

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME Bruce Rosen, M.D., PhD	POSITION TITLE Professor of Radiology_HMS		
eRA COMMONS USER NAME Brosen	Director, Athinoula A. Martinos Biomedical Imaging Center MGH		
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Harvard University, Cambridge, MA	AB	1977	Astronomy
Mass. Institute of Technology, Cambridge, MA	MS	1980	Physics
Hahnemann Medical College & Hospital, Phila	MD	1982	Medicine
Harvard/MIT Division of Health Sciences	Ph.D.	1984	Physics

A. Positions and Honors. List in chronological order previous positions, concluding with your present position. List any honors. Include present membership on any Federal Government public advisory committee.

1974 John Harvard Scholarship, Harvard University, Cambridge, MA

1977 Phi Beta Kappa, Harvard University, Cambridge, MA

1997 Gold Medal, International Society of Magnetic Resonance in Medicine "Functional Magnetic Resonance Imaging"

1983 Sigma Xi, MIT Chapter of the Scientific Research Society, Cambridge, MA

1983-87 Clinical Fellow, Dept. of Radiology, Massachusetts General Hospital, Boston, MA

1984 National Medical Board Certification

1984-88 Lecturer, Harvard/MIT Division of Health Sciences and Technology, Boston, MA

1985-92 Visiting Scientist, Whitaker College and Dept. of Nuclear Engineering, MIT, Cambridge, MA

1987 American Board of Radiology Board Certification

1987-88 Instructor in Radiology, Harvard Medical School, Boston, MA

1987-91 Director of Clinical NMR, Massachusetts General Hospital, Boston, MA

1988-91 Assistant Professor in Radiology, Harvard Medical School, Boston, MA

1991-99 Associate Professor in Radiology, Harvard Medical School, Boston, MA

1991-98 Co-Director, MGH-NMR Center, Massachusetts General Hospital, Boston, MA

1992-1999-Director, Radiological Sciences Division, Department of Nuclear Engineering, Massachusetts Institute of Technology, Cambridge, MA.

1998-present Director, MGH-NMR Center, Massachusetts General Hospital, Boston, MA

1999- Professor in Radiology, Harvard Medical School, Boston, MA

2002- Director, . MGH-Athinoula A. Martinos Biomedical Imaging Center

2007- Professor of Health Sciences and Technology, Harvard University, Cambridge, MA

B. Selected peer-reviewed publications (in chronological order). **Do not include publications submitted or in preparation.**

Belliveau JW, Kennedy DN, McKinstry RC, Buchbinder BR, Weisskoff RM, Cohen MS, Vevea JM, Brady TJ, Rosen BR. Functional mapping of the human visual cortex using magnetic resonance imaging. *Science*. 1991; 254:716-719.

Kwong KK, Belliveau JW, Chesler DA, Goldberg IE, Weisskoff RM, Poncelet BP, Kennedy DN, Hoppel BE, Cohen MS, Turner R, Cheng H-M, Brady TJ, Rosen BR. Dynamic magnetic resonance imaging of human brain activity during primary sensory stimulation. *PNAS*. 1992; 89:5675-5679.

Jenkins BG, Chen YI, Kuestermann E, Makris NM, Nguyen TV, Kraft E, Brownell AL, Rosas HD, Kennedy DN, Rosen BR, Koroshetz WJ, Beal MF. An integrated strategy for evaluation of metabolic and oxidative defects in neurodegenerative illness using magnetic resonance techniques. *Ann NY Acad Sci*. 2000; 893:214-242.

Aronen HJ, Pardo FS, Kennedy DN, Belliveau JW, Packard SD, Hsu DW, Hochberg FH, Fischman AJ, Rosen BR. High microvascular blood volume is associated with high glucose uptake and tumor angiogenesis in human gliomas. *Clin Cancer Res*. 2000; 6(6):2189-2200.

Zaharchuk G, Yamada M, Sasamata M, Jenkins BG, Moskowitz MA, Rosen BR. Is all perfusion-weighted magnetic resonance imaging for stroke equal? The temporal evolution of multiple hemodynamic

parameters after focal ischemia in rats correlated with evidence of infarction. *J Cereb Blood Flow*. 2000; 9:1341-1351.

Ostergaard L., Sorensen AG, Chesler DA, Weisskoff RM, Koroshetz WJ, Wu O, Gyldensted C, Rosen BR. Combined diffusion-weighted and perfusion-weighted flow heterogeneity magnetic resonance imaging in acute stroke. *Stroke*. 2000; 31:1097-1103.

Mandeville JB, Jenkins BG, Kosofsky BE, Moskowitz MA, Rosen BR, Marota JJA. Regional sensitivity and coupling of BOLD and CBV changes during stimulation of rat brain. *Mag Reson Med*. 2001; 45:443-447.

Wu O, Koroshetz WJ, Ostergaard L, Buonanno FS, Copen WA, Gonzalez RG, Rordorf G, Rosen BR, Schwamm LH, Weisskoff RM, Sorensen AG. Predicting tissue outcome in acute human cerebral ischemia using combined diffusion- and perfusion-weighted MR imaging. *Stroke*. 2001; 32:933-942.

Hadjikhani N, Sanchez del Rio M, Wu O, Schwartz D, Bakker D, Fischl B, Kwong KK, Cutrer FM, Rosen BR, Tootell RBH, Sorensen AG, Moskowitz MA. Mechanisms of migraine aura revealed by functional MRI in human visual cortex. *Proc Natl Acad Sci USA*. 2001; 98(8):4687-4692.

Dijkhuizen RM, Asahi M, Rosen BR, Lo EH. Delayed rt-PA treatment in a rat embolic stroke model: Diagnosis and prognosis of ischemic injury and hemorrhagic transformation with magnetic resonance imaging. *J Cereb Blood Flow Metab*. 2001; 21:964-971.

Dijkhuizen RM, Ren JM, Mandeville JB, Wu O, Oxdag FM, Moskowitz MA, Rosen BR, Finklestein SP. Functional magnetic resonance imaging of reorganization in rat brain after stroke. *Proc Natl Acad Sci USA*. 2001; 98:12766-12771.

Dijkhuizen RM, Asahi M, Wu O, Rosen BR, Lo EH. Rapid breakdown of microvascular barriers and subsequent hemorrhagic transformation after delayed recombinant tissue plasminogen activator treatment in a rat embolic stroke model. *Stroke* 2002; 33:2100-2104.

Cramer SC, Weisskoff RM, Schaechter JD, Nelles G, Foley M, Finklestein SP, Rosen BR. Motor cortex activation is related to force of squeezing. *Hum Brain Mapping*. 2002; 16:197-205.

Sperling R, Greve D, Dale A, Killiany R, Holmes J, HD Rosas, Bates JF, Cocchiarella A, Firth P, Rosen B, Lake S, Lange N, Routledge C, Albert M: Functional MRI detection of pharmacologically induced memory impairment. *PNAS*. 2002; 99:455-460.

Chen YC, Choi JK, Andersen SL, Rosen BR, Jenkins BG. Mapping dopamine D2/D3 receptor function using pharmacological magnetic resonance imaging. *Psychopharmacology (Berl)*. 2005 Aug; 180(4):705-15.

Thomas RJ, Rosen BR, Stern CE, Weiss JW, Kwong KK. Functional imaging of working memory in obstructive sleep-disordered breathing. *J Appl Physiol*. 2005 Jun; 98(6):2226-34.

Kim YR, Huang IJ, Lee SR, Tejima E, Mandeville JB, van Meer MP, Dai G, Choi YW, Dijkhuizen RM, Lo EH, Rosen BR. Measurements of BOLD/CBV ratio show altered fMRI hemodynamics during stroke recovery in rats. *J Cereb Blood Flow Metab*. 2005 Jul; 25(7):820-9.

Salat DH, Tuch DS, Greve DN, van der Kouwe AJ, Hevelone ND, Zaleta AK, Rosen BR, Fischl B, Corkin S, Rosas HD, Dale AM. Age-related alterations in white matter microstructure measured by diffusion tensor imaging. *Neurobiol Aging*. 2005 Aug-Sep; 26(8):1215-27. Epub 2004 Dec 19. PMID: 15758949

Bar M, Kassam KS, Ghuman AS, Boshyan J, Schmidt AM, Dale AM, Hamalainen MS, Marinkovic K, Schacter DI, Rosen BR, Halgren E. Top-Down facilitation of visual recognition. *Proc Natl Acad Sci U S A*. 2006 Jan 10; 103(2):449-54.

Salat DH, Tuch DS, Greve DN, van der Kouwe AJ, Hevelone ND, Zaleta AK, Rosen BR, Fischl B, Corkin S, Rosas HD, Dale AM. Age-related alterations in white matter microstructure measured by diffusion tensor imaging. *Neurobiol Aging*. 2005 Aug-Sep; 26(8):1215-27. Epub 2004 Dec 19. PMID: 15758949

Schaechter JD, Moore CI, Connell BD, Rosen BR, Dijkhuizen RM. Structural and functional plasticity in the somatosensory cortex of chronic stroke patients. *Brain*. 2006 Oct; 129(Pt 10):2722-33. Epub 2006 Aug 18. PMID: 16921177

Liu CH, Kim YR, Ren JQ, Eucgker F, Rosen BR, Liu PK. Imaging cerebral gene transcripts in live animals. *J Neurosci*. 2007 Jan 17; 27(3):713-22. PMID: 172343603

Murphy SN, Mendis ME, Grethe J, Gollub R, Kennedy D, Rosen BR. A Web Portal that Enables Collaborative Use of Advanced Medical Image Processing and Informatics Tools through the Biomedical Informatics Research Network (BIRN). *AMIA Annu Symp Proc*. 2006; 579-83

Mainero C, Zhang WT, Kumar A, Rosen BR, Sorensen AG. Mapping the spinal and supraspinal pathways of dynamic mechanical allodynia in the human trigeminal system using cardiac-gated fMRI. *Neuroimage*. 2007 Apr 15; 35:1201-10

Liu CR, Huang S, Cui J, Kim YR, Farrar CT, Moskowitz MA, Rosen BR, Liu PK, MR contrast probes that trace gene transcripts for cerebral ischemia in live animals. FASEB J. 2007 Sep;21 (11):3004-15 PMID: 17478745
Farrar CT, Dai G, Novikov M, Rosenzweig A, Weissleder R, Rosen BR, Sosnovik DE, Impact of field strength and iron oxide nanoparticle concentration on the linearity and Diagnostic accuracy of off-resonance imaging. NMR Biomed. 2007 Oct 8 PMID: 17918777

Kannurpatti SS, Biswal BB, Kim YR, Rosen BR. Spatio-temporal characteristics of low-frequency BOLD signal fluctuations in isoflurane-anesthetized rat brain. Neuroimage. 2008 May 1;40(4):1738-47.

C. Research Support. List selected ongoing or completed (during the last three years) research projects (federal and non-federal support). Begin with the projects that are most relevant to the research proposed in this application. Briefly indicate the overall goals of the projects and responsibilities of principal investigator identified above.

ONGOING

Rosen

Advanced Multimodal Neuroimaging Training Grant 9/30/06-7/31/11
1R90-DA023427-01

This training grant will unite trainees whose backgrounds include quantitative engineering, physical and chemical sciences as well as biomedical and biological sciences aims to prepare a new generation of scientists whose broad-based graduate training comprises fundamental neurosciences the technologies.

NIH Rosen T90DA022759-01 9/1/06-7/31/11

Advanced Multimodal Neuroimaging Training Grant

This training grant will unite trainees whose backgrounds include quantitative engineering, physical and chemical sciences as well as biomedical and biological sciences aims to prepare a new generation of scientists whose broad-based graduate training comprises fundamental neurosciences the technologies

Perfusion Imaging with Magnetic Resonance 9/15/06-7/31/10
5R01EB002066-18 (Rosen)

This project is aimed at improving our understanding of the neuro physiological mechanisms that underlie functional recovery after stroke.

5P41 RR14075 08(Rosen) Project 4 09/01/04 – 08/31/09
NCRR

Center for Functional Imaging Technologies

Regional Resource for functional brain imaging.

The goal of this project is to significantly advance the state of the art in DOT for functional brain imaging through the engineering of instrumentation, improvements in image reconstruction algorithms, and experimental validation of DOT results in phantoms, animals, and humans.

BIRN Functional Imaging Project: MGH Site (Subcontract) 2/08/06-11/30/10
(Rosen) U24RR021992-01

The Infrastructure and federated database developed in this proposal will provide access to and sharing of stored MRI Images, clinical findings, and behavioral data relevant to the study of schizophrenia.

Neuroimaging Acupuncture Effects on Human Brain Activity 9/26/03 – 5/31/09
P01AT002048-05 (Rosen - PI)

The central goal of this application is to investigate the neurobiology of acupuncture. All three projects will investigate the possible brain pathways and circuitries involved in acupuncture.

1UL1 RR02578-01 (Slavin) 5/19/08-4/30/09 NCRR

The major goals of this UL1 is to support clinical research through infrastructure, education and service.

This includes the Biomedical Imaging Core.

Role on project: Investigator

COMPLETED

- 5R01EB00790-04 (Rosen) 9/1/04-8/31/07
S/C University of California, San, Diego
Spatiotemporal Brain Imaging: Microscopic and Systems Level
The goal of this project is to improve the spatial and temporal resolution of non invasive technologies which will enable direct imaging of discrete neural units which bridge the systems and cellular levels and to clarify the mechanisms which relate the biophysics of neuronal activity "observables" in our imaging measurements.
- ONDCP (Breiter) 10/01/03 – 09/30/07
Validating High-Field Functional and Structural MRI for Circuitry-Based Phenotyping to Drive Genotyping of Heritable Components Leading to Cocaine Addiction and Mood Disorders Role-Investigator
These proof-of-concept studies will lay the foundation for a neuroimaging-based phenotype delineation of cocaine addiction and recurrent major depression, and serve as a prelude to genome-wide scans for quantitative trait loci for cocaine addiction, and the commonly comorbid disorder of depression.
- BIRN Functional Imaging Project: MGH Site 9/1/02-5/31/08
NIH Supplement to P41 (Rosen)M01RR00827-29
The Infrastructure and federated database developed in this proposal will provide access to and sharing of stored MRI Images, clinical findings, and behavioral data relevant to the study of schizophrenia.
- NCRR (Rosen)S10RR021110-01 04/01/06 – 03/31/07
A Siemens MAGNETOM Trio 3 Telsa MRI System
Shared Instrument Grant
- Cyclotron and Radiochemistry Modules (Rosen) 5/1/04-10/31/07
1S10RR017208-01
The proposed instrument will be important resource for current funded and potential research initiatives. With this, cyclotron and the completion of the PET resources, the NMR Center will be able to provide under one roof the most advanced biomedical imaging tool available.
- (Rosen) NIH 6/10/07-6/9/08
500 MHZ Spectrometer for Molecular Imaging Applications
Shared Instrument Grant
- Rosen MIND Institute 7/1/07-6/30/08
The Mind Institute-MGH SITE
This proposal will maximize the productivity of the MIND Institute investigators and collaborators as well as the broader scientific community by the development, deployment and integration of advanced neuroimaging analysis software for structural, functional and diffusion weighted MRI data.
- Morphometry Biomedical Informatics BIRN: MGH Site 09/30/04 – 05/31/09
NIH 1U24 RR021382 04
This grant proposal is in response to the recent NCRR RFA RR-01-003. The applicant institutions through their currently NIH funded P41 and/or CGRC grants propose to partner with the National Partnership for Advanced Computational Infrastructure to develop a networked federated structural neuroimaging database.