HARRISON H. BARRETT
Regents Professor

PERSONAL DATA

Date and place of birth: 7/1/39, Springfield, Massachusetts
Citizenship: USA

EDUCATIONAL BACKGROUND

Harvard University	PhD, Applied Physics	1969
Massachusetts Institute of Technology	MS, Physics	1962
Virginia Polytechnic Institute	BS, Physics	1960

EMPLOYMENT HISTORY

University of Arizona

College of Optical Sciences (formerly Optical Sciences Center)
Regents Professor	1990-present
Acting Director	1983
Professor	1976-1990
Associate Professor	1974-1976

College of Medicine, Dept. of Medical Imaging (formerly Radiology)
Regents Professor	1990-present
Vice Chair for Research	2005-2009
Professor	1976-1990
Associate Professor	1974-1976

Program in Applied Mathematics
Professor	1986-present

Program in Biomedical Engineering
Professor	2006-present

Arizona Cancer Center
Professor	1988-present

Raytheon Research Division, Waltham, MA

Project Leader	1971-1974
Principal Research Scientist	1973-1974
Senior Research Scientist	1968-1973
Research Scientist	1962-1968

FIELDS OF CURRENT INTEREST

Image Science
SPECT, PET and CT imaging
Molecular imaging
Theoretical and psychophysical investigations of image quality
Applications of parallel computing in imaging
Astronomical imaging and adaptive optics
Optical metrology with maximum-likelihood methods
Electron imaging
Stem cells
Digital radiology and telemedicine in remote regions
Clinical effects of low radiation doses

PROFESSIONAL SOCIETY AFFILIATIONS, ACTIVITIES, AND HONORS

Honors and Awards

SPIE Gold Medal of the Society, 2011
IEEE Medal for Innovations in Healthcare Technology, 2011
University of Arizona College of Medicine, Dept. of Radiology, M. Paul Capp Award, 2010
University of Arizona College of Medicine, Founders Day Faculty Science Award, 2006
First Biennial OSA/SPIE J. W. Goodman Book Writing Award, with K. J. Myers, 2006
C. E. K. Mees Medal, Optical Society of America, 2005
E. T. S. Walton Fellowship, Science Foundation Ireland, 2004
MERIT (Method to Extend Research in Time) Award, NIBIB, 2003
John R. Cameron Lecturer, University of Wisconsin, 2003
Charles C. Jones Lecturer, Thayer School, Dartmouth College, 2003
IEEE Medical Imaging Scientist Award, 2000
Peter W. Bartels Distinguished Visiting Professor, University of Washington, 1998
Humboldt Prize, Alexander von Humboldt Foundation, 1980
Society of Nuclear Medicine Scientific Exhibit Awards: First Prize, 1991; Silver medal, 1972; Bronze medals, 1973,
        1975, 1983, 1984, 1985; Honorable mention, 1983
IR-100 Award, Industrial Research Magazine, 1973
College honor societies: Sigma Pi Sigma, Phi Kappa Phi, Sigma Xi

Current Memberships and Fellowships

Optical Society of America, Fellow
American Physical Society, Fellow
American Institute of Medical and Biological Engineering, Fellow
Institute of Electrical and Electronic Engineers, Fellow
SPIE
Society of Nuclear Medicine and Molecular Imaging
Academy of Molecular Imaging
American Association for the Advancement of Science
Society of Industrial and Applied Mathematics
Hupmobile Club of America
Horseless Carriage Club of America

Other Activities

Center for Gamma-Ray Imaging (CGRI), Director, 1999-present
Optical Society of America
        C. E. K. Mees Medal Committee, member, 2006; chair, 2008
        Guest editor, focus issue of Optics Express, 1997
        Adolph Lomb Medal Committee, Chair, 1994; Member, 1995
        Editor, Journal of the Optical Society of America A, 1985-1991
        Optics News Advisory Committee, 1983-1986
        Fellows and Honorary Members Committee, 1985
        Board of Editors, 1985-1991
        Editorial Board, Optics Letters, 1978-1981
SPIE, organizing committee, Medical Physics conference (numerous times)
National Academies of Science
        Keck Futures Initiative, Seeing the Future with Imaging Science, steering committee, 2010
        National Academy of Sciences Exchange Scientist to USSR, 1971
National Institutes of Health
        Member, College of CSR Reviewers, 2010-2012
        Co-chair, Workshop on Defining the State-of-the-Art in Biomedical Imaging, Jackson, Mississippi, 2003
International Commission for Optics
        Program co-chair, Light for Life Conference, Cancun, Mexico, 1999
        U.S. National Committee, 1983-1986

International Conference on Information Processing in Medical Imaging (IPMI)
> Chair, meeting held in Flagstaff, Arizona, June 1993
> Board member, 1993-present

Arizona Council for Economic Conversion, founding board member, 1988-1991
Visiting Professor, Brain-Mind Research Institute, University of Sydney, Australia, 2012
Visiting Professor, National University of Ireland Galway, 2005
Visiting Professor, Tokyo Institute of Technology, 1998
Visiting Scientist, National Institute of Environmental Health Sciences, 1992
Visiting Professor, University of Heidelberg, short course on tomography (in German), 1985
Visiting Professor, Short course on the Radon transform, Nankai University, Tianjin, China, 1982
World Federation of Nuclear Medicine and Biology, Workshop on Coded-aperture Imaging, Chair, Paris, France, 1982
Visiting Professor, Weizmann Institute, Rehovot, Israel, 1980
Visiting Professor, Universitaet Erlangen-Nuernberg, 1980-1981
Gordon Research Conference on Coherent Optics and Holography, Vice-chairman, 1978; Chairman, 1980
Editorial Board, Review of Scientific Instruments, 1974-1976

COURSES TAUGHT

Holography
Optical Data Processing
Radiological Imaging
Advanced Radiological Imaging
Mathematical Methods for Optics (introductory level)
Mathematical Methods for Optics (advanced level)
Mathematical Optics Laboratory
Quantum Optics
Solid State Optics
Statistical Optics
Quantum and Solid-state Optics
Electromagnetic Theory for Optics
Principles of Image Science
Noise in Imaging Systems
Optical Zingers
Physical Optics
Introduction to Image Science
Imaging Physics and Devices
Radiometry, Sources and Detectors (graduate and undergraduate levels)

SIGNIFICANT PUBLICATIONS:
(Does not include abstracts, posters, book reviews, letters to the editor)

H. H. Barrett, "Dielectric breakdown of single-crystal strontium titanate," *J. Appl. Phys.*, 35(5):1420-1425, May 1964.

H. H. Barrett, "Exponential comparison system for ultrasonic attenuation measurements," *Rev. Sci. Inst.*, 36(7):1047-1048, July 1965.

H. H. Barrett, "The effect of elastic anisotropy on low-temperature ultrasonic attenuation," *Phys. Lett.*, 21(6):623-624, July 1966.

H. H. Barrett and J. H. Matsinger, "The interaction of almost-collinear longitudinal phonons," *Phys. Rev.*, 154:877-886, 1967.

H. H. Barrett, "Ultrasonic propagation velocity in $KTaO_3$," *Phys. Lett.*, 26A(6):217-218,1968.

M. G. Holland, M. B. Schulz, R. H. Tancrell, and H. H. Barrett, "Pulse expansion and compression using surface ultrasonic waves," pp. 94-95 in 1969 IEEE International Convention Digest, IEEE New York, 1969.

H. H. Barrett, "Ultrasonic attenuation by interaction with the soft optic mode in $KTaO_3$," *Phys. Rev.*, 178(2):743-762, 1969.

R. H. Tancrell, M. B. Schulz, H. H. Barrett, L. Davis, Jr., and M. G. Holland, "Dispersive delay lines using ultrasonic surface waves," *Proc. IEEE* 57(6):1211-1212, June 1969.

H. H. Barrett and M. G. Holland, "Critique of current theories of Akhieser damping in solids," *Phys. Rev.*, B1(6):2538-2544, March 1970.

H. H. Barrett and M. G. Holland, "Thermal conductivity in Perovskites," *Phys. Rev.*, B2(8):3441-3443, October 1970.

H. H. Barrett and J. H. Matsinger, "Use of ultrasonic apparatus for the demonstration of resonant cavity properties," *Am. J. Phys.*, 39(3):337-338, March 1971.

H. H. Barrett and F. A. Horrigan, "Advanced technology in medicine," *Electronic Prog.*, 13:2, 1971.

M. Bass and H. H. Barrett, "The probability and dynamics of damaging optical materials with lasers," *Proc. Conference on Laser Damage*, Boulder, Colorado, 1971.

M. Bass and H. H. Barrett, "Avalanche breakdown and the probabilistic nature of laser induced damage," *IEEE J. Quantum Electronics*, QE8(3):338-345, March 1972.

H. H. Barrett, "Pulse compression techniques in nuclear medicine," *Proc. IEEE,* 60(6):723-724, June 1972.

H. H. Barrett, "Fresnel zone plate imaging in nuclear medicine," *J. Nucl. Med.*, 13(6):382-385, 1972.

H. H. Barrett, K. Garewal, and D. T. Wilson, "A spatially coded X-ray source," *Radiology*, 104:429-430, August 1972.

H. H. Barrett, D. T. Wilson, and G. D. DeMeester, "The use of half-tone screens in Fresnel zone plate imaging of incoherent sources," *Opt. Comm.*, 5(5):398-401, August 1972.

H. H. Barrett, G. D. DeMeester, and D. T. Wilson, "Tomographic imaging with a Fresnel zone plate system," in *Tomographic Imaging in Nuclear Medicine*, G. S. Freedman (Ed.), Society of Nuclear Medicine, New York, 1973.

H. H. Barrett, G. D. DeMeester, D. T. Wilson, and M. H. Farmelant, "Recent advances in Fresnel zone plate imaging," in *Medical Radioisotopes Scintigraphy 1972*, Vol. I, 269-284, IAEA Vienna, Austria, 1973.

H. H. Barrett, D. T. Wilson, G. D. DeMeester, and H. Scharfman, "Fresnel zone plate imaging in radiology and nuclear medicine," *Opt. Eng.*, 12(1):8-12, January-February 1973. (Also presented at SPIE Symposium on Applications of Optical Instrumentation in Medicine, Chicago, Illinois, November 1972.)

M. Bass and H. H. Barrett, "Laser-induced damage probability at 1.06 μm and 0.69 μm," *Appl. Opt.*, 12(4):690-699, April 1973.

D. T. Wilson, H. H. Barrett, G. D. DeMeester, and M. H. Farmelant, "Point-source artifacts in Fresnel zone plate imaging," *Opt. Eng.*, 12(4):133-134, July-August 1973.

D. T. Wilson, G. D. DeMeester, H. H. Barrett, and E. Barsack, "A new configuration for coded aperture imaging," *Opt. Comm.*, 8(4):384-386, August 1973.

H. H. Barrett and F. A. Horrigan, "Fresnel zone plate imaging of gamma rays: theory," *Appl. Opt.*, 12(11):2686-2702, November 1973.

H. H. Barrett and G. D. DeMeester, "Quantum noise in Fresnel zone plate imaging," *Appl. Opt.*, 13(5):1100-1109, May 1974.

H. H. Barrett, W. W. Stoner, D. T. Wilson, and G. D. DeMeester, "Coded apertures derived from the Fresnel zone plate," *Opt. Eng.*, 13(6):539-549, November-December 1974.

M. H. Farmelant, G. DeMeester, D. Wilson, and H. Barrett, "Initial clinical experiences with a Fresnel zone-plate imager," *J. Nucl. Med.*, 16(3):183-187, March 1975.

S. K. Gordon and H. H. Barrett, "An incoherent optical processor for transaxial tomography," *Proc. of the OSA Topical Conference on 2D and 3D Reconstruction from Projections*, Stanford, California, August 1975.

H. H. Barrett, T. Bowen, R. S. Hershel, S. K. Gordon, and D. A. DeLise, "Noise and dose considerations in transaxial tomography with X-rays and particles," *Proc. of the OSA Topical Conference on 2D and 3D Reconstruction from Projections*, Stanford, California, August 1975.

R. G. Simpson, H. H. Barrett, J. A. Subach, and H. D. Fisher, "Digital processing of annular coded-aperture imagery," *Opt. Eng.*, 14(5):490-494, September-October 1975.

H. H. Barrett, S. K. Gordon, and R. S. Hershel, "Statistical limitations in transaxial tomography," *Computers in Biol. and Med.*, 6:307-323, 1976.

R. G. Simpson, H. H. Barrett, and H. D. Fisher, "Decoding techniques for use with annular coded apertures," pp. 119-129, in *Applications of Holography and Optical Data Processing*, pp. 119-129, E. Marom and A. A. Friesem (Eds.), Pergamon Press, Oxford and New York, 1977.

H. H. Barrett and W. W. Swindell, "Analog reconstruction methods for transaxial tomography," *Proc. of the IEEE*, 65(1):89-107, January 1977.

R. G. Simpson, H. H. Barrett, J. G. Kelly, and K. T. Stalker, "Some applications of one-dimensional coded apertures," SPIE Conference on X-ray Imaging, Reston, Virginia, April 18-21, 1977.

W. Swindell and H. H. Barrett, "Computerized tomography: taking sectional X-rays," *Phys. Today*, 30(12):32-41, December 1977; Reprinted in Optics Today, J. Howard (Ed.), American Institute of Physics, New York, 1986.

C. Chou and H. H. Barrett, "Gamma-ray imaging in Fourier space," *Opt. Lett.*, 3(5):187-189, November 1978.

H. H. Barrett, J. Greivenkamp, S. K. Gordon, A. F. Gmitro, M. Y. Chiu, and W. Swindell, "A simple pupil function for OTF synthesis in transaxial tomography applications," *Opt. Comm.*, 28(3):287-290, March 1979.

H. H. Barrett and S. F. Jacobs, "Retroflective arrays as approximate phase conjugators," *Opt. Lett.*, 4(6):190-192, June 1979.

I. Glaser and H. H. Barrett, "Halftone screen techniques for photographic film response shaping with application to optical processing of medical x-ray images," *Appl. Opt.*, 18(13):2294-2300, July 1979.

H. H. Barrett, M. Y. Chiu, S. K. Gordon, R. E. Parks, and W. Swindell, "Optical transfer function synthesis: a geometrical optics approach," *Appl. Opt.*, 18(16):2760-2766, August 1979.

J. E. Greivenkamp, W. Swindell, H. H. Barrett and A. F. Gmitro, "Progress report on optical-analog transaxial tomography," *Proc. of the 12th International Conference on Medical and Biological Engineering and the 5th International Conference on Medical Physics*, Jerusalem, Israel, August 19-24, 1979.

M. Y. Chiu, H. H. Barrett, R. G. Simpson, C. Chou, J. W. Arendt, and G. R. Gindi, "Three-dimensional radiographic imaging with a restricted view angle," *J. Opt. Soc. Am.,* 69(10):1323-1333, October 1979.

M. A. Kujoory, B. J. Hillman, and H. H. Barrett, "High-resolution computed tomography of the normal rat nephrogram," *Invest. Rad.*, 15:148-154, 1980.

W. Swindell, M. L. M. Boone, R. G. Simpson, H. H. Barrett, C. T. Chen and E. A. Grubbs, "A tissue densitometer for radiation oncology," *Proc. of the ESCAT 2*, London, United Kingdom, February 1980.

A. F. Gmitro, G. R. Gindi, J. E. Greivenkamp, H. H. Barrett and W. Swindell, "A high-resolution hybrid digital-optical processor for transaxial tomography," *Proc. of the International Optical Computing Conference*, Washington, D. C., April 1980.

A. F. Gmitro, J. E. Greivenkamp, W. Swindell, H. H. Barrett, M. Y. Chiu, and S. K. Gordon, "Optical computers for reconstructing objects from their X-ray projections," *Opt. Eng.*, 19(3):260-272, May-June 1980.

M. Y. Chiu, H. H. Barrett and R. G. Simpson, "Three-dimensional reconstruction from planar projections," *J. Opt. Soc. Am.,* 70(7):755-761, July 1980.

M. A. Kujoory, E. L. Miller, H. H. Barrett, G. R. Gindi, and P. N. Tamura, "Coded-aperture imaging of gamma-ray sources with an off-axis rotating slit," *Appl. Opt.*, 19(24):4186-4195, July 1980.

H. H. Barrett, A. F. Gmitro, and M. Y. Chiu, "Use of an image orthicon as an array of lock-in amplifiers," *Opt. Lett.*, 6(1):1-3, January 1981.

J. E. Greivenkamp, W. Swindell, A. F. Gmitro, and H. H. Barrett, "Incoherent optical processor for X-ray transaxial tomography," *Appl. Opt.*, 20(2):264-275, 15 January 1981.

B. J. Hillman, P. A. Ervin, M. A. Kujoory, and H. H. Barrett, "Computed tomographic analysis of renal function in rats with myoglobinuric acute renal failure," *Nephron*, 28:255-257, 1981.

W. Swindell, J. E. Greivenkamp, A. F. Gmitro, and H. H. Barrett, "A low-cost CT scanner," *Radiology*, 139(2):499-501, May 1981.

G. R. Gindi, J. Arendt, H. H. Barrett, M. Y. Chiu, A. Ervin, C. L. Giles, M. A. Kujoory, E. L. Miller, and R. G. Simpson, "Imaging with rotating slit apertures and rotating collimators," *Med. Phys.*, 9(3):324-339, 1982.

H. H. Barrett, "Dipole-sheet transform," *J. Opt. Soc. Am.,* 72:468-475, 1982.

H. H. Barrett, "Die mathematische Erfassung der Bildqualitaet," *Electromedica*, 3/82:96-100, 1982.

H. H. Barrett, "Optical processing in Radon space," *Opt. Lett.*, 7:248-250, 1982.

H. H. Barrett, "Optics at the Optical Sciences Center," *Optics News*, 8(5):8-11, 1982.

W. E. Smith, H. H. Barrett, and R. G. Paxman, "Reconstruction of objects from coded images by simulated annealing," *Opt. Lett.*, 8(4):199-201, April 1983.

A. F. Gmitro, G. R. Gindi, H. H. Barrett, and R. L. Easton, "Two-dimensional image processing by one-dimensional filtering of projection data," *Proc. SPIE*, 388, 1983.

H. H. Barrett, W. G. Hawkins, and M. L. G. Joy, "Historical note on computed tomography" (includes a translation from the Russian of "About one scheme of tomography," by B. I. Korenblyum et al.), *Radiology*, 147:172, 1983.

W. E. Smith and H. H. Barrett, "The Radon transform and bandwidth compression," *Opt. Lett.*, 8(7):395-397, 1983.

A. Clough and H. H. Barrett, "Attenuated Radon and Abel transforms," *J. Opt. Soc. Am.*, 73:1590-1595, 1983.

R. L. Easton, H. H. Barrett, and A. J. Ticknor, "Using SAW filters to process 2D data by means of the Radon transform," p. 185 in *Proc. of the 1983 IEEE Ultrasonics Symposium.*

G. R. Gindi, R. Paxman, and H. H. Barrett, "Reconstruction of an object from its coded image and object constraints," *Appl. Opt.*, 23(6):851-856, March 1984.

R. G. Paxman, W. E. Smith, and H. H. Barrett, "Two algorithms for use with an orthogonal-view coded-aperture system," *J. Nucl. Med.*, 25(6):700-705, June 1984.

T. D. Milster, L. A. Selberg, H. H. Barrett, R. L. Easton, G. R. Rossi, J. Arendt, and R. G. Simpson, "A modular scintillation camera for use in nuclear medicine," *IEEE Trans. Nucl. Sci.*, NS-31:578-580, 1984.

H. B. Barber, H. H. Barrett, W. J. Wild, and J. M. Woolfenden, "Development of small in-vivo imaging probes for tumor detection," *IEEE Trans. Nucl. Sci.*, NS-31:599-604, 1984.

R. L. Easton, A. J. Ticknor, and H. H. Barrett, "Application of the Radon transform to optical production of the Wigner distribution function," *Opt. Eng.*, 23:738-744, 1984 (invited paper).

A. J. Ticknor, R. L. Easton, and H. H. Barrett, "A two-dimensional Radon-Fourier transformer," *Opt. Eng*., 24:82-85, 1985.

W. E. Smith, R. G. Paxman, and H. H. Barrett, "Image reconstruction from coded data: I. reconstruction algorithms and experimental results," *J. Opt. Soc. Am. A*, 2:491-500, April 1985.

R. G. Paxman, H. H. Barrett, W. E. Smith, and T. D. Milster, "Image reconstruction from coded data: II. code design," *J. Opt. Soc. Am. A*, 2:501-509, April 1985.

R. L. Easton, A. J. Ticknor, and H. H. Barrett, "Two-dimensional complex Fourier transform via the Radon transform," *Appl. Opt*., 24:3817-3824, 1985.

W. E. Smith, R. G. Paxman, and H. H. Barrett, "Application of simulated annealing to coded-aperture design and tomographic reconstruction," *IEEE Trans. Nucl. Sci*., NS-32 (1):758-761, February 1985.

H. H. Barrett, W. E. Smith, K. J. Myers, T. D. Milster, and R. D. Fiete, "Quantifying the performance of imaging systems," *Proc. SPIE*, 535:65-69, 1985.

T. D. Milster, R. H. Seacat III, H. H. Barrett, A. L. Landesman, and L. A. Selberg, "Localization of weak point sources of light," *Acta Polytechnica Scandinavica 2*, Helsinki, Finland, 1985.

K. J. Myers, H. H. Barrett, M. C. Borgstrom, D. D. Patton, and G. W. Seeley, "Is ideal observer SNR a good predictor of human performance?" *Proc. SPIE*, 535, 12-15, 1985.

T. D. Milster, L. A. Selberg, H. H. Barrett, A. L. Landesman, and R. H. Seacat III, "Digital position estimation for the modular scintillation camera," *IEEE Trans. Nucl. Sci*., NS-32:748-752, February 1985.

K. J. Myers, H. H. Barrett, M. C. Borgstrom, D. D. Patton, and G. W. Seeley, "Effect of noise correlation on detectability of disk signals in medical imaging," *J. Opt. Soc. Am. A*, 2:1752-1759, 1985.

W. Hawkins and H. H. Barrett, "A numerically stable circular harmonic reconstruction algorithm," *SIAM J. Num. Anal*., 23:873-890, 1986.

W. E. Smith and H. H. Barrett, "Hotelling trace criterion as a figure of merit for the optimization of imaging systems," *J. Opt. Soc. Am. A*, 3:717-725, 1986.

H. H. Barrett, K. J. Myers, and R. F. Wagner, "Beyond signal-detection theory," *Proc. SPIE*, 626, 231-239, 1986.

A. J. Ticknor and H. H. Barrett, "Optical Implementations in Boltzmann machines," *Opt. Eng*. 26:16-21, 1987. Reprinted in <u>Selected Papers in Optical Neural Networks</u>, S. Jutamulia (Ed.), SPIE Milestone Series, Vol. MS96, 1994.

K. J. Myers and H. H. Barrett, "Addition of a channel mechanism to the ideal-observer model," *J. Opt. Soc. Am. A*, 4:2447-2457, 1987.

R. D. Fiete, H. H. Barrett, W. E. Smith, and K. J. Myers, "The Hotelling trace criterion and its correlation with human observer performance," *J. Opt. Soc. Am. A*, 4:945-953, 1987.

W. J. Dallas, H. H. Barrett, R. F. Wagner, H. Roehrig, and C. N. West, "The finite-length line spread function," *J. Opt. Soc. Am. A*, 4:2039-2044, 1987.

R. D. Fiete and H.H. Barrett, "Using the Hotelling trace criterion for feature enhancement in image processing," *Opt. Lett*., 12:643-645, 1987.

R. D. Fiete, H. H. Barrett, E. B. Cargill, K. J. Myers, and W. E. Smith, "Psychophysical validation of the Hotelling trace criterion as a metric for system performance," *Proc. SPIE*, 727:298-305, 1987.

R. F. Wagner and H. H. Barrett, "Quadratic tasks and the ideal observer," *Proc. SPIE*, 727:306-309, 1987.

W. E. Smith and H. H. Barrett, "Linear estimation theory applied to the evaluation of a priori information and system optimization in coded-aperture imaging," *J. Opt. Soc. Am. A*, 5:315-330, 1988.

B. T. Landesman and H. H. Barrett, "Gaussian amplitude functions that are exact solutions to the scalar Helmholtz equation," *J. Opt. Soc. Am. A*, 5:1610-1619, 1988.

J. N. Aarsvold, H. H. Barrett, J. Chen, A. L. Landesman, T. D. Milster, D. D. Patton, T. J. Roney, R. K. Rowe, R. H. Seacat III, and L. M. Strimbu, "Modular scintillation cameras: a progress report," *Proc. SPIE*, 914:319-325, 1988.

E. B. Cargill, H. H. Barrett, R. D. Fiete, M. Ker, D. D. Patton, and G. W. Seeley, "Fractal physiology and nuclear medicine scans," *Proc. SPIE*, 914:355-361, 1988.

T. S. Hickernell, H. B. Barber, H. H. Barrett, and J. M. Woolfenden, "A dual-detector probe for surgical tumor staging," *J. Nucl. Med.*, 29:1101-1106, 1988.

J. M. Woolfenden, T. S. Hickernell, H. B. Barber, and H. H. Barrett, "A dual-detector probe for surgical tumor localization," *Proceedings of the Chinese Academy of Medical Sciences and the Peking Union Medical College,* 3:237, 1988 (supplement I).

N. E. Hartsough, H. B. Barber, J. M. Woolfenden, H. H. Barrett, T. S. Hickernell, and D. P. Kwo, "Probes containing gamma radiation detectors for *in vivo* tumor detection and imaging," *Proc. SPIE*, 1068:92-99. 1989.

K. J. Myers, R. F. Wagner, D. G. Brown, and H. H. Barrett, "Efficient utilization of aperture and detector by optimal coding," *Proc. SPIE*, 1090:164-175, 1989.

H. H. Barrett, J. P. Rolland, R. F. Wagner, and K. J. Myers, "Detection and discrimination of known signals in inhomogeneous, random backgrounds," *Proc. SPIE*, 1090:176-182, 1989.

J. P. Rolland, H.H. Barrett and G.W. Seeley, "Quantitative study of deconvolution and display mappings for long-tailed point-spread functions," *Proc. SPIE*, 1092:17-21, 1989.

R. L. Shoemaker, R. H. Seacat III, A. Landesman, B. B. Taylor, and H. H. Barrett, "TRIMM: a high speed parallel processor for optimization and estimation problems," *Proc. SPIE*, 1092:619-624, 1989.

H. B. Barber, H. H. Barrett, J. M. Woolfenden, K. J. Myers, and T. S. Hickernell, "Comparison of *in-vivo* probes and gamma cameras for detection of small, deep tumors," *Phys. Med. Biol.,* 34:727-739, 1989.

T. D. Milster, J. N. Aarsvold, H. H. Barrett, A. L. Landesman, L. S. Mar, D. D. Patton, T. J. Roney, R. K. Rowe, and R. H. Seacat III, "A full-field modular gamma camera," *J. Nucl. Med.*, 5, 31:632-639, 1990.

T. S. Hickernell, H. H. Barrett, H. B. Barber, J. M. Woolfenden, and J. N. Hall, "Probability modelling of a surgical probe for tumor detection," *Phys. Med. Biol.*, 35:539-559, 1990.

H. H. Barrett, "Objective assessment of image quality: effects of quantum noise and object variability," *J. Opt. Soc. Am. A*, 7:1266-1278, 1990.

K. J. Myers, J. P. Rolland, H. H. Barrett, and R. F. Wagner, "Aperture optimization for emission imaging: effect of a spatially varying background," *J. Opt. Soc. Am. A*, 7:1279-1293, 1990.

H. H. Barrett, Editorial: "Limited-angle tomography for the nineties," *J. Nucl. Med.* 31, 10:1668-1691, 1990.

J. P. Rolland, H. H. Barrett, and G. W. Seeley, "Ideal versus human observer for long-tailed point spread functions: does deconvolution help?" *Phys. Med. Biol.*, 36, 8:1091-1109, 1991.

H. B. Barber, H. H. Barrett, G. Entine, T. S. Hickernell, D. P. Kwo, C. Ortale, and J. M. Woolfenden, "Comparison of NaI(T1), HgI$_2$ and CdTe surgical probes--I: physical characterization," *Med. Phys.*, 18:373-381, 1991.

D. P. Kwo, H. B. Barber, H. H. Barrett, T. S. Hickernell, and J. M. Woolfenden, "Comparison of NaI(Tl), HgI$_2$ and CdTe surgical probes--II: effect of scatter compensation on probe performance," *Med. Phys.*, 18:382-389, 1991.

K. A. Girodias, H. H. Barrett, and R. L. Shoemaker, "Parallel simulated annealing for emission tomography," *Phys. Med. Biol.*, 36, 7:921-938, 1991.

R. L. Shoemaker, H. H. Barrett, A. L. Landesman, R. H. Seacat III, and B. B. Taylor, "TRIMM parallel processor," *Computers in Physics*, 5, 4:418-425, 1991.

J. P. Rolland and H. H. Barrett, "Effect of random background inhomogeneity on observer detection performance," *J. Opt. Soc. Am. A*, 9, 5:649-658, 1992.

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J. A. Sakamoto, H. H. Barrett, and A. V. Goncharov, "Inverse optical design of the human eye using likelihood methods and wavefront sensing," *Opt. Express*, 16, 304-314, 2008.

L. Caucci, H. H. Barrett, N. Devaney, and J. L. Rodriguez, "Application of the Hotelling and ideal observers to detection and localization of exoplanets," *J. Opt. Soc. Am. A*, 24(12), B13-B24, 2007. [Selected for republication in Virtual Journal for Biomedical Optics]

E. Clarkson, M. A. Kupinski, H. H. Barrett, and L. Furenlid, "A task-based approach to adaptive and multimodality imaging," *Proc. IEEE*, 96, 500-511, 2008 (invited paper).

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M. Freed, M. A. Kupinski, L. R. Furenlid, D. W. Wilson, and H. H. Barrett, "A Prototype Instrument for Single-Pinhole Small-Animal Adaptive SPECT Imaging," *Med. Phys*., 35, 1912-1925, 2008

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M. K. Whitaker, E. Clarkson, and H. H. Barrett, "Estimating random signal parameters from noisy images with nuisance parameters: Linear and scanning-linear methods," *Opt. Express*, 16(11), 8150-8173, 2008.

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H. H. Barrett, "NEQ: Its Progenitors and Progeny," Keynote talk at SPIE Medical Imaging Conference, Orlando, FL February 2009. *Proc. SPIE* 7263, 72630F, 2009.

R. Palit, M. A. Kupinski, H. H. Barrett, E. W. Clarkson, J. A. Aarsvold, L. Volokh, Y. Grobshtein, "Singular value decomposition of pinhole SPECT systems," *Proc. SPIE* 7263, 72631U, 2009.

L. Chen, L. S. Gobar, N. G. Knowles, D. W. Wilson, and H. H. Barrett, "Direct charged-particle imaging system using an ultra-thin phosphor: physical characterization and dynamic applications," *IEEE Trans. Nucl. Sci.*, 56:2628-2635, 2009.

H. H. Barrett, W. C. J. Hunter, B. W. Miller, S. K. Moore, Y. Chen and L. R. Furenlid, "Maximum-likelihood methods for processing signals from gamma-ray detectors," plenary paper, *IEEE Trans. Nucl. Sci*., 56:725-735, 2009.

W. C. J. Hunter, H. H. Barrett and L. R. Furenlid, "Calibration method for ML estimation of 3D Interaction Position in a thick gamma-ray detector," *IEEE Trans. Nucl. Sci*. 56:189-196, 2009.

H. Fan, H. L. Durko, S. K. Moore, J. Moore, B. W. Miller, L. R. Furenlid, S. Pradhan and H. H. Barrett, "DR with a DSLR: Digital Radiography with a Digital Single-Lens Reflex camera," *Proc. SPIE* 7622, 76225E, 2010.

H. H. Barrett, D. W. Wilson, M. A. Kupinski, K. Aguwa, L. Ewell, R. Hunter and S. Mueller, "Therapy Operating Characteristic (TOC) Curves and their Application to the Evaluation of Segmentation Algorithms," *Proc. SPIE* 7627, 76270Z, 2010.

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A. Bousselham, H. H. Barrett, V. Bora, K. Shah, "Photoelectron anticorrelations and sub-Poisson statistics in scintillation detectors," *Nucl. Instrum. Meth. A*., 620, 359-362, 2010. PMC2923410

A. Burvall, H. H. Barrett, K. J. Myers, and C. Dainty, "Singular-value decomposition of a tomosynthesis system," *Optics Express*, 18(20), 20699-20711, 2010. PMC2958053

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R. M. Dwyer, J. Ryan, R. Havelin, J. C. Morris, B. Miller, Z. Liu, M. Foley, H. H. Barrett, M. Murphy, F. P. Barry, T. O'Brien, and M. J. Kerin, "Mesenchymal Stem Cell (MSC) mediated delivery of the Sodium Iodide Symporter (NIS) supports radionuclide imaging and treatment of breast cancer," *Stem Cells* 29(11), 1149-1157, 2011. PMID 21608083.

B. W. Miller, J. W. Moore, H. H. Barrett, T. Fryé, S. Adler, J. Sery, and L. R. Furenlid, "3D printing in x-ray and gamma-ray imaging: A novel method for fabricating high-density imaging apertures," *Nucl. Instrum. Methods Phys. Res. A*. 2011 Dec 10;659(1):262-268. PMID 22199414, PMC3244175.

H. L. Durko, T. E. Peterson, H. H. Barrett and L. R. Furenlid, "High-resolution, anamorphic, adaptive small-animal SPECT imaging with silicon double-sided strip detectors," *Proc. SPIE* 8143, 81430G, 2011; doi:10.1117/12.896729.

B. W. Miller, R. Van Holen, H. Barrett, and L. Furenlid, "A system calibration and fast iterative reconstruction method for next-generation SPECT imagers," accepted for publication in IEEE Trans. Nucl, Sci., 2012.

W. C. J. Hunter, H. H. Barrett, J. P. Muzi, X. Li, W. McDougald, L. R. MacDonald, R. S. Miyaoka, T. K. Lewellen, "SCOUT: A Fast Monte-Carlo Modeling Tool of Scintillation Camera Output." Submitted to IEEE Trans. Nucl. Sci., 2012.

A. K. Jha , M. A. Kupinski , T. Masumura, E. Clarkson, A. A. Maslov and H. H. Barrett, "Simulating photon-transport in uniform media using the Radiative Transport Equation: A study using the Neumann-series approach," accepted for publication in J. Opt Soc. Am. A, 2012.

A. K. Jha, M. A. Kupinski, H. H. Barrett, E. Clarkson an J. H. Hartman, "A Neumann-Series for Modeling Light Transport in Non-uniform Media" accepted for publication in, 2012.

L. Caucci and H. H. Barrett, "Objective Assessment of Image Quality V: Photon-counting Detectors and List-mode Data." *J. Opt Soc. Am. A*, 29(6), 1003-1016, 2012.

W. C. J. Hunter, H. H. Barrett, R. S. Miyaoka, T. K. Lewellen, "Multiple-hit parameter estimation in monolithic detectors." accepted for publication in IEEE Trans. Nucl. Sci., 2012

H. Fan and H. H. Barrett, "CT detector evaluation with complex random backgrounds," to be published, *Proc. SPIE* 8318, 2012.

J. A. Sakamoto and H. H. Barrett, "Maximum-likelihood estimation of parameterized wavefronts from multifocal data," submitted to Opt. Expr., 2012.

H. H. Barrett and R. Van Holen, "Analytical singular-value decomposition of three-dimensional, proximity-based SPECT systems." To be submitted to Phys. Med. Biol., 2012

Invited Papers at Scientific Conferences

H. H. Barrett, G. D. DeMeester, D. T. Wilson, and H. Sharfman, "Fresnel zone plate imaging in radiology and nuclear medicine," SPIE Symposium on Applications of Optical Instrumentation in Medicine, Chicago, Illinois, November 1972.

H. H. Barrett, G. D. DeMeester, and D. T. Wilson, "Fresnel zone plate imaging--a new approach to radiology and nuclear medicine," Optical Society of America Spring Meeting, Denver, Colorado, March 13-16, 1973.

H. H. Barrett, "Pseudo-holographic techniques in gamma-ray and X-ray imaging," IEEE/OSA Conference on Laser Engineering and Applications, Washington, D. C., May 30-June 1, 1973.

H. H. Barrett, "Application of holography to myocardial imaging," Association of University Radiologists Symposium on Myocardial Imaging, Palm Springs, California, January 1974.

H. H. Barrett, "Biomedical applications of holography," Symposium on Optics in Diagnostic Medicine, Tucson, Arizona, January 1974.

H. H. Barrett, "Coded-aperture imaging in radiology and nuclear medicine," Gordon Research Conference on Coherent Optics and Holography, Santa Barbara, California, June 24, 1974.

R. A. Simpson, H. H. Barrett, and H. D. Fisher, "Digital processing of annular coded aperture imagery," International Optical Computing Conference, April 23-25, 1975.

H. H. Barrett and S. K. Gordon, "Transaxial tomography for pedestrians," Optical Society of America 1975 Annual Meeting, Boston, Massachusetts, October 12-14, 1975.

H. H. Barrett, "A survey of coded-aperture imaging techniques," Meeting on Liquid Metal Fast Breeder Reactor Safety, Albuquerque, New Mexico, November 1975.

H. H. Barrett, "Nuclear medicine in depth--new approaches to tomography," Annual Meeting, Arizona Society of Nuclear Medicine Technologists, Tucson, Arizona, November 2, 1975.

H. H. Barrett, "3-D radiographic imagery," Gordon Research Conference on Coherent Optics and Holography, Santa Barbara, California, June 23, 1976.

W. Swindell, S. K. Gordon, and H. H. Barrett, "Optical analog computing for transaxial tomography," International Optical Computing Conference, Capri, Italy, August 1976.

H. H. Barrett and M. Y. Chiu, "Three-dimensional radiographic imaging," Eleventh Congress of the International Commission for Optics, Madrid, Spain, 1978.

H. H. Barrett, W. Swindell, J. E. Greivenkamp, A. F. Gmitro, and G. R. Gindi, "Analog reconstruction methods in tomography," Third Symposium of the German Society for Applied Optics and 81st Meeting of the German Association for Pattern Recognition, Essen, Germany, May 27-31, 1980.

H. H. Barrett, "Time-modulated OTF synthesis," Israel Laser and Electro-optics Society, Rehovot, Israel, December 30, 1980.

H. H. Barrett, "Three-dimensional image reconstruction from planar projections," Norwegian Physical Society, Electro-optics Meeting, Vinstra, Norway, March 29-April 1, 1981.

H. H. Barrett, "Limited-angle tomographic reconstructions," Harvard-MIT Symposium on Single-photon Emission Computed Tomography," Cambridge, Massachusetts, October 1-2, 1981.

H. H. Barrett, "Optical processing in Radon space," Gordon Research Conference on Holography and Optical Information Processing, Plymouth, New Hampshire, June 1982.

H. H. Barrett, "Coded-aperture imaging--whither now?" World Federation of Nuclear Medicine and Biology, Post-Congress Meeting on Coded-Aperture Imaging, Paris, France, September 1982.

H. H. Barrett, H. B. Barber, P. A. Ervin, K. J. Myers, R. Paxman, W. E. Smith, W. Wild, and J. M. Woolfenden, "New Directions in Coded-Aperture Imaging," Eighth Conference on Information Processing in Medical Imaging, Brussels, Belgium, August-September 1983.

H. H. Barrett, "Potential for future developments in SPECT instrumentation," NCI Workshop on Functional Imaging with SPECT, Bethesda, Maryland, January 1984.

H. H. Barrett, "Radon/Wigner, stochastic pseudoinverses and other tricks," Gordon Research Conference on Holography and Optical Information Processing, Plymouth, New Hampshire, June 1984.

H. H. Barrett, W. E. Smith, and R. G. Paxman, "Application of simulated annealing to coded-aperture design and tomographic reconstruction," IEEE Nuclear Science Symposium, Orlando, Florida, October 1984.

H. H. Barrett, "Optical processing in Radon space," Symposium on Optical Information Processing, Hamamatsu, Japan, August 1984.

H. H. Barrett, W. E. Smith, and R. G. Paxman, "Image retrieval by simulated annealing," ARO Workshop on Unconventional Imagery, Luzern, Switzerland, September 1984.

H. H. Barrett, R. L. Easton, and A. J. Ticknor, "Unconventional tomography," ARO Workshop on Unconventional Imagery, Luzern, Switzerland, September 1984.

H. H. Barrett, W. E. Smith, and R. G. Paxman, "Monte Carlo methods in optics," Image Science 85, Helsinki, Finland, June 1985.

K. J. Myers, H. H. Barrett, M. C. Borgstrom, E. B. Cargill, A. V. Clough, R. D. Fiete, D. D. Patton, R. G. Paxman, G. W. Seeley, W. E. Smith, and M. O. Stempski, "A systematic approach to the design of diagnostic systems for nuclear medicine," Ninth International Conference on Information Processing in Medical Imaging, Washington, D.C., June 10-14, 1985.

K. J. Myers and H. H. Barrett, "Effect of frequency-selective channels on observer performance," Annual Meeting of the Society of Photographic Scientists and Engineers, Boston, Massachusetts, November 1985.

H. H. Barrett, "Quantum limits in gamma-ray imaging," OSA Topical Meeting on Quantum-Limited Imaging and Image Processing, Honolulu, Hawaii, March 30-April 2, 1986.

H. H. Barrett, "Perspectives on SPECT," Conference on Engineering in Biology and Medicine, Newport Beach, California, April 2-4, 1986; also published in *Proc. SPIE*, 671:178-183, 1986.

H. H. Barrett, "The Radon transform and its applications," NATO Advanced Study Institute, Il Ciocco, Italy, September 1986.

K. J. Myers and H. H. Barrett, "Detectability in medical imaging," Rank Mini-Symposium on the Statistical Efficiency of Physical and Biological Vision," Cambridge, England, December 1986.

A. J. Ticknor and H. H. Barrett, "Digital acceleration of optical computations," Gordon Research Conference on Holography and Optical Information Processing, Santa Barbara, California, January 1987.

H. H. Barrett "Tomographic imaging and image processing," Workshop on Image Processing, Leon, Mexico, July 1987.

H. H. Barrett, "State of science and technology in acquisition and processing of visual information," American College of Radiology Workshop on Visualization Science in Engineering and Computing, Arlington, Virginia, March 30-April l, 1988.

H. H. Barrett, "Image reconstruction and the solution of inverse problems in medical imaging," NATO Advanced Study Institute, Povoa de Varzim, Portugal, September 12-23, 1988.

H. H. Barrett, "Coded-aperture imaging: a tutorial," Invited presentation at SPIE Meeting on Medical Imaging, Newport Beach, California, February 1989.

W. E. Smith, H. H. Barrett, and J. N. Aarsvold, "Coded-aperture imaging in nuclear medicine," International Workshop on Visual Information Processing for Television and Telerobotics, Williamsburg, Virginia, May 1989.

H. H. Barrett, J. N. Aarsvold, T. J. Roney, and R. K. Rowe, "Quantum-limited imaging and image reconstruction in nuclear medicine," Optical Society of America Topical Meeting on Quantum-Limited Imaging and Image Processing II, Cape Cod, Massachusetts, June 1989.

K. J. Myers, D. G. Brown, R. F. Wagner, H. H. Barrett, and J. P. Rolland, "Detection tasks and decision theory for quantum limited imagery," Optical Society of America Topical Meeting on Quantum-Limited Imaging and Image Processing II, Cape Cod, Massachusetts, June 1989.

H. H. Barrett, J. N. Aarsvold, and T. J. Roney, "Null functions and eigenfunctions: tools for the analysis of imaging systems," Eleventh International Conference on Information Processing in Medical Imaging, Berkeley, California, June 1989. Also in Prog Clin Biol Res. 363:211-26, 1991.

H. H. Barrett, "Unconventional digital image reconstruction," International Commission for Optics, Triennial Meeting, Garmisch-Partenkirchen, West Germany, August 1990.

H. H. Barrett, "Statistical approaches to the assessment of image quality," Statistics and Society Conference, Tucson, Arizona, November 1991.

H. H. Barrett and H. B. Barber, "Towards millimeter resolution in SPECT," Society of Nuclear Medicine, Midwinter Meeting, Dallas, Texas, February 1992.

H. H. Barrett, "Image Quality," National Academy of Sciences Symposium, Images of Science, Science of Images, Washington, D. C., March 1992.

H. H. Barrett, "Evaluation of image quality through linear discriminant functions," Society for Information Display, Boston, Massachusetts, May 1992.

H. H. Barrett, "Military technology and medical imaging: opportunities for conversion and cooperation," SPIE Conference on Mathematical Methods in Medical Imaging, invited evening speaker, San Diego, California, July 1992.

H. H. Barrett, J. Yao, and J. Rolland, "Efficiency of human observers relative to linear discriminant models," Optical Society of America Annual Meeting, Albuquerque, New Mexico, September 1992.

H. H. Barrett, "Image Processing: Art or Science?" Image Processing Technical Group, Optical Society of America Annual Meeting, Albuquerque, New Mexico, September 1992.

H. H. Barrett and H. B. Barber, "The future of nuclear medicine instrumentation," National Electrical Manufacturers Association Annual Meeting of the Diagnostic Imaging and Therapy Systems Division, Tucson, Arizona, September 1992.

H. H. Barrett, "Objective assessment of image quality: is quality in the eye of the beholder?" Optical Society of America Annual Meeting, Joint meeting of three technical groups, Toronto, Ontario, October 1993.

H. H. Barrett, invited speaker at workshop on small gamma cameras, IEEE Medical Imaging Conference, San Francisco, California, November 1993.

H. H. Barrett, "Semiconductor imaging detectors: the future of nuclear medicine?" American Association of Physicists in Medicine, Newport, Rhode Island, May 1994.

H. H. Barrett, "Objective evaluation of image quality," American Association for the Advancement of Science Annual Meeting, Atlanta, Georgia, February 1995.

H. H. Barrett, "Gamma-ray imaging of the human brain: current approaches and future prospects," University of Rochester and Rochester Institute of Technology, Distinguished Speakers Series, May 1995.

H. H. Barrett, "Objective evaluation of image quality," Theory Institute on Large-Scale Medical Imaging, Argonne National Laboratory, Argonne, Illinois, August 1995.

H. H. Barrett, "Objective assessment of image quality," Conference on Future Trends in Optics, Heidelberg, Germany, August 1995.

H. H. Barrett, "Offbeat SPECT," banquet speaker, IEEE Medical Imaging Conference, San Francisco, California, November 1995.

H. H. Barrett, "Developing and presenting a research plan," SPIE Workshop on The Peer Review Application Process at NIH, Newport Beach, California, February 1996.

H. H. Barrett, "Objective evaluation of image quality," IEEE Engineering in Medicine and Biology Society, International Summer School on Biomedical Imaging, Ile de Berder, France, June 1996.

H. H. Barrett, "Optimal Bayesian classifiers," Optical Society of America Annual Meeting, October 1996.

H. H. Barrett, E. Clarkson, B. Gallas, B. Huang, T. White, and A. Clough, "Scattered radiation in emission computed tomography: accurate characterization and optimal utilization," Institute for Mathematics and its Applications, Minneapolis, Minnesota, March 17-21, 1997.

H. H. Barrett, Three tutorials on topics in image science, Workshop on Image Processing, Brussels, Belgium, May 1997.

H. H. Barrett, "Optimal signal detection: is there a role for optics?" Gordon Research Conference on Information Optics, New Hampshire, June 1997.

H. H. Barrett, Discussant, Panel on Assessment of Image Quality, Visualization 97, Phoenix, Arizona, August 1997.

H. H. Barrett, "Developing and presenting a research plan," SPIE Workshop on The Peer Review Application Process at NIH, San Diego, California, February 1998.

H. H. Barrett, "Room-temperature solid-state detectors for imaging," CME Tutorial at the 45th Annual Meeting of the Society of Nuclear Medicine, Toronto, Ontario, Canada, June 1998.

H. H. Barrett, "Should pixels be legal?" Technical group on image processing, Optical Society of America Annual Meeting, Baltimore, Maryland, October 1998.

H. H. Barrett, "The future of instrumentation in nuclear medicine," Arizona Society of Nuclear Medicine, Tucson, Arizona, October 1998.

E. Clarkson, H. H. Barrett, and J. L. Denny, "The positive and negative effects of positivity in digital imaging," Workshop on Fundamental Issues in Image Formation, Detection and Processing, Center for Advanced Studies, Albuquerque, New Mexico, January 1999.

E. Clarkson, H. H. Barrett, and J. L. Denny, "The role of positivity in image reconstruction," Sparse Aperture Workshop, Jet Propulsion Laboratory, Pasadena, California, January 1999.

H. H. Barrett, 'Task-based assessment of image quality: tools from medical imaging, applications to sparse-aperture imaging?" Sparse Aperture Workshop, Jet Propulsion Laboratory, Pasadena, California, January 1999.

H. H. Barrett, "Research on image quality in nuclear medicine: a brief history and a status report," Symposium on Future Directions in Nuclear Medicine, Physics and Engineering, Chicago, Illinois, March 1999.

H. H. Barrett and A. Pineda, "Information content of tomographic data sets," ICO Meeting, Light for Life, Cancun, Mexico, July 1999.

H. H. Barrett, "Bayesian approaches to pattern recognition and signal detection," Tutorial, Optical Society of America Annual Meeting, Santa Clara, California, October 1999.

H. H. Barrett, "Topics in the mathematics of computed tomography," Short course, IEEE Nuclear Science Symposium, Seattle, Washington, October 24-30, 1999.

H. H. Barrett, "Issues in tomographic imaging," Symposium on Digital Imaging Across Interdisciplinary Boundaries, Dartmouth College, Hanover, New Hampshire, November 1999.

J. D. Sain and H. H. Barrett, "Tumor detection performance of a modular gamma camera," The Society of Nuclear Medicine 47th Annual Meeting, St. Louis, Missouri, June 4-7, 2000.

H. H. Barrett, "Overview of current research in image quality," Information Processing in Medical Imaging, Davis, California, June 2001.

H. H. Barrett, "Experimental nuclear cardiology--small-animal SPECT," American Society of Nuclear Cardiology, Boston, Massachusetts, September 2001 (cancelled after Sept. 11, 2001).

H. H. Barrett, L. Furenlid, and J. Sain, "Theory and practice of modular scintillation cameras," Short course, IEEE Nuclear Science Symposium, San Diego, California, October 2001.

H. H. Barrett, "Objective assessment of image quality and its implications for system design," Optical Society of America Topical Meeting, Integrated Computational Imaging Systems, Albuquerque, New Mexico, November 2001.

E. Clarkson, H. H. Barrett, H. Zhang, B. Gallas, and A. Lehovich, "Evaluating the effectiveness of parameterizations for signals and backgrounds," IPAM Symposium on Medical Imaging and Geometric Motions, UCLA, Los Angeles, California, May 2001.

H. H. Barrett, "What can we learn about continuous functions from discrete data sets?" SIAM Conference on Imaging, Boston, Massachusetts, March 2002.

H. H. Barrett, "Introduction to objective assessment of image quality," SIAM Conference on Imaging, Boston, Massachusetts, March 2002.

H. H. Barrett, "Cardiac SPECT: Current limitations and potential ways to overcome them," American Society of Nuclear Cardiology, Sixth Invitational Conference, Lake Tahoe, California, July 21-24, 2002.

H. H. Barrett, L. Furenlid, G. Kastis, Z. Liu, G. Stevenson, and D. W. Wilson, "Multidetector SPECT systems for cardiac imaging in small animals," American Society of Nuclear Cardiology Workshop, Lake Tahoe, California, July 21-24, 2002.

H. H. Barrett, G. Kastis, Z. Liu, L. Furenlid, and D. W. Wilson, "Small-animal SPECT imaging: recent advances in technology and applications," Plenary presentation, First Annual Meeting, Society for Molecular Imaging, Boston, Massachusetts, August 24-26, 2002.

H. H. Barrett, Instructor at Workshop on Task-Based Assessment of Image Quality, IEEE Medical Imaging Conference, Norfolk, Virginia, November 10-16, 2002.

H. H. Barrett, "Model observers for assessment of image quality," Plenary presentation, IEEE Medical Imaging Conference, Norfolk, Virginia, November 10-16, 2002.

C. K. Abbey, H. H. Barrett, and E. Clarkson, "Adjoint iterative algorithms for assessing the quality of reconstructed images," SIAM Conference on Imaging Science, Boston, Massachusetts, March 2002.

E. Clarkson, H. H. Barrett, and D. W. Wilson, "SPECT imaging with multiple-pinhole apertures," SIAM Conference on Imaging Science, Boston, Massachusetts, March 2002.

H. H. Barrett, "Aspects of image reconstruction from noisy, discrete data," Workshop on New Mathematics and Algorithms for 3D Image Analysis, Louisiana State University, Baton Rouge, Louisiana, September 5-7, 2003.

H. H. Barrett, "State of the art in semiconductor detector arrays," Plenary talk at the IEEE Nuclear Science Symposium and Medical Imaging Conference, Portland, Oregon, October 19-25, 2003.

H. H. Barrett, "Task-based optimization of imaging systems," John R. Cameron Lecture, University of Wisconsin, 2003.

H. H. Barrett, "Gamma-ray imaging: a tool for functional genomics," Charles C. Jones Lecture, Thayer School, Dartmouth College, 2003.

L. Furenlid, H. H. Barrett, and Z. Liu, "Small-animal imaging with FastSPECT II," Academy of Molecular Imaging (AMI), Orlando, Florida, March 28, 2004.

H. H. Barrett and Z. Liu, "Recent advances in small-animal SPECT with application to cardiac imaging," American Society of Nuclear Cardiology, Symposium on Molecular Cardiology, Bethesda, Maryland, May 3-4, 2004.

H. H. Barrett and L. Furenlid, "State of the art in gamma-ray detectors," Short course, IEEE Nuclear Science Symposium and Medical Imaging Conference, Rome, Italy, 2004.

H. H. Barrett, "Molecular imaging: visualizing biology with gamma-rays and light," Public lecture at the National University of Ireland, Galway, May 2005.

H. H. Barrett, E. Clarkson, L. Furenlid, and M. A. Kupinski, "Task-based assessment and optimization of gamma-ray imaging systems," Optical Society of America Annual Meeting, Tucson, Arizona, October 2005.

H. H. Barrett, "Imaging random, dynamic objects through random, dynamic imaging systems," Pacific Institute for Mathematical Sciences, Banff, Canada, March 2006.

H. H. Barrett, "The Center for Gamma-Ray Imaging," Arizona Biosciences Leadership Symposium, Phoenix, Arizona, 2006.

H. H. Barrett, "Image Science: Windows on nature, vistas on the future," Faculty Science Forum, University of Arizona College of Medicine Founders Day, Tucson, Arizona, 2006.

H. H. Barrett, "Detector requirements and fundamental physics" and "Detector statistics and estimation methods," Presented in Short Course on Gamma-Ray Detectors, IEEE Nuclear Science Symposium and Medical Imaging Conference, San Diego, California, 2006.

H. H. Barrett, "Stochastic models of objects and images," Presented in Short Course on Image Quality, IEEE Nuclear Science Symposium and Medical Imaging Conference, San Diego, California, 2006.

H. H. Barrett, Keynote Speaker, "Statistical characterization of radiological images: Basic principles and recent progress," SPIE Medical Imaging Conference, San Diego, California, 2007.

K. J. Myers, H. H. Barrett, B. D. Gallas, R. M. Gagne, N. Petrick, and R. F. Wagner, "Unique issues in the assessment of biomarkers from imaging," RSNA Imaging as a Biomarker for Planning and Monitoring Therapy Workshop, Bethesda, Maryland, May 3-4, 2007.

H. H. Barrett and K. J. Myers, "Signal recovery as estimation: A discourse on null functions and nuisance parameters," Plenary talk, OSA Topical Meeting on Signal Recovery and Synthesis, Vancouver, Canada, June 18-20, 2007.

H. H. Barrett, "Progress in speckle statistics," Invited paper at the SPIE Annual Meeting, San Diego, California, August 29, 2007.

L. R. Furenlid, J. W. Moore , M. Freed, M. A. Kupinski, E. Clarkson, Z. Liu, D. W. Wilson, J. M. Woolfenden and H. H. Barrett , "Adaptive small-animal SPECT/CT," IEEE International Symposium on Biomedical Imaging, May 14-17, 2008.

H. H. Barrett, W. C. J. Hunter, B. W. Miller, S. K. Moore, Y. Chen and L. R. Furenlid, "Maximum-likelihood methods for processing signals from gamma-ray detectors," Plenary talk, SORMA West 2008, Berkeley, CA June 2-5, 2008.

H. H. Barrett, "Recent research at the Center for Gamma-ray Imaging," Keynote talk at International Workshop on Nuclear Medicine Imaging, National Yang Min University, Taiwan, July, 2008

H. H. Barrett, "Introduction to image quality," Short course at International Workshop on Nuclear Medicine Imaging, National Yang Min University, Taiwan, 2008

H. H. Barrett, "Task-based adaptive imaging," 2008 Chicago Nuclear Medicine Forum, Chicago, Illinois, September 25-26, 2008.

H. H. Barrett, "NEQ: Its Progenitors and Progeny," Keynote talk at SPIE Medical Imaging Conference, Orlando, FL, February 2009.

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"Fresnel zone plate imaging," Society of Nuclear Medicine, 1972 (silver medal).

"What's new in Fresnel zone plate imaging?" Society of Nuclear Medicine, 1973 (bronze medal).

"Uncomputerized axial tomography," Society of Nuclear Medicine, 1975 (bronze medal).

"Optical processing methods for transaxial tomography," Society of Nuclear Medicine, 1976.

"Annular coded-aperture imagery," Society of Nuclear Medicine, 1976.

"A modular imaging system in nuclear medicine," Society of Nuclear Medicine, 1983 (honorable mention).

"Two approaches to tomographic imaging using coded apertures," Society of Nuclear Medicine, 1983 (bronze medal).

"Small radiation detector probes for tumor localization," Society of Nuclear Medicine, 1984 (bronze medal).

"A mathematical model of the liver," Society of Nuclear Medicine, 1985 (bronze medal).

"A dual-detector probe for surgical tumor staging," Society of Nuclear Medicine, 1986.

"A mathematical liver phantom and its application to system evaluation," Society of Nuclear Medicine, 1986.

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