. *Physica A* **231**:359-367 (1996).
29. W. Windig, B. Antalek, J.P. Hornak, Multivariate Image Analysis of Magnetic Resonance Images with the Direct Exponential Curve Resolution Algorithm (DECRA). Part 1: Algorithm and Model Study. *J. Magn. Reson.* **132**:298-306 (1998).
30. B. Antalek, J.P. Hornak, W. Windig, Multivariate Image Analysis of Magnetic Resonance Images with the Direct Exponential Curve Resolution Algorithm (DECRA). Part 2: Application to Human Brain Images. *J. Magn. Reson.* **132**:307-315 (1998).
31. L.J. Schwartz, C.L. DeCiantis, S. Chapman, B.K. Kelley, J.P. Hornak, Motions of Water, Decane, and AOT in Reverse Micelle Solutions. *Langmuir* **15**:5461-5466 (1999).
32. J.P. Hornak, Teaching NMR Using Online Textbooks, *Molecules* **4**:353-365 (1999).
33. D.H. Chang, J.P. Hornak, Fingerprint Recognition through Circular Sampling. *Imaging Science and Technology*, **44**:560-564 (2000).
34. C.L. Bray, N.C. Schaller, S.L. Ianapolo, M.D. Bostick, G. Ferranti, A. Fleming, J.P. Hornak, A Study of the <sup>1</sup>H NMR Signal from Hydrated Synthetic Sands. *J. Env. & Eng. Geophys.* **11**:1-8 (2006).
35. C.L. Bray, J.P. Hornak, Unilateral MRI using a Rastered Projection. *J. Magn. Reson.* **188**:151-159 (2007).
36. J.P. Hornak, Labels Printed with Magnetic Toner, *Magn. Reson. Imaging*, **25**:1459-1460 (2007).
37. C.L. Bray, R.G. Bryant, M.J. Cox, G. Ferrante, Y. Goddard, S. Sur, J. P. Hornak, The Proton Nuclear Magnetic Resonance Spin-Lattice Relaxation Rate of Some Hydrated Synthetic and Natural Sands. *Diffusion Fundamentals* **10**:8.1-8.3 (2009).

38. C.L. Bray, R.G. Bryant, M.J. Cox, G. Ferrante, Y. Goddard, S. Sur, J. P. Hornak, The  $^1\text{H}$  NMR Spin Lattice Relaxation Rate of Some Hydrated Sands. *J. Env. & Eng. Geophys* **14**:49-61 (2009).
39. C.L. Bray, J.P. Hornak, Underground Variations in  $B_{\text{Earth}}$ : Implications for Near-Surface MRI. *Concepts Magn. Reson.* **35B**:153–167 (2009).
40. S.Y. Moon, J.P. Hornak, A Volume Resolution Phantom for MRI. *Mag. Reson. Imag.* **28**:286-289 (2010).
41. J.P. Hornak, G. Ferrante, A. Coy, E.R. McCarney, A Possible Difference in the Surface Relaxivity of Coastal and Inland Sands. *TOMRJ* **3**:52-56 (2010).
42. J.P. Hornak, MRI of Printed Text. *Concepts Magn. Reson.* **36A**:347-348 (2010).
43. B. Alfano, M. Commerci, M. Larobina, A. Prinster, J.P. Hornak, S.E. Selvan, U. Amato, M. Quarantelli, G. Tedeschi, A. Brunetti, M. Salvatore, An MRI Digital Brain Phantom for Validation of Segmentation Methods. *Medical Image Analysis* **15**:329-339 (2011).
44. J.P. Hornak, The  $^1\text{H}$  Nuclear Spin-Lattice and Spin-Spin Relaxation Times at  $B_{\text{Earth}}$  of Some Liquids Associated with Environmental Spills. *Organic Geochemistry* **42**:985-990 (2011).
45. T.G. Servoss, J.P. Hornak, Converting the chemical shift artifact to a spectral image. *Concepts in Magnetic Resonance* **38A**: 107–116 (2011).
46. Y. Qiu, W.C.E. Kwok, J.P. Hornak, A method of switching the signal in an MRI phantom based on trace ion currents. *J. Magn. Reson.* **245**: 171-176 (2014).
47. W.J. Ryan, N. Zumbulyadis, J.P. Hornak, The Potential of Low Frequency EPR Spectroscopy in Studying Pottery Artifacts and Pigments. *MRS Proceedings* **1656**: (2014).
48. Y. Qiu, W. Yao, W-C.E. Kwok, J.P. Hornak, A Circuit for Synchronizing External Stimuli and Events to the Pulse Sequence of a Clinical Magnetic Resonance Scanner. *Concepts in Magn. Reson.* **44B**:50-52 (2014).

#### Book Chapters:

1. R.W. Fessenden and J.P. Hornak, "The Study of Radical Reaction Kinetics by Time-Resolved ESR," 345-352, *IUPAC Frontiers of Chemistry*, ed. by K.J. Laidler, (Pergamon Press, NY, 1982).
2. J.P. Hornak, "Empirical Techniques in Magnetic Resonance Imaging," accepted for publication in *Digital Image Analysis: A Practical Guide*, K. Karcich and D. Johnson, eds., Marcel Dekker.
3. E.R. Dougherty, Y.D. Chen, S.M. Totterman, J.P. Hornak, "Detection Of Osteoporosis By Morphological Granulometries" *Biomedical Image Processing and Three-Dimensional Microscopy*, Pts 1 & 2 Book Series: Proceedings Of the SPIE, **1660**:666-680 (1992).
4. L.M. Fletcher and J.P. Hornak, "Multispectral Image Segmentation in Magnetic Resonance Imaging," in *Digital Image Processing Methods*, E. Dougherty, ed., Marcel Dekker, NY 1994.
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103. M. Cheung, R. Boswell, B. Lipchick, T.W. Smith, C.L. Bray, J.P. Hornak, A Low Dielectric Constant High-Conductivity Filler Material for MRI Phantoms, 10<sup>th</sup> Upstate NY NMR Symposium, Rochester, NY, October 2008.
104. C.L. Bray, R.G. Bryant, M.J. Cox, G. Ferrante, Y. Goddard, S. Sur, J.P. Hornak, The  $^1\text{H}$  NMR  $R_1$  of Some Hydrated Synthetic and Natural Sands, 2008 NY State Complex Matter Workshop, Cornell University, Ithaca, NY, December 2008.
105. J.P. Hornak, G. Ferrante, A. Coy, E. McCarney, A  $^1\text{H}$  NMR Spin-Lattice Relaxation Time Study of Asilomar Sands, 50<sup>th</sup> Experimental NMR Conference, Asilomar, CA March 2009.
106. R.Q. Boswell, M. Cheung, B.C. Lipchick, T.W. Smith, S. Coons, P.E. Steen, C.L. Bray, J.P. Hornak, A search for a homogeneity phantom filler material for high-frequency MRI systems, 51<sup>st</sup> Experimental NMR Conference, Daytona Beach, FL, April 2010.
107. R. Smith, J.P. Hornak, Are copper mineral supplements a contraindication for MRI contrast agents? Rochester Section of the American Chemical Society 2010 Undergraduate Research Symposium, Hobart & William Smith Colleges, Geneva, NY, April 2010.
108. Y. Qiu, J.P. Hornak, An fMRI Phantom Based on Electric Field Alignment of Molecular Dipoles, RIT Graduate Research Symposium, Rochester, NY, August 2011.
109. H. Yuan, S.D. Kennedy, E. Kwok, J. P. Hornak, A Selectable Diffusion Coefficient Phantom Based on Restricted Diffusion, 19<sup>th</sup> Annual Meeting of the ISMRM, Montreal, Canada, May 2011.
110. J.P. Hornak, Teaching NMR Fundamentals Using the Web and Other New Tools, NMR Bootcamp for Educators, Lake Superior State University, Sault Ste Marie, MI, 5/23-24/2011.
111. E. Ferrarah, S. Paluskiewicz, J.P. Hornak, NMR Microscopy: Applications in Botany. Rochester Academy of Sciences Fall Symposium, Rochester, NY, October 2011.
112. Y. Qiu, W.E. Kwok, J.P. Hornak, Electric Field NMR and Spin Relaxation in Propylene Carbonate, 53<sup>rd</sup> Experimental NMR Conference, Miami Beach, FL, April 2012.
113. Y. Qiu, W.E. Kwok, J.P. Hornak, An fMRI Phantom Based on the Alignment of Molecular Dipoles with an Electric Field, 20<sup>th</sup> Annual Meeting of the ISMRM, Melbourne, Australia, May 2012.
114. Y. Qiu, E. Kwok, J.P. Hornak, A Multidisciplinary Approach to Creating a Functional MRI Phantom, INTERCON-2012, Lima, Peru, August 2012.
115. N. Zumbulyadis, W.J. Ryan, J.P. Hornak, Non-destructive Low Frequency EPR Spectroscopy of Pottery Standards Using Surface Coils, 246<sup>th</sup> American Chemical Society National Meeting, Indianapolis, IN, September 2013.
116. M. Terwilliger, A. Cannella, W.J. Ryan, N. Zumbulyadis, J.P. Hornak, The Potential of Low Frequency Electron Paramagnetic Resonance for the Analysis of Cultural Heritage Artifacts,

- Rochester Academy of Science 40<sup>th</sup> Annual Fall Scientific Paper Session, Rochester, NY November 2013.
117. N. Zumbulyadis, W.J. Ryan, J.P. Hornak, The Potential of Low Frequency EPR Spectroscopy in Studying Pottery Artifacts, 2013 Materials Research Society Fall Meeting, Boston, MA, December 2013.
  118. A. Becker, J.P. Hornak, A t-Butanol/Water, Lipid/Water MRI Standard, 59<sup>nd</sup> American Chemical Society Undergraduate Research Symposium, Rochester, NY, 2014.
  119. N. Zumbulyadis, B. Antalek, W.J. Ryan, J.P. Hornak, Non-destructive Low Frequency EPR and Solid State NMR for the Characterization of Paramagnetic Components in Cultural Heritage Objects. 55<sup>th</sup> Experimental NMR Conference, Boston, MA, March 2014.
  120. N. Zumbulyadis, W.J. Ryan, L. Switala, J.P. Hornak, Low Frequency EPR: A Novel, Non-invasive, Spectroscopic Approach to Studying Ceramic Objects. Gordon Research Conference: Scientific Methods in Cultural Heritage Research. Newry, ME, Jul 27-Aug 4, 2014.
  121. L. Switala, E.I. Hornak, W.J. Ryan, N. Zumbulyadis, J.P. Hornak, A Low Frequency Electron Paramagnetic Resonance Spectroscopy Study Of The Firing Temperature Of Redart Clay. Rochester Academy of Science 41<sup>th</sup> Annual Fall Scientific Paper Session, Rochester, NY November 2014.

## INVITED LECTURES

### Single-Turn Solenoids in MRI (Various Titles):

1. Roswell Park Memorial Institute, Buffalo, NY, 8/5/1985.
2. Radiology Research Seminar, University of Rochester Medical Center, Rochester, NY 2/1987.
3. RIT Imaging Science Industrial Associates Meeting, Rochester, NY, 10/24/1988.
4. Department of Radiology, University of Alabama School of Medicine, Birmingham, AL, 10/11/1990.
5. Department of Diagnostic Radiology, University of Maryland, Baltimore, MD, 7/28/1986.
6. Department of Biological Chemistry, Wright State University, Dayton, OH, 8/26/1986.
7. General Electric Medical Systems Group, Milwaukee, WI, 9/11/1986.

### Microwave waveguides and cavity resonators:

1. System Technology Division, IBM, Endicott, NY, 11/14/1986.

### Diffusion coefficients in anisotropic fluids by ESR imaging of concentration profiles

1. Radiation Research Lab, University of Notre Dame, Notre Dame, IN 10/13/1986.

### Nuclear Magnetic Resonance Imaging:

1. Department of Chemistry, SUNY Geneseo, Geneseo, NY 10/21/1986.
2. Department of Chemistry, Utica College of Syracuse University, Utica, NY 12/1/1986.
3. Department of Chemistry, Colgate University, Hamilton, NY 2/26/1987.
4. Rochester Area Alpha Chi Sigma Dinner Meeting, 6/23/1987.
5. Nazareth College, Rochester, NY 3/25/1988.

### Magnetic Resonance Imaging:

1. RIT Parents Weekend, RIT, Rochester, NY, 10/24/1988.
2. St. John Fisher College, Rochester, NY, 10/21/1988.
3. Potsdam College of SUNY, Potsdam, NY, 11/1/1988.
4. St. Lawrence University, Canton, NY, 11/1/1988.
5. Trinity College, Hartford, CT, 12/4/1989.
6. University of Massachusetts at Amherst, Amherst, MA, 12/5/1989.
7. Magnetic Resonance Center, Univ. of Alabama School of Med., Birmingham, AL, 10/11/1990.
8. Chemistry/Physics Seminar, Trent University, Peterborough, Ontario, CA, 10/17/1990.
9. Chemistry Seminar, Niagara University, Niagara Falls, NY, 3/11/1991.
10. Chemistry Seminar, Hobart and William Smith Colleges, NY, 4/19/1991.
11. College Seminar, Merrimack College, North Andover, MA, 3/24/1990.

12. Slippery Rock University, Slippery Rock, PA, 11/21/1991.
13. Magnetic Resonance Imaging, Department of Chemistry, SUNY Brockport, 10/6/1992.
14. Physics Department, RIT, 10/8/1992.
15. Department of Chemistry, Alfred University, 2/11/1992.
16. Chemistry Department, Canisius College, 2/25/1993.
17. Department of Chemistry, Hamilton College, Clinton, NY, 10/1/1994.
18. RIT Student Chapter of Imaging Science and Technology, Rochester, NY, 3/28/1994.
19. Department of Chemistry, LeMoyne College, Syracuse, NY, 12/21/1995.
20. IEEE Seminar, RIT Chapter, Rochester, NY, 7/25/1995.
21. Keynote Speaker, Rochester Section ACS Undergraduate Research Symposium, 4/27/1996.
22. ENI, Inc, Highpower Road, Rochester, NY, 6/20-21/1990.
23. Teradyne, Inc., North Reading, MA, 11/24/2008.
24. Teradyne, Inc., North Reading, MA, 6/18/2009.

MRI: An overview and recent advances:

1. ACS North East Regional Meeting, Rochester, NY, 10/24/1995.

MRI Simulation:

1. RIT Center for Digital Media, 1995 Summer Faculty Workshops, 5/31/1995.

Relaxation Time Studies Using MRI:

1. Medical Imaging II Symposium, Rochester, NY, 9/30/1989.

Multispectral Tissue Classification – Brain or Breast (Various Titles):

1. John P. Roberts Research Institute, University of Western Ontario, London, Ontario, 6/18/1992.
2. Radiology Department, University of Rochester Medical School, Rochester, NY, 7/23/1992.
3. Department of Radiology, University of Alabama School of Med., Birmingham, AL, 10/120/1990.
4. Radiology Department, University of Rochester, 5/12/1989.
5. Center for Imaging Science Industrial Associates Meeting, RIT, 4/23/1990.
6. Center for Imaging Science Seminar, RIT, 5/9/1991.
7. Electrical and Computer Engineering, University of West Virginia, Morgantown, WV, 11/20/1991.
8. American Association of Physicists in Medicine, Upstate NY Chapter, Rochester, NY 3/30/1994.

A Fast  $T_1$  Algorithm:

1. CIS Industrial Associates Meeting, Fall 1991

Water Diffusion in Gelatin:

1. Eastman Kodak Company Research Labs, Rochester, NY, 3/6/1992.

Magnetic Resonance Imaging of Materials:

1. Chemistry Department, SUNY Binghamton, NY, 4/22/1994.

An Overview of MRI Research at RIT:

1. MRI Center 10<sup>th</sup> Birthday Celebration, University of Rochester Medical Center 10/13/1995.
2. Rochester Section of IEEE-Signal Processing, University of Rochester, Rochester, NY, 4/11/1998.
3. Henan University, Kaifeng, China, 8/23/2009.
4. The Mind Research Network for Neurodiagnostic Discovery, Albuquerque, NM, 12/22/2010.
5. Pontificia Universidad Católica del Perú, Lima, Peru, 3/7/2012.

Signals from Within: Magnetic Resonance Imaging of Disease:

1. Annual Meeting of the American Association for Clinical Chemistry, Anaheim, CA, 7/17/1995.

MRI Studies of the Proton  $T_1$ ,  $T_2$  and Spin Densities of the Brain:

1. Free Radicals: Perspectives and Future. A symposium honoring R.W. Fessenden, Notre Dame, IN, 2001.



Reflections on Developing and Hosting Magnetic Resonance Educational Web Sites:

1. 32<sup>nd</sup> Northeast Regional Meeting of the American Chemical Society, Rochester, NY, 11/2004.
2. Conference on NMR in Undergraduate Education, Bucknell University, PA, 9/17/2005.

Development and Utilization of NMR Web Sites

1. Analytical Sciences Digital Library Workshop, San Diego, CA, 3/12/2005.

Motion of Water and Decane in Reverse Micelle Solutions

1. Leibniz Institut für Polymerforschung, Dresden, Germany 8/25/2005.

Studies of the <sup>1</sup>H NMR Relaxation Rate of Hydrated Sands

1. Angewandte Geophysik, Institut für Angewandte Geowissenschaften, Technische Universität Berlin, 7/5/2005.
2. NY State Complex Matter Workshop, Cornell University, Ithaca, NY, 12/8/2008.
3. Zengzhou University and Henan University of Technology, 8/25/2009.
4. Henan University, Kaifeng, China, 8/27/2009.
5. Chemistry Department, University of Nevada at Las Vegas, Las Vegas, NV, 10/9/2009.

Recent Advances in MRI with a Focus on Near Surface MRI:

1. GIDRM XXXVI National Congress on NMR, Vietri sul Mare, Salerno, Italy, 9/23/2006.
2. Consiglio Nazionale delle Ricerche, Centro per la Medicina Nucleare, Università degli Studi di Napoli - Federico II, Naples, Italy, 9/20/2006.

MRI: Where we are at and where we are going:

1. American College of Veterinary Radiology Annual Scientific Meeting, Chicago, IL, 11/30/2007.

Phase Transitions with Liquid Nitrogen and Dry Ice

1. Monica B. Leary Elementary School, Henrietta, NY, 11/16/2007.

An Overview of RIT:

1. Henan University, Kaifeng, China, 8/23/2009.
2. Henan Normal University and President of Henan University of Science & Technology, 8/25/09.
3. Pontificia Universidad Católica del Perú, Lima, Peru, 3/7/12

Transforming the Chemical Shift Artifact into a Spectral Image:

1. Henan University, Kaifeng, China, 8/23/2009

A Tutorial on NMR Spectroscopy:

1. Henan University, Kaifeng, China, 8/17-19/2009
2. NMR Bootcamp for Educators, Lake Superior State University, Sault Ste Marie, MI, 5/23-24/2011.

Measuring T<sub>1</sub>, T<sub>2</sub>, and D on a Bruker NMR Spectrometer

1. Henan University, Kaifeng, China, 8/20-22/2009

UC Made Possible...

1. The Utica College Chemistry Reunion Symposium, Utica College, Utica, NY 9/12/2009

Keeping a Magnetic Resonance Imager Knocking

1. Society of Analytical Chemists of Pittsburgh, Pittsburgh, PA 10/4/2010.
2. Dickinson College, Carlisle, PA 11/30/2012.
3. Cleveland State University, Cleveland, OH 2/27/2013.

Lima, Peru: Its people, culture, architecture, and cuisine.

1. The Harley School, Rochester, NY 3/29/2012.

A Multidisciplinary Approach to Creating a Functional MRI Phantom

1. INTERCON-2012, Lima, Peru 8/6/2012.

### **MEMBERSHIPS IN PROFESSIONAL SOCIETIES**

1. Member of Rochester Chapter of Sigma Xi (1985-Pres)
2. Honor Society of Phi Kappa Phi (1985-Pres)
3. American Chemical Society (1989-1991)
4. International Society of Magnetic Resonance in Medicine (1987-Pres)
5. International Society for Magnetic Resonance (2004-2005)
6. Environmental and Engineering Geophysical Society (2007-2011)
7. Groupement Atomes et Molécules Par Études Radio-Électriques (2009-2012)
8. Aircraft Owners and Pilots Association (1987-Pres)
9. American Nano Society (2011-Pres)
10. Materials Research Society (2013-Pres)

### **EDITORIAL AND REFEREE SERVICES**

#### Peer-Reviewed Journals:

1. Reviewer, Journal of Magnetic Resonance, 1989-Present
2. Reviewer, Magnetic Resonance in Medicine, 1990-2011
3. Reviewer, Magnetic Resonance Imaging, 2009-Present
4. Reviewer, Concepts in Magnetic Resonance, 2011-Present
5. Reviewer, Open Magnetic Resonance Journal, 2009
6. Reviewer, Journal of Electronic Imaging, 1991-1994
7. Reviewer, Journal of Imaging Science & Technology, 1993-1994
8. Reviewer, Current Medical Imaging Reviews, 2004
9. Reviewer, Journal Of Neuroscience Methods, 2003
10. Reviewer, Physica Medica: European Journal of Medical Physics, 2009-Present
11. Reviewer, IEEE Transactions on Biomedical Engineering, 1993-1995, 2002
12. Reviewer, Journal of Hydrology, 2010-2011
13. Reviewer, Journal of Environmental & Engineering Geophysics, 2006-2011
14. Reviewer, Organic Geochemistry, 2010
15. Reviewer, Geophysics, 2013
16. Reviewer, Vadose Zone Journal, 2009
17. Reviewer, Near Surface Geophysics, 2010
18. Reviewer, Journal of Physical Chemistry, 2013
19. Reviewer, Journal of Solution Chemistry, 2005
20. Reviewer, Langmuir, 2004-Present
21. Reviewer, Cellulose, 2011
22. Reviewer, Acta Histochemica, 2012
23. Reviewer, Measurement, 2013
24. Reviewer, Sensors, 2013
25. Reviewer, IEEE Journal of Solid-State Circuits, 2008
26. Reviewer, Journal of Chemical Education, 2011

#### Abstracts:

1. Reviewer, International Society for Magnetic Resonance in Medicine Meeting, 2002, 2004, 2007, 2008
2. Reviewer, Society for Magnetic Resonance Imaging Meeting, 1991
3. Reviewer, Society for Magnetic Resonance in Medicine Meeting, 1994

#### Research Proposals:

1. Site Visit Reviewer, National Institutes of Health, 1995-1998
2. Reviewer, Petroleum Research Fund, 1993-94, 2002
3. Reviewer, Department of Energy, 1993-94

4. Reviewer, National Science Foundation (NSF), 1994-95, 1995-96
5. Reviewer, The Research Council of Norway, 2004-2005
6. Reviewer, National Institutes of Health (NIH), 2003-2007, 2011, 2012
7. Reviewer, The Cottrell College Science Awards, 2001-2002
8. Reviewer, US Army Prostate Cancer Research Program, 2008, 2009, 2011
9. Reviewer, Japan Society for the Promotion of Science (JSPS), 2009, 2011

**Other:**

1. Reviewer, UK Biobank, 2007
2. External Tenure Reviewer, Ithaca College, Ithaca, NY, 2007
3. External Tenure Reviewer, Department of Biomedical Engineering, University of Miami, FL, 2006
4. External Promotion Reviewer, Worcester Polytechnic Institute, Worcester, MA, 1997
5. External Promotion Reviewer, St. John Fisher College, Rochester, NY, 2000
6. External Promotion Reviewer, University of Rochester Medical School. Rochester, NY, 1997, 2002

**Book Reviews and Commentaries:**

1. J.P. Hornak, *CHOICE*, (<http://www.ala.org/ala/acrl/acrlpubs/choice/Home.htm>) December 2004. Functional Magnetic Resonance Imaging. S.A. Huettel, A.W. Song, G. McCarthy. Sinauer Associates, 2004.
2. R.B. Pearce, New Surface Coil Designs Enhance MRI Performance. *Diagnostic Imaging* **10**(1), 117-129 (1988).
3. P. Singer, An RIT Professor Translates Techno-Speak to Put Patient's Fears to Rest. *Rochester D. & C.*, 23 March 1998, 1,6-C.
4. J. Loenhirth, MRI Scans Made Faster and More Versatile. *Biophotonics Research*, p55, 1999.

**RIT COMMITTEE SERVICE**

**Departmental:**

1. Department of Chemistry, Library Committee, 1984-1985
2. Department of Chemistry, Awards Committee, Chair, 1984-1989
3. Department of Chemistry, Equipment Committee, 1984- 2002
4. Department of Chemistry, Computer Committee, 1984-1989
5. Department of Chemistry, Space Committee, 1985-2001
6. Department of Chemistry, Community and Industrial Relations, 1985-87
7. Department of Chemistry, NMR Committee, Chair, 1988-Present
8. Department of Chemistry, Faculty Search Committee, 1988-Present
9. Department of Chemistry, Graduate Committee, 1994-1996, 2005-2010
10. Department of Chemistry, Graduate Committee, 2006-2009; Chair, 2010-Present
11. Department of Chemistry, Undergraduate Research Committee, 2004-2006
12. Department of Chemistry, Web Development Committee, 1999-2000, 2004-2006
13. Center for Imaging Science, Ph.D. Exam Committee, 1990-1996, 2007
14. Center for Imaging Science, Tenure Committee, Chair, 1992-96
15. Center for Imaging Science, Computer Committee, 1996-1999
16. Center for Imaging Science, Biomedical Imaging Committee, 2005-2007
17. Center for Imaging Science, Nano Imaging Committee, 2006-2007

**College:**

1. College of Science, Strategic Planning Committee, 1992-1995
2. College of Science, Space Committee, 1999
3. College of Science, New Building Planning Committee, 1994
4. College of Science, Undergraduate Research Committee, 2004-2009
5. College of Science, Dean's Faculty Advisory Committee, 2005-Present
6. College of Science, Faculty Enhancement and Development, 2007-2011
7. College of Science, Trustees Scholarship Award Committee, 2006-2011
8. College of Graphic Arts and Photography, Wiedman Chair Search Committee, 1989

9. College of Graphic Arts and Photography, Tenure Committee, 1992-1993
10. College of Science, Off-Cycle Tenure Review Committee, 2011
11. College of Science, Curriculum Committee, 2011-2014
12. College of Science, Machine Shop Task Force, 2012-2013
13. College of Science, Task Force on International Education Initiatives, 2013

**Institute:**

1. RIT, Eisenhart Teaching Award Committee, 1999-2000, 2002-2003, 2005-2006
2. RIT, Trustee's Scholarship Award, 2006-2011
3. RIT, Dean of Graduate Studies Search Committee, Co-Chair, 2010-2011
4. RIT, Graduate Council, 2011-2014 (Chairman: 2013-2015)
5. Task Force on +/- grading, 2012-2013
6. Task Force on Ethics in the Graduate Curricula, Chairman, 2012-2013
7. Periodic Comprehensive Evaluation of Dean Walker, Co-Chairman, 2013-2014

**External:**

1. American Chemical Society, Rochester Section, Undergraduate Awards Committee, Chairman, 1989-1997.
2. 10<sup>th</sup> Annual Upstate NY NMR Symposium Organizing Committee, Chairman, 2008.

**RESEARCH SUPERVISED**

Summer High School Interns:

1. Naba Ali – Temperature dependence of transmetallation, Pittsford High School, Pittsford, NY 2010
2. Raliek Boswell - MRI Phantoms, Edison Technical High School, Rochester, NY, 2007.
3. Allison Bright - Near Surface MRI, Victor High School, Victor, NY, 2005.
4. May Cheung - MRI Phantoms, Webster High School, Webster, NY, 2007
5. Bethany Connors – B<sub>Earth</sub> Mapping, Spencerport High School, Spencerport, NY 2009.
6. Nicole Conway – MRI Contrast Agents, Canandaigua Academy, Canandaigua, NY, 2008.
7. Marcus Cox - Packing Studies of Polydispersed Beads, Lima Christian School, Lima, NY, 2006.
8. Elaine Ferrara – NMR Microscopy, Penfield High School, Penfield, 2011
9. Allison Fleming - Packing Studies of Monodispersed Beads, Aquinas Institute of Rochester, Rochester, NY, 2004.
10. Tyler Lucero - Near Surface MRI, Rush-Henrietta High School, Henrietta, NY, 2005.
11. Sarah Paluskiewicz – NMR Microscopy, Our Lady of Mercy High School, Rochester, NY, 2011
12. Gretchen Smith – MRI Contrast Agents, Nazareth Academy, Rochester, NY, 2008.

B.S. Non-Thesis Research:

1. Alicja Bajorska - Particle Diameter Histograms of Polydispersed Sands, Imaging Science, 2006.
2. Amy Becker - Relaxivity of MRI Contrast Agents, 2013-14.
3. Marcia Bero - Triboluminescence of Wintergreen Lifesaver Candies, and Pulsed NMR Spectroscopy, Chemistry, 1987.
4. Michael Bostick – T<sub>2</sub> of Water in Synthetic Soils, Imaging Science, 2005.
5. Anthony Cannella, LFEPR, Chemistry, 2013-14.
6. David Cesarz - Low frequency ESR spectroscopy, Chemistry, 1989.
7. Sarah Chapman - Diffusion and Relaxation Time Studies of Microemulsions, Chemistry, 1997-99.
8. Steven Christopher – Earth's Field NMR, Physics, 2008-09.
9. Raymond Courtney - Transient Acoustic Cavitation During Ultrasound Imaging and Detection of Subsequent Free Radicals, Chemistry, 1991.
10. Jeremy Cusimano - Low frequency ESR, Chemistry, 1998.
11. Paul DeMuth - ESR Spectrometer Design and Mapping B<sub>1</sub> Magnetic Fields From Two Resonators, Chemistry, 1985-87
12. David Fetzer - MRI Compatibility Issues with Tattoo Inks, Imaging Science, 2002.
13. Pat Fleckenstein – Development of a Volume Calculation Package for MR Images, Math, 1991-92.
14. Garland Gen - Calculated T<sub>1</sub>, T<sub>2</sub>, and Spin Density Images, Chemistry, 1986-88.

15. Rick Grucza - FT NMR and Computation and Mapping of  $B_1$  Fields in Magnetic Resonators, Chemistry, 1988.
16. Andrew Hoerner - NMR  $T_1$  of Hydrated Sands, Imaging Science, 2006.
17. David Hetzer -NMR Microscopy, Chemistry, 1998.
18. Steve Iannopollo - NMR Studies of Structured and Bulk Water in Pores, Chemistry, 2003-04.
19. Harold Jones - Pulsed NMR Spectroscopy, Chemistry, 1987.
20. Marilyn Jukiewicz -  $T_1$  of Reverse Micelle Solutions, Chemistry Student, Baldwin-Wallace College, Berea, OH, 1991.
21. Brian Kelley - NMR Spin Relaxation Time Studies of Microemulsions, Chemistry, 1997.
22. Lauren Kelley – Kinetics of transmetallation, COS-RIT, 2010.
23. Pam Knight - Measurement of  $T_1$  of Water in Soils, Chemistry, 2002
24. Edward LaChanse -  $B_1$  Fields From Nonuniform Current Densities, Chemistry, 1988.
25. Brittany Lipchick – Nonlinear NMR Relaxation Agents, Chemistry, 2007-08.
26. Scott Lee - ESR of Coal and Triboluminescence, Chemistry, 1988-89.
27. Alfred Marchese – Low Frequency ESR, Chemistry, 1991-92.
28. William Murray - MRI of Nuclear Spin Relaxation Times, Chemistry, 1987
29. Nitin Nampalli – RF coil design for near-surface MRI, 2009-10.
30. Walter Oneschuk - GE Signa to Vax Image Transfer, Biomedical Computing, 1986
31. Jeremy Pasatta - NMR Studies of the  $T_1$  and  $T_2$  of Water in Soil, Chemistry, 2000.
32. Katryna Pellingra – Tramsmetallation in MRI Contrast Agents, Chemistry 2010-11
33. Jonathan Purington – Mapping RF Magnetic Fields from a Surface Resonator, 2006.
34. Durga Ramanan – MRI of the Diffusion of Ions In Gelatin, Chemistry, 1991-92.
35. Jonathan Sam - Calibration of an ESR Spectrometer, & NMR Spectroscopy, Chemistry, 1988-89.
36. Robert Sherlock - Pulse FT NMR Spectroscopy, Chemistry, 1987.
37. Jody Sigismondi - The Properties of a Microwave Klystron Source, Physics, 1986.
38. Aric Smith - RF Coil Design for MRI of Teeth, Chemistry, Chemistry, 1989-90
39. Rebecca Smith – Tramsmetallation in MRI Contrast Agents, 2009-11
40. Mike Solomon - Optical Determination of Translational Diffusion Coefficients. 1985
41. Jeffrey StPierre - An IBM PC Based Data Collection System for a Perkin-Elmer 552A UV/Vis Spectrometer, Chemistry, 1985.
42. Ryan Susa -  $T_1$  of Porous Sands, Chemistry, 2002
43. Jennifer Swartzenberg - Nonlinear NMR Relaxation Agents, Chemistry, 2007-08.
44. ZiWie Tang – Oxygen Monitoring Using Low Frequency ESR, 1991-92.
45. James Trainer - NMR Spectroscopy Techniques, Chemistry, 1987.
46. Allison Roder - Plum pox virus screening of stone fruit trees in NY State, 2012.
47. Anthony Cannella - Plum pox virus screening of stone fruit trees in NY State, 2012.
48. Alyssa Dibble - Plum pox virus screening of stone fruit trees in NY State, 2012.
49. Ashley Dunham - Plum pox virus screening of stone fruit trees in NY State, 2012.
50. Amber Wilson Daeschlein - Plum pox virus screening of stone fruit trees in NY State, 2012.
51. Alexandria Washington - Plum pox virus screening of stone fruit trees in NY State, 2012.
52. Brian Cifrodello-Sheridan - Plum pox virus screening of stone fruit trees in NY State, 2012.
53. Brandon Cona - Plum pox virus screening of stone fruit trees in NY State, 2012.
54. Christopher Mc Namee - Plum pox virus screening of stone fruit trees in NY State, 2012.
55. Cherie Wong - Plum pox virus screening of stone fruit trees in NY State, 2012.
56. Daniel Saviola - Plum pox virus screening of stone fruit trees in NY State, 2012.
57. Hailee Wetherbee - Plum pox virus screening of stone fruit trees in NY State, 2012.
58. Jesse Spencer - Plum pox virus screening of stone fruit trees in NY State, 2012.
59. Jeffrey Pyka - Plum pox virus screening of stone fruit trees in NY State, 2012.
60. Katherine Valentine - Plum pox virus screening of stone fruit trees in NY State, 2012.
61. Kasie Tierson - Plum pox virus screening of stone fruit trees in NY State, 2012.
62. Krzysztof Bajorski - Plum pox virus screening of stone fruit trees in NY State, 2012.
63. Laura Parisi - Plum pox virus screening of stone fruit trees in NY State, 2012.
64. Matt Greenwood - Plum pox virus screening of stone fruit trees in NY State, 2012.
65. Ryan Capasse - Plum pox virus screening of stone fruit trees in NY State, 2012.
66. Samuel Richheimer - Plum pox virus screening of stone fruit trees in NY State, 2012.
67. Sierra Williams - Plum pox virus screening of stone fruit trees in NY State, 2012.

68. Wesley Wander - Plum pox virus screening of stone fruit trees in NY State, 2012.
69. Anna Bower - Plum pox virus screening of stone fruit trees in NY State, 2012.
70. Carly Augustyn - Plum pox virus screening of stone fruit trees in NY State, 2012.
71. Kelley Lockwood - Plum pox virus screening of stone fruit trees in NY State, 2012.
72. Keegan Coombs - Plum pox virus screening of stone fruit trees in NY State, 2012.
73. Suhasini Gattu - Plum pox virus screening of stone fruit trees in NY State, 2012.
74. Gabriel Sferrazza - Plum pox virus screening of stone fruit trees in NY State, 2012.
75. Maya Anichini - Plum pox virus screening of stone fruit trees in NY State, 2012.
76. Michael Terwilliger - LFEPR, Biology, Susquehanna University, 2013.
77. Lauren Switala - LFEPR of ceramics with cultural heritage significance, 2014.
78. Natin Nampali - Surface coils for unilateral MRI, 2012.

#### B.S. Thesis Research in Imaging Science:

1. Alexander Barelka - NMR Microscopy, May 1992.
2. Andrew Benfield - MRI Angiography, May 1992.
3. Andre Blaakman - MRI of Breast Pathology, May 1991.
4. Rebecca Bogdan - Multispectral Tissue Classification of Breast Pathology, May 1994.
5. Bobbie Bosse – Digital Image Processing of Magnetic Resonance Images, May 1992.
6. Marvin Boonmee -Comparison of Tissue Classification Using Spin Echo and Fast Spin Echo MRI, May 2001.
7. Keith Bourgeois - MRI Coil Development, May 1992.
8. Ken Brodeur - Characterizing Spatial-Spatial-Spectral MRI, May 1998.
9. Jennifer Cerniglia - Examination of Alternative Segmentation Spaces, May 1995.
10. David Chang - Fingerprint Matching Algorithm, May 1999.
11. James Dickman - Clustering Algorithms, May 1991.
12. Presley Ellsworth - Noise Reduction in MRI, May 1989.
13. Tiffany Fetzner - CSI Based on Variable Bandwidth MRI, May 1998.
14. Lynn Fletcher - Multispectral Brain Tissue Classification, May 1992.
15. Rachael Gold – Erythema in Intradermal Pigments During MRI Exams, May 2005
16. Jordan Guinn - Analysis of T<sub>1</sub> Environments Using DECRA, May 1998.
17. Joyce Haberman - Optimization of Bandwidth in MRI of the Knee, May 1997.
18. Mark Holly - Motion Artifact Reduction in MRI, May 1989.
19. John Householder - Optical Fourier Ttransformer, May 1992.
20. Blake Jabielski - Detection of Pathology Based on Asymmetry, May 1993.
21. Cindy Jacobs - Spin Trapping for Low-Frequency ESR, May 1991.
22. Lada Jawny - Cyclic Changes in T<sub>1</sub>, T<sub>2</sub> and Spin Density of Breast Tissue, May 1993.
23. Michelle Kelly - T<sub>1</sub> Determination With Gradient Refocused MRI, May 1992.
24. Timothy Looney - Registration of MR Images to Improve Multispectral Image Segmentation of Brain Tissues, May 1993.
25. Daisei Konno - Ultrasound Detection of Windsheer, May 1995.
26. John Lacognina - Image Processing of Endoscopic Images, May 1991.
27. Andrew Martelli - Color Calibration of a Matrix Camera, May 1992.
28. Sang-Yun Moon - MRI Synthetic Image Generator, May 2006.
29. Thomas O'Brien - Digital Archival Techniques, May 1993.
30. Michael Platt - Homogenization of RF Magnetic Fields in Single Turn Solenoids, May 1994.
31. Scott Szeglowski - MRI Wrist Coil, May 1992.
32. Eric Thomsin - Parameter Optimization for MRI Diagnosis of Multiple Sclerosis, May 1988.
33. Stefanie VanGorden - NMR Microscope, May 1999.

#### M.S. Project and Non-Thesis Research

1. Dmitriy Beryoza - A PC Based NMR Educational Package, Computer Science, 1992-94.
2. Derrick Campbell - Wavelet techniques in MRI, 2014.
3. Ann Cecchi - A PC Based NMR Educational Package, Computer Science, 1994.
4. Katrien Daels - Segmentation With Clustering Algorithms, Imaging Science, 1991.
5. Marat Gitman - NMRI of Solutions Utilizing Pulse Sequence Programs Based on 1D Gradients, Chemistry, 1997.

6. Jian Gong - A fast  $T_1$  algorithm, Imaging Science, 1991.
7. Manish Kadakia – A Windows Based Teaching package on MRI, Computer Science, 1991-92.
8. Terrie Levy – A Graphical 3D Histogram Package, Computer Science, 1991-92.
9. Christopher McCarthy – Encapsulation of Nitroxide Spin Probes in Polymer Spheres, Chemistry, 1991-92.
10. Tom Maszerowski - A Graphical 3D Histogram Package, Computer Science, 1991-92.
11. Melissa Monahan - Nonlinear NMR Relaxation Agents, Mechanical Engineering, 2007.
12. Dimitrios Psarros – A 2D Image Segmentation Tool, Computer Science, 1991-94.
13. Yue Qiao – Multispectral Analysis of Brain Tissues Using MRI, Imaging Science, 1992-93.
14. Samson Tsoi – An NMR Simulator, Computer Science, 1991-92.
15. Wendy Weigert – Development of a computer based teaching package on MRI, Computer Science, 1991-92.

#### M.S. Thesis

1. Brian Antalek - MRI of Materials. Materials Science & Engineering, February 1991.
2. Xing Li -  $T_1$  &  $T_2$  Measurements in the Presence of  $B_1$  Inhomogeneities. Imaging Science, March 1995.
3. Sang-Yun Moon - Quantitative MRI: System Performance Testing. Imaging Science, May 2008.
4. Nagesh Narendranath - Multispectral Tissue Classification. Imaging Science, May 1996.
5. Harshe Narne – Modeling of  $B_0$  and  $B_1$  Fields in Unilateral MRI. Computer Science, May 2007.
6. Wayne Prentice - Segmentation of Motion From System Instabilities. Imaging Science, May 1997.
7. Dimitri Psarros - Graphical 3D Image Segmentation. Computer Science, May 1993.
8. Jo E. Roe - A Multipurpose MRI Phantom. Chemistry, July 1996.
9. William Ryan - Interface & Characterization of an LFESR Spectrometer. Chemistry, February 1996.
10. Hongmei Yuan – Pulsed Field Gradient NMR Spectroscopy, Chemistry, 2012.

#### Ph.D. Thesis

1. Thomas Servoss, Imaging Science – Collection & Analysis of Multispectral MRI Data Using a Clinical Imaging System, Imaging Science, May 2002.
2. Christina Bray, Imaging Science – Magnetic Resonance Surface Imaging. Imaging Science, May 2006.
3. Yujie Qiu, Imaging Science – A Dynamic Magnetic Resonance Imaging (MRI) Phantom Based on Electric Field Induced Residual Dipolar Couplings, May 2013.

#### Post-Doctoral Associates

1. Dr. Christina L. Bray – NMR Phantom Filler Material, 2007.
2. Dr. Karl Helmer - Diffusion of Ions in Gelatin, 1992-93.
3. Dr. Edward Szczepaniak – CW ESR Imaging With Phases Modulation Coils, 1990-92.

#### Visiting Scholars

1. Prof. Liu Xiuhua, Chemistry Department, Henan University, Kaifeng, China – NMR Spectroscopy. 2006.
2. Prof. Leslie Schwartz, St. John Fisher College, Rochester, NY – Low-Field ESR of Free Radicals, 1990-1991.
3. Prof. Leslie Schwartz, St. John Fisher College, Rochester, NY – Reverse Micelle Solution Characterization, 1997-1998.
4. Dr. Zafer Koylu, Physics Department, Science Faculty, Dicle University, Diyarbakir, TURKEY - NMR Spin-Lattice Relaxation, 2012.