

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel in the order listed on Form Page 2.
Photocopy this page or follow this format for each person.

NAME		POSITION TITLE		
Norbert J. Pelc, Sc.D.		Professor of Radiology		
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)				
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY	
University of Wisconsin - Madison	B.S.	1974	Appl. Math, Eng & Physics	
Harvard University	S.M.	1976	Med. Radiological Physics	
Harvard University	Sc.D.	1979	Med. Radiological Physics	

A. Positions and HonorsProfessional Experience:

9/74-10/78: Research Assistant, Massachusetts General Hospital, Physics Research Lab
 10/78-1/90: Senior Physicist and Manager, Applied Science Lab., GE Medical Systems
 8/82-1/90: Assistant Clinical Professor, Dept. of Radiology, Med. Coll. of Wisconsin
 1/90-6/97: Associate Professor, Department of Radiology, Stanford University
 9/90-6/97: Associate Professor - Courtesy, Dept. of Electrical Eng., Stanford University
 6/97-Present: Professor, Department of Radiology, Stanford University
 6/97-Present: Professor - Courtesy, Dept. of Electrical Eng., Stanford University
 12/02-Present Associate Chair for Research, Dept. of Radiology, Stanford University

Government Advisory Committee

7/93-6/97 Diagnostic Radiology Study Section, Division of Research Grants, NIH
 12/99 NIH NHLBI Board of Scientific Counselors (ad hoc member)
 2/03-Present NIBIB National Advisory Council

Honors and Awards:

Fellow, ISMRM; Fellow, Council on Cardiovasc. Radiol., AHA; Cum Laude Award, SCBT 1990; GE Medical Systems Fellowship; Steinmetz Award; NIH Traineeship in Medical Physics; NSF Graduate Fellow; NSF Undergraduate Research Fellow; Honors (U. of Wis.); Phi Beta Kappa; Phi Eta Sigma.

B. Selected peer-reviewed publications (in chronological order)Sample Publications (selected from >135 publications and >200 presentations):

G.M. Stevens and N.J. Pelc: Depth-segmented detector for x-ray absorptiometry. *Med Phys* 27, 1174-1184, 2000.
 P.R. Hilfiker, R.J. Herfkens, S.G. Heiss, M.T. Alley, D. Fleischmann and N.J. Pelc: Partial fat-saturated contrast-enhanced three-dimensional MR angiography compared with non-fat-saturated and conventional fat-saturated MR angiography. *Radiology* 216, 298-303, 2000.
 R. Fahrig, K. Butts, J.A. Rowlands, R. Saunders, J. Stanton, G.M. Stevens, B.L. Daniel, Z. Wen, D.L. Ergun and N.J. Pelc: A truly hybrid interventional MR/x-ray system: Feasibility demonstration. *JMRI* 13, 294-300, 2000.
 G.M. Stevens, R. Fahrig and N.J. Pelc: Filtered backprojection for modifying the impulse response of circular tomosynthesis. *Medical Physics* 28: 372-380, 2001.
 G.M. Stevens, R. Saunders and N.J. Pelc: Alignment of a Volumetric Tomography System. *Medical Physics* 28, 1472-1481, 2001.
 S.J. Thornton, D.M. Spielman, N.J. Pelc, W.F. Block, D.E. Crocker, D.P. Costa, B.J. LeBoeuf, and P.W. Hochachka: Effects of forced diving on the spleen and hepatic sinus in northern elephant seal pups. *PNAS* 98, 9413-9418, 2001.

- B. Madore and N.J. Pelc: SMASH and SENSE: SMASH and SENSE: experimental and numerical comparisons. *Magn Reson Med.* 45:1103-11, 2001.
- R. Fahrig, K. Butts, Z. Wen, R. Saunders, S.T. Kee, D.Y. Sze, B.L. Daniel, F. Laerum, and N.J. Pelc: Truly hybrid interventional MR/X-ray system: investigation of in vivo applications.. *Acad Radiol.* 8:1200-7, 2001.
- K.L. Wedding, M.T. Draney, R.J. Herfkens, C.K. Zarins, C.A. Taylor and N.J. Pelc: Measurement of vessel wall strain using cine phase contrast MRI. *JMRI* 15, 418-428, 2002.
- C.H. Coulam, J.H. Lee, K.L. Wedding, D.M. Spielman, N.J. Pelc, S.T. Kee, B.B. Hill, D.M. Bouley, G.C. Derby, B.D. Myers, A.M. Sawyer-Glover, F.G. Sommer: Use of MRI for Noninvasive measurement of extraction fraction and single-kidney glomerular filtration rate with MR imaging in swine with surgically created renal arterial stenoses. *Radiology* 223, 76-82, 2002.
- B. Madore and N.J. Pelc: New approach to 3D time-resolved angiography. *Mag. Res. Med.* 47, 1022-1025, 2002.
- JP Ku, MT Draney, FR Arko, WA Lee, FP Chan, NJ Pelc, CK Zarins, and CA Taylor: In Vivo Validation of Numerical Predictions of Blood Flow in Arterial Bypass Grafts. *Ann. Biomed Eng* 30, 743-752, 2002.
- MT Draney, RJ Herfkens, TJR Hughes, NJ Pelc, CK Zarins, and CA Taylor: Quantification of Vessel Wall Cyclic Strain Using Cine Phase Contrast Magnetic Resonance Imaging, *Ann Biomed Eng* 30, 1033-1045, 2002.
- SB Reeder, NJ. Pelc, MT Alley, and GE Gold: Rapid Imaging of Articular Cartilage with Steady-State Free Precession and Multipoint Fat-Water Separation, *AJR* 180, 357-62, 2003.
- M Markl, F.P. Chan, M.T. Alley, K.L. Wedding, M.T. Draney, C.J. Elkins, D.W. Parker, R. Wicker, C.A. Taylor, R.J. Herfkens, and N.J. Pelc: Time Resolved Three Dimensional Phase Contrast MRI (4D-Flow), *JMRI* 17, 499-506, 2003.
- M. Markl, M.T. Alley, N.J. Pelc. Balanced Phase-Contrast Steady-State Free Precession (PC-SSFP): A Novel Technique for Velocity Encoding by Gradient Inversion, *Magn. Res. Med* 49, 945-952, 2003.
- C.J Elkins, M Markl, N.J. Pelc, and J.K. Eaton: Magnetic Resonance Velocimetry for Mean Velocity Measurements in Complex Turbulent Flows. *Experiments in Fluids* 34, 494-503, 2003.
- GM Stevens, R.L. Birdwell, C.F. Beaulieu, D.M. Ikeda and N.J. Pelc: Circular tomosynthesis: Potential for imaging the breast and upper cervical spine - Preliminary phantom and *in vitro* study. *Radiology* 228, 569-575, 2003.
- Z-P Liang, B. Madore, G.H. Glover and N.J. Pelc: Fast algorithms for GS model-based image reconstruction in data-sharing Fourier imaging. *IEEE Trans Med Imag* 22, 1026-1030, 2003.
- R Bammer, M Markl, B Acar, MT Alley, NJ Pelc, ME Moseley, and GH Glover: Analysis and generalized correction of the effect of spatial gradient field distortions in diffusion-weighted imaging. *Mag Reson Med* 50, 560-569, 2003.
- M Markl, R Bammer, MT Alley, CJ Elkins, MT Draney, A Barnett, ME Moseley, GH Glover and NJ Pelc: Generalized reconstruction of phase contrast MRI: Analysis and correction of the effect of gradient field distortions. *Mag Reson Med* 50 791-801, 2003.
- Markl M, Alley MT, Elkins CJ, Pelc NJ. Flow Effects in Balanced Steady State Free Precession Imaging. *Magn Reson Med* 50 892-903, 2003.
- R. Fahrig, G. Heit, Z. Wen, B.L. Daniel, K. Butts and N.J. Pelc: "*Technical Development: First use of a truly-hybrid X-ray/MR imaging system for guidance of brain biopsy*" *Acta Neurochir (Wien)* 145 : 995-997, 2003.
- SB Reeder, Z Wen, H Yu, AR Pineda, GE Gold, M Markl, and NJ Pelc: Multicoil Dixon chemical species separation with an iterative least-squares estimation method. *Mag Res Med* 55, 35-45, 2004.
- Markl M, Reeder SB, Chan FP, Alley MT, Herfkens RJ, Pelc NJ. Steady-state free precession MR imaging: Improved myocardial tag persistence and signal-to-noise ratio for analysis of myocardial motion. *Radiology* 230, 845-851, 2004.
- Markl M, Draney MT, Hope MD, Levin JM, Chan FP, Alley MT, Pelc NJ, Herfkens RJ. Time-Resolved 3D Velocity Mapping in the Thoracic Aorta: Visualization of Three-Directional Blood Flow Patterns in Healthy Volunteers and Patients. *J Comput Assist Tomogr* 28, 459-468, 2004.
- FG Sommer, L Chow, and N.J Pelc: Measurement of Renal Extraction Fraction using Contrast-enhanced CT, *Med Phys* 31, 37-38. 2004.
- Schmidt TG, Fahrig R, Solomon EG, and Pelc NJ: An inverse-geometry volumetric CT system with a large area scanned source: A feasibility study. *Med Phys* (in press)

Selected Issued U.S. Patents (from a total of 62):

Multiple voltage x-ray switching system. (#4,361,901)

Method and apparatus for compensating CT images for truncated projections. (#4,550,371)

Sampled data CT system including analog filter and compensating digital filter. (#4,554,633)

Method for reducing image artifacts due to projection measurement inconsistencies. (#4,580,219)

Method for fast scan cine MRI imaging. (#4,710,717)

Noninvasive myocardial motion analysis using phase contrast MRI maps of myocardial velocity. (#5,195,525)

Reconstruction method for helical scanning computed tomography apparatus with multi-row detector array employing overlapping beams. (5,430,783)

Projection domain reconstruction method for helical scanning computed tomography apparatus with multi-column detector array employing overlapping beams. (#5,469,486)

Systems, methods and apparatus for reconstructing images in a CT system implementing a helical scan. (#5,559,847)

C. Research Support**Ongoing Research Support****T32 CA09695** (PI: Gary M. Glazer, M.D.)

02/01/93 - 01/31/08

NIH/NCI

Advanced Techniques in Cancer Imaging

Role: Preceptor

The purpose of this program is to provide postdoctoral training focusing on cancer imaging.

T32 GM08294 (PI: William Weis, Ph.D.)

07/01/94 - 06/30/05

NIH/NIGMS

Molecular Biophysics Training Program

Role: Preceptor

The purpose of this program is to provide predoctoral training for Biophysics graduate students.

P41 RR09784 (PI: Gary H. Glover, Ph.D.)

01/01/00 - 05/31/05

NIH/NCRR (Co-Principal Investigator)

Center for Advanced MR Technology at Stanford

Role: Co-Principal Investigator

The goals of this project are to develop innovative MR techniques for fundamental anatomic, physiologic and pathophysiologic studies involving animals and humans and to serve the academic and scientific community through collaborations, education, and access to Center facilities and resources.

T32 GM08412 (PI: Channing Robertson, Ph.D.)

07/01/96 - 9/30/05

NIH/NIGMS

Graduate Training in Biotechnolog

Role; Preceptor y

The purpose of this program is to provide biotechnological, predoctoral training for graduate students.

R01 EB00198 (PI: Rebecca Fahrig, Ph.D.)

09/30/02 - 08/31/05

NIH/NIBIB

Hybrid X-Ray/MR Systems for Image-Guided Procedures

Role: Co-Investigator

The main goal of this project is to develop a hybrid imaging platform, combining x-ray fluoroscopy and magnetic resonance imaging, to provide optimum image guidance for detection, ongoing assessment and treatment of disease.

(PI: Norbert J. Pelc, Sc.D.)

09/01/02 - 12/31/04

GE Medical Systems

Novel Volumetric Computed Tomography System

Role: Principal Investigator

The main goal of this project is to investigate the concept of volumetric CT imaging using a scanned source inverse geometry 2D scanned anode x-ray source and arrays of fast detectors. This project is synergistic with the present proposal and is described in the application. There is no scientific or budgetary overlap.

(PI: Norbert J. Pelc, Sc.D.)

09/01/03 – 06/30/06

The Whitaker Foundation

\$402,419

Department of Bioengineering – Graduate and Postdoctoral Education

Role: Principal Investigator

The goals of this project are to develop new M.S. and Ph.D. bioengineering graduate courses; develop new teaching labs in imaging, biodesign, and tissue engineering; recruit three new bioengineering faculty and jump-start the bioengineering educational programs by funding graduate student fellowships and fellowships for postdoctoral trainees.

Completed Research Support:

R01 HL46347 (PI: Norbert J. Pelc, Sc.D.)

02/01/92 - 05/31/02

NIH/NHLBI

Noninvasive Myocardial Motion Analysis with MRI

Role: Principal Investigator

The major goals of this project are to develop a readily transportable, clinically useful, noninvasive, and accurate technique for evaluating myocardial motion in three dimensions using phase contrast MRI methods. The project includes the development and testing of improved data acquisition and processing methods, the development of a motion phantom for testing these methods, and initial testing in animals and humans.

(PI: Robert Whalen, Ph.D.)

10/01/99 – 08/31/03

NASA Ames Research Center

Non-Invasive of Bone Adaption in Humans to Cumulative Daily Mechanical Loading

Role: Stanford Principal Investigator

The goal of this project is to understand the role of cumulative daily mechanical loading in the regulation of bone density and bone structure.

R01 HL64327 (PI: Christopher Zarins, M.D.)

10/01/99 – 09/30/03

NIH/NHLBI

Quantitation of Biomechanical Determinants of Human AAA

Role: Investigator

The main goal of this project is to quantitatively define the varying hemodynamic forces which act on the human thoraciabdominal aorta resulting in biomechanical stresses and strains in the vessel wall which may over time result in mechanical failure of the aortic wall and aneurysmal enlargement.

R01 DK48051 (PI: F. Graham Sommer, M.D.)

5/01/99 – 3/31/03

NIH/NIDDK

MRI of Renal Anatomy and Function in Chronic Ischemia

Role: Co-Investigator.

This proposal will develop a comprehensive renal MRI study and apply this methodology to the study of renal artery stenosis. The techniques include imaging renal artery morphology, measurement of the extraction of Gd-DTPA by the kidney, estimation of GFR, and the measurement of renal cortical and medullary volumes.

R01 CA97020 (PI: Bruce J. Hillman, MD)

12/1/98 - 11/30/03

NIH/NCI

American College of Radiology Oncologic Imaging Network (ACROIN)

Role: Stanford Principal Investigator

ACROIN supports scientific clinical trials of imaging technologies. Dr. Pelc is a member of the Physics and Engineering Committee that evaluates the technical portion of proposed trials.