

CURRICULUM VITAE

Gregory S. Karczmar, Ph.D.

EDUCATION

B.A.	Major in Chemistry, Reed College, Portland, Oregon, 1977
M.S.	Physical Chemistry, University of California, Berkeley, 1980
Ph.D.	Physical Chemistry, University of California, Berkeley, 1984

EMPLOYMENT

1984-1986	Postdoctoral fellow, University of California at San Francisco
1986-1988	Research associate, University of California at San Francisco
1988-1989	Adjunct Assistant Professor, Department of Radiology, University of California at San Francisco
1989-1996	Assistant Professor, Department of Radiology, University of Chicago
1993-present	Director of MRIS Research Facility Department of Radiology, University of Chicago
1996-2005	Associate Professor, Department of Radiology, University of Chicago
2003 - 2005	Associate Professor, Committee on Medical Physics, University of Chicago
2005 – present	Professor of Radiology and Medical Physics, University of Chicago
2006-present	Director, Lynn S. Florsheim Magnetic Resonance Imaging and Spectroscopy Facility

TEACHING EXPERIENCE

- 1979-1980** Teaching Assistant in Chemistry; four quarters.
Freshman Chemistry and Biophysical Chemistry,
University of California, Berkeley
- Current** MR section of 'Physics of Diagnostic Radiology' offered yearly.
- MR section of Radiology 343: 'Practicum in Physics of Diagnostic Radiology' offered yearly.
- Radiology 358: 'Biomedical Applications of Magnetic Resonance' offered intermittently.
- Radiology 395: 'Seminar in *In Vivo* MR Methods' offered intermittently.
- MR section of BioSci 263: 'Introduction to Medical Physics', every other year.

Graduate Students:

- David A. Kovar, Ph.D. 1998.* Thesis: 'Measurement of Perfusion and Extraction Fraction using MR'.
- Hania A. Al-Hallaq. Ph.D. 2000.* Thesis: ' Effects of Tumor Oxygenating Agents measured by MRI'.
- Weiliang Du. Ph.D. in 2004.* Thesis: 'High spectral and spatial resolution MRI'.
- Sean Foxley.* Ph.D. expected in 2007.
- Sanaz Arkani-Hamed* (shared with Dr. Newstead, the FBI, MI6 and CSS), Ph.D. expected in 2008.
- Abbie Marie Wood.* Ph.D. expected in 2010.

Physics graduate students who worked part time in my laboratory:

- Jim Knight (Graduate Advisors - Drs. Nagle and Jaeger), 1994.
- Dan Mueth (Graduate Advisors - Drs. Nagle and Jaeger), 1999.
- Milica Medved (Graduate Advisors - Drs. Nagle and Jaeger), 1999-2000.
- Cheng Yang (Graduate Advisor - Dr. Kadanoff), 2003.
- Matthias Mobius (Graduate Advisors - Drs. Nagle and Jaeger), 2002-2003.
- Cheng Xiang (Graduate Advisors - Drs. Nagle and Jaeger), 2004.
- Sanaz Arkani-Hamed (Graduate Advisor - Dr. Sean Carrol), 2003.

Postdocs full time in my lab:

Zoya Goldman, 1991 - 1992
Vadim Kuperman, 1992 - 1994
Philippe Bourrinet, 1996
Xiaobing Fan, 1999 - 2001
Milica Medved, 2000 - 2002
Cheng Yang (co-advisor with Walter Stadler), 2003-2004

Postdocs who worked part-time in my laboratory:

Edward Ehrichs (Physics; Dr. Nagel), 1994.
Georges Debregas (Physics; Dr. Jaeger), 1999.
Chad Haney (Radiation and Cellular Oncology; Dr. Pelizzari), 2002.
Cheng Yang (Medicine; Dr. Stadler), 2002 – 2003.

GRANT SUPPORT

Previous

Principal Investigator; NIH National Research Service Award; 'NMR study of effects of fructose on high energy phosphates in liver'; 1986 - 1988, Total direct and indirect costs \$80,000.

Principal Investigator; Whitaker Bioengineering Award; 'Use of radiofrequency magnetic field gradients to image perfusion and diffusion in tumors'; 1990-1993. Total direct and indirect costs \$220,000.

Principal Investigator; 1-S10-RR05887 Shared Instrumentation Grant; 'General Electric 4.7 Tesla/33 MRI/MRS Spectrometer'; 1991. Total direct and indirect costs \$500,000.

Principal Investigator; University of Chicago Cancer Research Center Development Award; 1991-1992. Total direct and indirect costs \$100,000.

Principal Investigator; NCI 5R29 CA52008; 'Response of tumors to TNF studied by Magnetic Resonance'; 1991-1996. Total direct and indirect costs \$542,000.

Principal Investigator; American Cancer Society Institutional Award; 'MRI of Cancer'; 1992. Total direct and indirect costs \$20,000.

Principal Investigator of the MRI section; NCI – 1 P20 CA66132; 'Breast Cancer Planning Grant; 1992- 1995. Total direct and indirect costs \$30,000.

Principal Investigator; ACS JFRA-442 American Cancer Society Junior Faculty Research Award; 'Measurement of tumor perfusion by MR'; P.I. Karczmar; 1993 – 1995. Total direct and indirect costs \$117,000.

Principal Investigator; American Cancer Society, Illinois Division, Research Grant; 'Magnetic Resonance chemical shift imaging study of tumor oxygenation'; 1994-1995. Total direct and indirect costs \$100,000.

Principal Investigator; American Cancer Society Research Grant CCE-86272; 'Use of MR to study tumor response to hyperoxia'; 1997- 2000. Total direct and indirect costs \$412,000.

Principal Investigator; Nycomed Inc.; 'Use of superparamagnetic contrast agents to image tumor vasculature'; P.I. Karczmar; 1998-2000. Total direct and indirect costs \$279,000.

Principal Investigator; Guerbet Group; 'MRI of metastatic and non-metastatic prostate tumors using slowly diffusing contrast agents'; 1998 – 2000. Total direct and indirect costs \$100,000.

Principal Investigator; General Electric Medical Systems; ' Implementation of high spectral and spatial resolution MRI on a SIGNA platform; 1999- 2001. Total direct and indirect costs \$100,000.

Principal Investigator; Army Breast Cancer Research Program BC981147; 'Improved MR images of breast lesions with fast spectroscopic imaging' ; 1999- 2000. Total direct and indirect costs \$510,000.

Principal Investigator for the Core facility; University of Chicago Cancer Center; 'Magnetic resonance imaging core facility.' 2000 – 2002. Total direct and indirect costs \$263,000.

Principal Investigator; NCI 1RO1CA76476, 'Effects of radiosensitizers measured by MRI'; 2000 - 2003. Total direct and indirect costs \$651,000.

Principal Investigator; NCI 1RO1CA78803; 'Fast spectroscopic imaging of breast cancer'; 8/31/99-8/31/03. \$558,000.

Principal Investigator; NIH Shared Instrument Grant; 'Upgrade for 4.7 Tesla MR Scanner', 04/01/01 – 03/31/02 with no cost extension to 03. Total direct and indirect costs \$487,000.

Co-investigator; MARF, Computerized Analysis of Mesothelioma on Thoracic Images P.I, Armato - 11/1/01-10/30/03. Total direct and indirect costs approximately \$300,000.

Co-Investigator: American Cancer Society, Illinois Division Grant #25890, 'Use of Dynamic Contrast Enhanced MRI with High Temporal Resolution for Diagnosis of DCIS'; P.I. Gillian Newstead - 07/01/03 – 06/30/04. Total direct and indirect costs \$100,000.

Co-investigator; NIH RO1 GM61101-01, 'Electrical Injury: Imaging of thermal and non-thermal aspects; P.I. Lee - 04/01/00-03/31/03 with no-cost extension to 2005. Total direct and indirect costs approximately \$1,500,000.

Principal Investigator; Department of Defense DAMD17-02-1-0033, 'Angiogenesis and invasiveness in prostate cancer detected with high spectral & spatial resolution MR'; 12/24/01 – 1/23/05 with no-cost extension. Total direct and indirect costs: approximately \$450,000.

Principal Investigator; ACS RPG-97-112-01-CCE, ‘Use of MR to study tumor response to hyperoxia’, 07/01/2001 - 6/30/05 with no-cost extension. Total direct and indirect costs approximately \$360,000.

Co-investigator; NIH R01 CA89452-01, ‘Computer-Aided Diagnosis in Breast Imaging’ P.I. Giger – 04/24/01-03/31/06. Total direct and indirect costs approximately \$1,500,000.

Co-Investigator; U.S. Army Medical Research DAMD17-02-1-0034; ‘Image Guidance and Assessment of Radiation Induced Gene Therapy’; P.I. Charles Pelizzari - 01/07/02 - 01/06/05. Total direct and indirect costs approximately \$400,000.

Principal Investigator; NIH Institute of Alternative Therapy; ‘Anti-angiogenic effects of green tea – Evaluation by MRI and EPRI’; 11/01/03 – 10/30/04. Total direct and indirect costs \$134,000.

Principal Investigator; UCCRC; Magnetic Resonance Imaging of Rodent Models of Early Breast Cancer. 01/01/ 2005 – 12/30/2006. Total direct and indirect costs, \$50,000.

Co-Investigator; American Cancer Society, Illinois Division Grant #25890, ‘Use of Dynamic Contrast Enhanced MRI with High Temporal Resolution for Diagnosis of DCIS’; P.I. Gillian Newstead - 01/01/05 – 12/30/06. Total direct and indirect costs \$100,000.

Principal Investigator; NCI R21CA100996 (R21/R33); Measurement of Subvoxel Microvessel Density With High Spectral and Spatial Resolution MRI ; 6/01/2004 –7/31/2007 Total direct and indirect costs requested: approximately \$1,500,000 if milestones for R33 phase are completed.

Co-Investigator, NIH R21CA104774; MRI of DCIS; New Approaches to Sampling and Analyzing Contrast Media Uptake and Washout; P.I. Gillian Newstead; 08/01/04 – 7/31/06. Total direct and indirect costs requested; \$325,000.

Principal Investigator, NIH S10; A 9.4 Tesla MRI magnet for the University of Chicago. Total direct and indirect costs requested; 06/01/2006 – 05/30/2007. Total costs \$500,000.

Principal Investigator; Florsheim Foundation; Funding for a 9.4 Tesla MRI magnet. 01/01/06 – 12/31/07/ Total costs \$500,000

Current:

P.I. of MRI Core facility on the UCCRC Cancer Center Grant (Michelle Le Beau, P.I.); University of Chicago Cancer Center; Renewal of ‘Magnetic resonance imaging core facility’; 4/1/03-3/31/07. Total direct and indirect costs approximately \$600,000.

Principal Investigator; 1 R01 EB003108-01 High Spectral/Spatial Resolution Imaging Breast Cancer; 09/15/03 – 07/31/07. Total direct and indirect costs \$1,252,000. Currently in no-cost extension through 07/31/08

Principal Investigator; 2NCI R01 CA078803-04A2 Fast Spectroscopic MR Imaging of Breast Cancer; 09/01/99 - 2/29/08. Total direct and indirect costs \$1,000,000.

Principal Investigator; NIH R21CA116939-01 ; Dynamic spatial and spectral, contrast enhanced MRI of breast; 08/01/05 – 07/31/07 Total direct and indirect costs; \$420,000. Currently in no-cost extension through 07/31/08.

Co-investigator; NIH R21CA108184; ‘Surrogate MRI markers for response to experimental anti-angiogenic therapy’; P.I. Walter Stadler. Total direct and indirect costs; \$700,000.

Principal Investigator; Philips Medical Systems; Improved spectral, temporal, and spatial sampling for breast cancer diagnosis. 06/01/2006 – 05/30/2007. Total direct and indirect; \$196,000.

Co-Investigator; Philips Medical Systems; Development of a Computer-Aided Diagnosis (CADx) System for Breast MR Lesions; P.I. Gillian Newstead; 06/01/2006 – 05/30/2009. Total direct and indirect costs, \$135,000.

Co-Investigator, NIH RO1; Development of TNFerade; P.I. Ralph Weichselbaum.

Co-Investigator; UCCRC; MRI of specimen images with pathologic correlation. P.I. Gillian Newstead. 06/01/2006 – 05/30/2007. Total direct and indirect costs, \$30,000. Currently in no-cost extension through 05/30/2008

Project 2 Leader; 1 P50 CA125183-01 (P.I. - Olopade); Specificity of MRI with optimal temporal, spatial, and spectral sampling in early breast cancer. 09/27/06 - 07/31/11 Total direct and indirect costs, \$1,395,000 for Karczmar’s project.

PENDING

Principal Investigator R33 CA100996; Microvessel density imaged with high spectral/spatial resolution MRI - **requested approval of transition to R33 phase of R21/R33 grant, currently under review.** Requested funding period, 12/01/07 – 11/30/10. Total funding requested for R33 phase, \$1,300,000 direct + indirect.

Principal Investigator; MRI of early rodent mammary cancer. Submitted to NIH, currently under review. Requested funding period, 1/01/08 – 1/01/13. Total funding requested \$1,918,000 direct + indirect.

Co-Principal Investigator with Newstead; Continuation of the development of HiSS and HiTS; Proposal to Philips Medical Systems, currently under review. Total funding requested, \$275,000 direct + indirect. Requested start date, 09/01/07

Principal Investigator; Preclinical development and testing of 'HIFU marking' Proposal to Philips Medical Systems, currently under review. Total funding requested, \$190,00 direct+indirect, Requested start date 09/01/07

Co-investigator; Impulse response analysis of DCEMRI data. Dr. Xiaobing Fan, P.I. Proposal to NIH, currently under review. Requested funding period 01/01/08 – 01/01/13. Total funding requested \$375,000 direct+indirect.

OTHER PROFESSIONAL ACTIVITIES:

Reviewer for Magnetic Resonance in Medicine

Editorial Board – Magnetic Resonance in Medicine, 2001 - present

Reviewer for Magnetic Resonance Imaging

Reviewer for Neoplasia

Reviewer for International Journal of Radiation Oncology, Biology, and Biophysics

Reviewer for Journal of Magnetic Resonance Imaging

Reviewer for NMR in Biomedicine

Reviewer for Bioelectromagnetics

Reviewer for Kidney International

Reviewer for Academic Radiology

Reviewer for Magma

Reviewer for Journal of the European Society for Therapeutic Radiology and Oncology

Research Advisory Committee, American Cancer Society of Illinois, 2001 - present

Imaging Committee, Cancer and Leukemia Group B, 2001 - present

Reviewer, Ad Hoc Study Section for Mellon Institute Research Resource Application, 2002.

Chair, NIH Special Emphasis Review Group; Imaging of Microcirculation in Diabetes, 2002

Reviewer of Imaging Protocols, Cancer and Leukemia Subgroup B, 2001 - present

Reviewer, NIH Shared Instrumentation 1992, 2001, 2002

Reviewer, NIH Diagnostic Radiology Study Section, 2001,2002, 2005

Reviewer, NIH, Radiation Study Section, 1998, 1999, 2003, 2004, 2005, 2006.

Reviewer, Army Breast Cancer Research Program, Ad Hoc Study Section, 1997

Reviewer, NIH Review committee for Breast Cancer 'Insight Awards'

Reviewer, American Cancer Society of Illinois, 1999 - present

Reviewer, Ad Hoc NIH Study Section for Mellon Institute Research Resource, 2002

Reviewer, NIH Study Section on 'Bioengineering Research Partnerships', 2005

Reviewer, NIH Review Committee for 'Innovation in Molecular Imaging Probes', 2005

Reviewer, California Breast Cancer Research Program, 2003, 2004, 2005

Reviewer, Israel Science Foundation, 2005

Permanent member of NIH, Radiation Study Section, 2006 - present.

Board of Education, School District 201U, 2005 – 2008.
Scientific Advisor, Perceptive Informatics, 2007-2009

UNIVERSITY COMMITTEES

Institutional Review Board 1991 –2003
Graduate Program in Medical Physics, Curriculum Committee, 1999.
Research Advisory Committee, Dept of Radiology, 1996- 1999.
Graduate Program in Medical Physics, Publicity Committee, present
Organizer of the contrast media research program, Dept of Radiology, 1998 - 2000
Organizer, Department of Radiology Research Seminars, 1999 - 2001.
Faculty Awards Committee, 2004 – 2008
Committee on Appointments and Promotions (COAP), 2006- 2008.
Graduate program review committee, 2007
RAC subcommittee on imaging research, 2007

HONORS:

Kroll Scholarship, Reed College, 1976
Dean's List, Reed College
National Research Service Award, 1986
Whitaker Bioengineering Award, 1989
American Cancer Society Junior Faculty Research Award, 1993
Kurt Rossman Award for Excellence in Teaching, 1996
Senior Author on a paper that received the Radiological Society of North America Research Prize in Physics, 1996.
Certificate of Appreciation, American Cancer Society, South Suburban Chicago Chapter, 1999.
Editorial Board, Magnetic Resonance in Medicine, 2001 – present
American Cancer Society Research Scholar, 2003

PROFESSIONAL MEMBERSHIPS:

Society of Magnetic Resonance in Medicine
Society of Magnetic Resonance Imaging
Radiological Society of North America
Radiation Research Society

PATENTS

GS Karczmar, DA Kovar, HA Al-Hallaq, M Zamora, JN River: Fast Spectroscopic Imaging System, Patent No. 6,037,772: MR data acquisition with high spectral and spatial resolution for improved anatomic and functional images. Awarded March 14, 2000.

GS Karczmar, C Pelizzari, Shunmugavelu Sokka. MRI-guided HIFU Marking to guide radiotherapy and other procedures. Patent application submitted.

PUBLICATIONS

Articles published in peer reviewed journals:

- 1) **GS Karczmar** and T Tritton: Interaction of Adriamycin with small unilamellar vesicle liposomes. *Biochimica et Biophysica Acta* **557**:306-319, 1979.
- 2) **GS Karczmar**, AP Koretsky, MW Weiner, MJ Bissell, and MP Klein: A device for maintaining viable cells at high densities for NMR studies. *Journal of Magnetic Resonance* **53**:123-128, 1983.
- 3) **GS Karczmar**, GB Matson, and MW Weiner: A single acquisition localization technique. *Magnetic Resonance in Medicine* **3**:341-345, 1986.
- 4) **GS Karczmar**, MW Weiner, and GB Matson: Detection of residual Z magnetization: Application to the surface coil rotating frame experiment. *Journal of Magnetic Resonance* **71**:360-364, 1987.
- 5) **GS Karczmar**, T Lawry, MW Weiner, and GB Matson: Use of shaped pulses for slice selection in B₁ gradients. *Journal of Magnetic Resonance* **76**:41-53, 1988.
- 6) **GS Karczmar**, DB Twieg, T Lawry, and MW Weiner: Detection of motion using B₁ gradients. *Magnetic Resonance in Medicine* **7**:111-116, 1988.
- 7) JM Arbeit, BJ Toy, **GS Karczmar**, A Hubesch, and MW Weiner: Inhibition of tumor high energy phosphate metabolism by Insulin combined with Rhodamine. *Surgery* **104**:161-170, 1988.
- 8) GB Matson, DB Twieg, **GS Karczmar**, T Lawry, J. Gover, M Valenza, M Boska, MW Weiner: Image-guided surface coil ³¹P MRS of human liver, heart, and kidney. *Radiology* **169**: 541-547, 1988.
- 9) S Schaefer, J Gober, **GS Karczmar**, M Valenza, B Massie, and MW Weiner: Image guided ³¹P spectroscopy of the human heart. *Journal of the American College of Cardiology* **12**: 1449-1445, 1988.
- 10) **GS Karczmar**, T Lawry, GB Matson, and MW Weiner: Improvement of the Rotating Frame Experiment by detection of residual Z magnetization: A ³¹P MRS study of a Meth-A Sarcoma. *NMR in Biomedicine* **1**:159-164, 1989.
- 11) **GS Karczmar**, NT Jalles, MW Weiner: An In Vivo ³¹P NMR study of intestine. *Magnetic Resonance in Medicine* **9**:8-15, 1989.

- 12) TJ Lawry, **GS Karczmar**, MW Weiner, and GB Matson: Computer simulation of MRS localization techniques; An analysis of ISIS. *Magnetic Resonance in Medicine* **9**:299-314, 1989.
- 13) N Shine, MA Palladino, JS Patton, A Deisseroth, **GS Karczmar**, G Matson, and MW Weiner: ^{31}P NMR detects early response to Tumor Necrosis Factor in mouse sarcoma. *Cancer Research* **49**:2123-2127, 1989.
- 14) **GS Karczmar**, T Kurtz, N Jalles-Tavares, and MW Weiner: Effects of fructose on liver phosphates. *Biochemical et Biophysica Acta* **1012**:121-127, 1989.
- 15) **GS Karczmar**, NJ Tavares, and ME Moseley: Use of RF field gradients to image flow in vivo. *Radiology* **172**:363-366, 1989.
- 16) DJ Meyerhoff, **GS Karczmar**, GB Matson, MD Boska, and MW Weiner: Abnormalities of the liver evaluated by ^{31}P MRS. *Investigative Radiology* **24**: 980-984, 1989.
- 17) **GS Karczmar**, DJ Meyerhoff, A Speder, F Valone, M Wilkinson, N Shine, MD Boska, and MW Weiner: Response of tumors to therapy studied by ^{31}P Magnetic Resonance Spectroscopy. *Investigative Radiology* **24**:1020-1023, 1989.
- 18) MW Weiner, H Hetherington, B Hubesch, **GS Karczmar**, B Massie, A Maudsley, DJ Meyerhoff, D Sappey-Marini, S Schaefer, DB Tweg, and GB Matson: Clinical Magnetic Resonance Spectroscopy of brain, heart, liver, kidney, and cancer: A quantitative approach. *NMR in Biomedicine* **2**:290, 1989.
- 19) MD Boska, B Hubesch, DJ Meyerhoff, DB Tweg, **GS Karczmar**, GB Matson, and MW Weiner: Comparison of ^{31}P MRS and ^1H MRI at 1.5 and 2.0 Tesla. *Magnetic Resonance in Medicine* **13**:228-238, 1990.
- 20) DJ Meyerhoff, **GS Karczmar**, GB Matson, MD Boska, and MW Weiner: Non-invasive quantitation of normal human liver metabolites using image-guided Magnetic Resonance Spectroscopy. *NMR in Biomedicine* **3**:17-22, 1990.
- 21) MD Boska, DJ Meyerhoff, GB Matson, **GS Karczmar**, DB Tweg, and MW Weiner: Non-invasive studies of metabolism in human orthotopic and transplanted kidney by ^{31}P MRS. *Kidney International* **38**: 294-300, 1990.
- 22) JM Gober, GG Schwartz, S Schaefer, BM Massie, MW Weiner, **GS Karczmar**: Use of radio frequency field gradient echoes to detect myocardial phosphate. *Magnetic Resonance in Medicine* **20**: 171-183, 1991.
- 23) **GS Karczmar**, DJ Meyerhoff, MD Boska, B Hubesch, J Poole, GB Matson, F Valone, MW Weiner: ^{31}P MRS study of response of superficial human tumors to therapy. *Radiology* **179**: 149 - 153, 1991.

- 24) **GS Karczmar**, JM Arbeit, BJ Toy, A Speder, and MW Weiner: Effects of 2-Deoxyglucose and Insulin on energy metabolism in Methylcholanthrene-induced rodent tumors. *Cancer* **52**: 71-76, 1991.
- 25) DJ Meyerhoff, **GS Karczmar**, F Valone, A Venook, GB Matson, MW Weiner: Hepatic cancers and their response to chemoembolization therapy. *Investigative Radiology* **27**:456-464, 1992.
- 26) **GS Karczmar**, P River, JN River, D Kovar, MZ Lewis, R Lee, and MJ Lipton. Prospects for assessment of the effects of electrical injury by Magnetic Resonance. *Annals of New York Academy of Science* **720**:176-180, 1993.
- 27) **GS Karczmar**, JN River, J Li, M Zamora, S Vijayakumar: Measurement of tumor oxygenation using susceptibility-weighted Magnetic Resonance Imaging. *NMR in Biomedicine* **7**:3-11, 1994.
- 28) **GS Karczmar**, V Yu Kuperman, JN River, MZ Lewis, and MJ Lipton. MR measurement of response to hyperoxia differentiates tumors from normal tissue and may be sensitive to oxygen consumption. *Investigative Radiology* **29**: S161-S163, 1994.
- 29) **GS Karczmar**, JN River, Z Goldman, J Li, E Weisenberg, M Zamora, and K Liu: Magnetic Resonance Imaging of rodent tumors using radio frequency gradient echoes. *Journal of Magnetic Resonance Imaging* **12**:881-893, 1994.
- 30) V Yu Kuperman, JN River, MZ Lewis MZ, **GS Karczmar**: Magnetic Resonance measurement of changes in T2*-weighted images during hyperoxia differentiates tumors from normal tissue. *Magnetic Resonance in Medicine* **33**:318-325, 1995.
- 31) **GS Karczmar**, J River, and AP Koretsky: Radiofrequency magnetic field gradient echoes have reduced sensitivity to susceptibility gradients. *Magnetic Resonance Imaging* **13**:791-797, 1995.
- 32) EE Ehrichs, HM Jaeger, **GS Karczmar**, JB Knight, VY Kuperman, and SR Nagel. Granular convection observed by Magnetic Resonance Imaging, *Science* **267**:1632-1634, 1995.
- 33) V Yu Kuperman, EE Ehrichs, HM Jaeger, and **GS Karczmar**. A new technique for differentiating between diffusion and flow in granular media using Magnetic Resonance Imaging. *Review of Scientific Instruments* **60**:4350-4355, 1995.
- 34) DA Kovar, MJ Lipton, MZ Lewis, JN River, L Lubich, **GS Karczmar**: Dynamic contrast agent measurement in rodent model tumors. *Academic Radiology* **33**:S384-S386, 1996.
- 35) V Yu Kuperman, **GS Karczmar**, MJK Blomley, MZ Lewis, L Lubich, MJ Lipton. Differentiating between T1 and T2* changes caused by Gd-DTPA in the kidney by using a double-echo dynamic MR imaging sequence. *Journal of Magnetic Resonance Imaging* **6**:764-768, 1996.

- 36) HJ Halpern, C Yu, M Peric, E Barth, **GS Karczmar**, JN River, DJ Grdina, BA Teicher. Measurement of differences in pO₂ response to perfluorocarbon oxygenation modification in FSa and NFSa Murine Fibrosarcomas with Low Frequency EPR Oxymetry. *Radiation Research* **145**:610-618, 1996.
- 37) H Oikawa, HA Al-Hallaq, MZ Lewis, DA Kovar, **GS Karczmar**: Spectroscopic Imaging of the water resonance with short repetition time to investigate response of tumors to hyperoxia. *Magnetic Resonance in Medicine* **38**: 27-33, 1997.
- 38) DA Kovar, MZ Lewis, J River, MJ Lipton, **GS Karczmar**, "*In Vivo* imaging of extraction fractions of low molecular weight MR contrast agents," *Magnetic Resonance in Medicine* **38**:259-268, 1997.
- 39) DA Kovar, HA Al-Hallaq, MZ Lewis, River JN, **GS Karczmar**: Fast Spectroscopic Imaging of water and fat resonances may improve the quality of MR scans. *Academic Radiology* **5**: 269-275 1998.
- 40) HA Al-Hallaq, JN River, MZ Lewis, H Oikawa, **GS Karczmar**. Correlation of Magnetic Resonance and oxygen microelectrode measurements of carbogen-induced changes in tumor oxygenation. *International Journal of Radiation Oncology, Biology, and Biophysics* **41**: 151-159, 1998.
- 41) EE Ehrichs, JK Flint, HM Jaeger, JB Knight, SR Nagel, **GS Karczmar**, VY Kuperman. Convection in vertically vibrated materials. *Philosophical Transactions of the Royal Society of London* **356**: 2561-2567, 1998
- 42) DA Kovar, M Lewis, **GS Karczmar**: A new method for imaging contrast agent extraction fraction: Input functions derived from reference tissues. *Journal of Magnetic Resonance Imaging* **8**: 1126 – 1134, 1998.
- 43) **GS Karczmar**, X Fan, JN River, H Al-Hallaq, M Zamora, C Rinker-Schaeffer, P Losco, K Tarlo, K Kellar. Uptake of a superparamagnetic contrast agent imaged by MR with high spectral and spatial resolution. *Magnetic Resonance in Medicine* **43**: 633-639, 2000.
- 44) H Al- Hallaq, M Zamora, BL Fish, JE Moulder, **GS Karczmar**. MRI measurements correctly predict the relative effect of tumor oxygenating agents on hypoxic fraction in rodent BA1112 tumors. *International Journal of Radiation Oncology, Biology, and Biophysics* **47**: 481-488, 2000.
- 45) DM Mueth, GF Debregas, **GS Karczmar**, PJ Eng, SR Nagel, HM Jaeger. Magnetic Resonance Imaging, X-Ray Tomography and High-Speed Video of Shear Bands in Dense, Three-Dimensional Granular Flows. *Nature*. **406**: 385-389, 2000.
- 46) J. Evelhoch, **G Karczmar**, J Koutcher, R Maxwell, Orhan Nalcioglu, Natarajan Raghunand, B Ross, H Swartz. Applications of Magnetic Resonance in Model Systems: II. Cancer Therapeutics". *Neoplasia* **2**: 152-165, 2000.

- 47) Fan, X., River, J.N., Zamora, M., Tarlo, K., Kellar, K., Rinker-Schaeffer, C., **Karczmar, G.S.** Differentiation of Non-Metastatic and Metastatic Rodent Prostate Tumors with High Spectral and Spatial Resolution MRI, *Magnetic Resonance in Medicine* **45**:1046-1055, 2001.
- 48) HA Al-Hallaq, M Zamora, JE Moulder, **GS Karczmar**. Measurement of spectrally inhomogeneous BOLD contrast changes in rodent tumors by high spectral and spatial resolution (HiSS) MRI. *NMR in Biomedicine* **15**: 28-36, 2001.
- 49) W Du, Y Du, U Bick, X Fan, PM MacEneaney, M Zamora, M Medved, **GS Karczmar**, High spectral and spatial resolution imaging of the breast; Preliminary Experience *Radiology* **224**: 577-585, 2002.
- 50) W Du, **GS Karczmar**, and X Pan: Effects of constant frequency noise in magnetic resonance imaging with non-uniform k-space sampling. *Medical Physics* **29**: 1832 - 1838, 2002
- 51) X Fan, W Du, M Zamora, PM MacEneaney, **GS Karczmar**. Structure of the water resonance in small voxels in rat brain detected with high spectral and spatial resolution MRI. *Magnetic Resonance in Medicine* **16**: 547-552, 2002
- 52) X Fan, JN River, M Zamora, H Al-Hallaq, **GS Karczmar**. Effect of carbogen on tumor oxygenation: Combined fluorine-19 and proton MRI measurements. *International Journal of Radiation Oncology, Biology, and Biophysics* **54**: 1202-1209, 2002.
- 53) RJ Gillies, N Raghunand, **GS Karczmar**, ZM Bhujwalla. MRI of the tumor microenvironment. *Journal of Magnetic Resonance Imaging* **16**: 430-450, 2002.
- 54) HA Al-Hallaq, MA Zamora, BL Fish, HJ Halpern, JE Moulder, **GS Karczmar**. Using high spectral and spatial resolution BOLD MRI to choose the optimal oxygenating treatment for individual cancer patients. *Adv Exp Med Biol* **530**: 433-440, 2003
- 55) M Medved, W Du, MA Zamora, X Fan, OI Olopade, PM MacEneaney, G Newstead, **GS Karczmar**. The effect of varying spectral resolution on the quality of high spectral and spatial resolution magnetic resonance images of the breast. *Journal of Magnetic Resonance Imaging* **18**: 442-448, 2003.
- 56) W Du, YP Du, X Fan, MA Zamora, **GS Karczmar**. Reduction of spectral ghost artifacts in high-resolution echo-planar spectroscopic imaging of water and fat resonances. *Magnetic Resonance in Medicine* **49**: 1113-1120, 2003.
- 57) M Elas, BB Williams, A Parasca, C Mailer, CA Pelizzari, MA Lewis, JN River, **GS Karczmar**, ED Barth, HJ Halpern. Quantitative tumor oxymetric images from 4D electron paramagnetic resonance imaging (EPRI): methodology and comparison with blood oxygen level-dependent (BOLD) MRI. *Magnetic Resonance in Medicine* **49**: 682 – 691, 2003.
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- 85) Images of the fourier components of the water resonance in breast G. S. Karczmar, M. Medved, W. Du, X. Fan, M. Zamora, P. M. MacEneaney, Y.P. Du, F Kelcz and G Newstead, Eleventh Scientific Meeting and Exhibition of ISMRM, Toronto, Canada, July 2003.
- 86) Peterson AC, Swiger S, Stadler W, Karczmar G, Gajewski T. Phase II study of the Flk-1 TK inhibitor SU5416 in patients with advanced melanoma. Proc Amer Soc Clin Oncol 22:2863, 2003
- 87) Newstead GM, Schmidt RA, Devnani AN, MacEneaney PM, Bick U, Karczmar GS. Breast MR Imaging in the Assessment of Residual Disease Following Breast Cancer Surgery. RSNA 89th Scientific assembly and annual meeting, Chicago, December 2003
- 88) High Spectral and Spatial Resolution MRI improves imaging of the breast, Karczmar GS, Medved M. Era of Hope DAMD meeting, September, 2004.
- 89) Successful Application of High Spatial and Spectral Resolution MR for Imaging of Small Breast Lesions M. Medved, G. Newstead, P. MacEneaney, W. Du, M. Zamora, X. Fan, O. Olopade, G. Karczmar, Twelfth Scientific Meeting and Exhibition of ISMRM, Kyoto, Japan, May 2004.
- 90) Correction of B0 Field Inhomogeneities Improves Susceptibility-Weighted Breast Echo Planar Spectroscopic Images J. L. Taylor, M. Medved, W. Du, G. Newstead, G. S. Karczmar, Twelfth Scientific Meeting and Exhibition of ISMRM, Kyoto, Japan, May 2004.

- 91) Differentiation of Metastatic and Non-metastatic Rodent Prostate Cancer Using a New Mathematical Model to Fit Dynamic Contrast Enhanced MRI Data X. Fan, M. Medved, J. N. River, M. A. Zamora, C. Corot, P. Robert, P. Bourinet, M. J. Lipton, G. S. Karczmar, Twelfth Scientific Meeting and Exhibition of ISMRM, Kyoto, Japan, May 2004.
- 92) High Temporal Resolution MR Imaging for More Accurate Diagnosis of DCIS C. Yang, M. Medved, H. Abe, M. A. Zamora, G. S. Karczmar, G. Newstead, Twelfth Scientific Meeting and Exhibition of ISMRM, Kyoto, Japan, May 2004.
- 93) Newstead GM, Karczmar GS, Medved M, Zamora M, Schmidt RA, Abe H. High Spectral and Spatial Resolution (HISS) MR Images of Focal Breast Lesions. Comparison with Conventional MR Imaging: Initial Experience. ARRS 104th annual meeting, Miami Beach, FL, 2004
- 94)
- 95) Multislice imaging with high spectral and spatial resolution for detection of breast lesions. M. Medved, G Karczmar, H Abe, G Newstead, RSNA, Chicago, Illinois, 2004.
- 96) Newstead GM, Abe H, Arkani S, Sennett CA, Schmidt RA, Karczmar GS. Jaskowiak N Effect of Magnetic Resonance Imaging on the Clinical Management of Women with Newly Diagnosed Breast Cancer. RSNA 2004
- 97) Foxley, S., D. Mustafi, X. Fan, C. Yang, M. Zamora, E. Markiewicz, and G. S. Karczmar, Changes in Fourier Component Magnetic Resonance Images Due to the Introduction of a Blood Pool Contrast Agent, in 92nd Scientific Assembly and Annual Meeting, RSNA, Nov/Dec, 2006. Chicago, IL.
- 98) Haney, C.R., A. Parasca, M. Zamora, X. Fan, G.S. Karczmar, H. Mauceri, R.W. Weichselbaum, H.J. Halpern, and C.A. Pelizzari. Image Registration for Multi-Modality Image Guided Radiation Induced Gene Therapy. in Fifth Annual Meeting of the Society for Molecular Imaging. 2006. Waikoloa, HI.
- 99) Mustafi, D., S. Foxley, M. Zamora, M. W. Makinen, and G. S. Karczmar. New Vanadium-based MRI Probes for Early Detection of Cancer. in International Society for Magnetic Resonance in Medicine, 14th Scientific Meeting, May 6-12, 2006 Seattle, WA.
- 100) Haney, C.R., C.A. Pelizzari, S. Foxley, M. Zamora, D. Mustafi, M. Tretiakova, T.S. Li, X. Fan, and G.S.Karczmar. Validation of EPSI Angiography by Image Co-registration. in International Society for Magnetic Resonance in Medicine. 2007. Berlin, Germany.
- 101) Sanaz Arkani, Suzanne Conzen, Thomas Krausz, Marta Zamora, Gillian M. Newstead, and Gregory Karczmar. MRI of Ductal Carcinoma in situ and Other Early Mammary Cancers in Transgenic Mice, in 15th Annual Meeting of the Society for Magnetic Resonance in Medicine, May 2007, Berlin Germany.
- 102) Karczmar GS., Foxley S., Medved M.: High spectral and spatial resolution imaging - advantages and challenges. Inaugural meeting at the Center for Neurodegenerative diseases, San Francisco, California, 2006.

- 103) Karczmar GS., Foxley S, Medved M., Newstead G: HiSS MRI of breast and other applications of spectral/spatial imaging. NIH Symposium on anatomic, functional, and molecular imaging. Bethesda Maryland, 2006.
- 104) Sanaz Arkani, Hiroyuki Abe, Gregory Karczmar, Robert A. Schmidt, Gillian M. Newstead. Ductal Carcinoma in Situ (DCIS): Kinetic and Morphologic Characteristics on Dynamic Contrast Enhanced Magnetic Resonance Imaging (DCEMRI), in 105th Annual Meeting of the American Roentgen Ray Society, May 2005.
- 105) Sanaz Arkani, Hiroyuki Abe, Gregory Karczmar, Robert A. Schmidt, Gillian M. Newstead. Characteristics of Ductal Carcinoma in Situ on Dynamic Contrast Enhanced Magnetic Resonance Imaging, in 13th Annual Meeting of the Society for Magnetic Resonance in Medicine, May 2005.
- 106) Sanaz Arkani, Vicky Chen, Caroline Cranford, Lindsay Zak, Hiroyuki Abe, Gregory Karczmar, Robert A. Schmidt, Funmi Olopade, Gillian M. Newstead. Women at High Risk for Breast Cancer: Classification of Parenchymal Enhancement on Breast MR Imaging and Correlation with Mammographic Density, in 106th Annual Meeting of the American Roentgen Ray Society, May 2006.
- 107) Sanaz Arkani, Hiroyuki Abe, Akiko Shimauchi, Gregory Karczmar, Robert A. Schmidt, Gillian M. Newstead. MR Imaging of Pure Ductal Carcinoma in Situ: Kinetics, Morphology, and Correlation with Mammographic Presentation and Nuclear Grade, in 92nd Scientific Assembly and Annual Meeting of the Radiological Society of North America, November 2006.
- 108) Sanaz Arkani, Vicky Chen, Caroline Cranford, Lindsay Zak, Hiroyuki Abe, Gregory Karczmar, Robert A. Schmidt, Funmi Olopade, Gillian M. Newstead. Parenchymal enhancement on breast MRI may be a marker for cancer risk: correlation of parenchymal enhancement with breast density, in 29th Annual San Antonio Breast Cancer Symposium, December 2006.
- 109) Sanaz Arkani, Xiaobing Fan, Hiroyuki Abe, Gregory Karczmar, Robert A. Schmidt, and Gillian M. Newstead. Improving the Diagnostic Accuracy of 3D Breast DCEMRI Data Using an Empirical Mathematical Model, in 15th Annual Meeting of the Society for Magnetic Resonance in Medicine, May 2007.
- 110) Sanaz Arkani, Hiroyuki Abe, Akiko Shimauchi, Gregory Karczmar, and Gillian M. Newstead. Molecular Markers and DCEMRI of Breast Cancer: Relationship with Kinetics in Invasive Ductal Carcinoma, in 15th Annual Meeting of the Society for Magnetic Resonance in Medicine, May 2007.
- 111) Sanaz Arkani, Hiroyuki Abe, Akiko Shimauchi, Robert A. Schmidt, Gregory Karczmar, and Gillian M. Newstead. Dynamic MR Imaging of Invasive Ductal Carcinoma: Studying Kinetics by Estrogen Receptor, Progesterone Receptor and Her2/Neu Amplification Status Molecular Markers, in 107th Annual Meeting of the American Roentgen Ray Society, May 2007.

- 112) Sanaz A. Jansen, Xiaobing Fan, Gregory Karczmar, Hiroyuki Abe, Robert A. Schmidt, Gillian M. Newstead. DCEMRI of Breast Lesions: Is Kinetic Analysis Equally Effective for Both Mass and Non-mass-like Enhancement?, in 93rd Scientific Assembly and Annual Meeting of the Radiological Society of North America, November 2007.
- 113) Sanaz A. Jansen, Cheng Yang, Hiroyuki Abe, Akiko Shimauchi, Gregory Karczmar, Gillian M. Newstead. DCEMRI of Malignant Breast Lesions: Should a Fixed Volume of Contrast be Injected, or a Fixed Dose, in 93rd Scientific Assembly and Annual Meeting of the Radiological Society of North America, November 2007.

ISMRM 2006 abstracts

RSNA abstracts 2005 and 2006

ARRS abstracts 2006

INVITED TALKS

- 1) Investigation of metabolic disorders in patients and animal models using *in vivo* magnetic resonance spectroscopy. International Symposium on Cell Function and Disease, Monterrey, Mexico, 1988.
- 2) Use of radio frequency gradients for spatially resolved NMR and spectral editing. XIII International Conference on Magnetic Resonance in Biological Systems, Madison, Wisconsin, 1988.
- 3) MR studies of the metabolic response of tumors to therapy. NIH Workshop on Applications of Magnetic Resonance to the Study and Treatment of Cancer, Bethesda, 1989.
- 4) Applications of surface coils for *in vivo* magnetic resonance. Society of Magnetic Resonance in Medicine, Educational Symposium, San Francisco, 1991.
- 5) Physiological measurements with MRI. Department of Pharmacology, Loyola University, 1993.
- 6) BOLD effect measurements in tumors. MRI Research Center, Fox Chase Cancer Center, Philadelphia, PA., 1993.
- 7) New approaches to measurement of tumor oxygenation. University of Illinois at Chicago, Dept. of Radiology, 1994.
- 8) Measurements of capillary permeability with MRI. Northwestern University Dept. of Radiology, 1995.

- 9) Use of magnetic resonance imaging to evaluate tumor oxygenation agents. Cancer Study Group, International Society of Magnetic Resonance in Medicine, 1996
- 10) Comparison of magnetic resonance and oxygen electrode measurements. Microscopy and Microanalysis Conference, St. Paul Minnesota, 1996.
- 11) MR measurements of effects of tumor oxygenating agents. University of Minnesota, Magnetic Resonance Research Center, 1996.
- 12) Spectroscopic imaging of the water resonance with high spectral and spatial resolution, Carnegie Mellon University, 1997.
- 13) Functional imaging of tumors. University of California at San Francisco Department of Radiology, 1998.
- 14) MR studies of tumor oxygenation. Stanford Department of Radiology, 1998.
- 15) Advantages of spectroscopic imaging tumors. Cancer Study Group, International Society of Magnetic Resonance in Medicine, St. Louis, 1998
- 16) High spectral and spatial resolution magnetic resonance imaging. University of Minnesota, Magnetic Resonance Research Center, 1998.
- 17) Differentiation of metastatic and non-metastatic tumors with contrast enhanced MRI. Monsanto Corporate Research Center, St. Louis, Missouri, 1998.
- 18) Functional imaging of tumors. American Association of Physicists in Medicine, Nashville Tennessee, 1999.
- 19) New approaches to detection of MR contrast agents. Nycomed Corporate Research, Wayne, PA., 1999.
- 20) MRI measurements correctly predict the relative effect of tumor oxygenating agents on hypoxic fraction. International Society of Oxygen Transport to Tissue, Dartmouth College, 1999.
- 21) Functional and anatomic imaging of tumor vasculature: High resolution MR spectroscopic imaging combined with a superparamagnetic contrast agent. Contrast Media Research Meeting, Woodstock, Vermont, 1999.
- 22) High spectral and spatial resolution MRI with applications to contrast media dynamics. Dept. of Biology, Carnegie Mellon University, 1999.
- 23) Early detection of cancer. American Cancer Society Illinois Division, Illinois, 1999.
- 24) MRI studies of tumor physiology. Department of Radiation Oncology, Medical College of Wisconsin, 1999.

- 25) Detection of the BOLD effect in tumors. St. Georges Medical Center, London, 1999.
- 26) Advantages of high spectral resolution for functional and anatomic MRI. Department of Radiology, University of Pittsburgh, 2000.
- 27) Measurement of tumor capillary permeability using two MRI contrast agents of different molecular weights. Guerbet Lecture Series, Paris, France, 2001
- 28) Increased sensitivity to contrast agents with high spectral and spatial resolution MRI. Contrast Media Research Meeting, Woodstock, Vermont, 2001
- 29) ***DCEMRI for Early Evaluation of Response to Antiangiogenic Cancer Treatment**", MRI Center, Clinical Center of Serbia, Belgrade, Yugoslavia, October 2001. ***Presenter – Dr. Milica Medved; results of collaborative research.**
- 30) High spectral and spatial resolution imaging for improved sensitivity to tumor microenvironments. Contrast Media Research Meeting, Capri, Italy, 2002.
- 31) Early detection of cancer. American Cancer Society of Illinois, Oakbrook, Illinois, 2001.
- 32) Use of MRI to detect tumor response to therapy. Cancer and Leukemia Group Meeting, Orlando, 2002.
- 33) High spectral and spatial resolution MRI of breast and other tissues. Northwestern University Evanston Hospital Department of Radiology, 2003
- 34) High spectral and spatial resolution MRI of breast cancer; University of Washington at St Louis; St. Louis MO., 2003
- 35) Anatomic and functional MRI of Cancer; Physics Department Colloquium., University of Washington at St. Louis; St. Louis MO. 2003.
- 36) ***Clinical Breast MRI. Kyoto College of Medical Tec, Kyoto, Japan 2003 . *Presenter - Dr. Gillian Newstead; results from collaborative research.**
- 37) ***Breast MR for the Breast Cancer Patient, McMaster University, Hamilton, Ontario, Canada, 2003. *Presenter - Dr. Gillian Newstead; results from collaborative research.**
- 38) New applications of MRI to cancer, American Cancer Society, Batavia Chapter, Geneva, Illinois, 2003.
- 39) MRI measurements of tumor oxygenation. Symposium on Advances in Imaging-Guided Diagnosis and Therapy, Round Top Texas, 2004
- 40) New sources of contrast in MR images, Dartmouth College, 2004

- 41) MRI approaches to Breast Cancer Screening and rapid evaluation of response to therapy; Cancer Center Administrators Forum, 2004
- 42) MRI imaging techniques for assessment of tumor response to therapy. RSNA refresher course, Chicago, Ill., 2004.
- 43) *MRI: Is it as good as all the hype? International Institute for Medical Education, Orlando, Florida 2004. ***Presenter - Dr. Gillian Newstead; results from collaborative research.**
- 44) New functional and anatomic MR imaging approaches to detection and staging cancer; implications for targeted therapy. Japan/US Cancer Therapy Symposium (JUCTS) on “New Horizons of Targeted Treatment in Radiation Oncology”, Maui, Hawaii, 2005
- 45) Vascular properties of tumors measured using intrinsic MRI contrast. ISMRM Cancer Imaging Course, Miami, Florida, 2005.
- 46) RSNA refresher course, 2006 XXXXX
- 47) Characteristics of Fourier Component Images. ENC, Asilomar, California, 2006.
- 48) Vascular properties of tumors measured using intrinsic MRI contrast II. ISMRM Cancer Imaging Course, Seattle, Washington, 2006.
- 49) High spectral and spatial resolution imaging - advantages and challenges. Inaugural meeting at the Center for Neurodegenerative diseases, San Francisco, California, 2006.
- 50) HiSS MRI of breast and other applications of spectral/spatial imaging. NIH Symposium on anatomic, functional, and molecular imaging. Bethesda Maryland, 2006.

*Talks with an asterisk indicate presentations by colleagues of the results of our collaborative research.