CURRICULUM VITAE

University of Pittsburgh
School of Medicine

BIOGRAPHICAL

Name:	**Robert Mark Nishikawa**	**Birth Date:**	January 27, 1958
Home Address:	125 Woodshire Dr. Pittsburgh, PA 15215	**Birth Place:**	Toronto, Canada
Home Phone	412-772-1638	**Citizenship:**	American and Canadian
Business Address:	Imaging Research Division Department of Radiology University of Pittsburgh 3362 Fifth Ave Pittsburgh, PA 15213	**E-mail Address:**	nishikawarm@upmc.edu
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EDUCATION and TRAINING

UNDERGRADUATE:

1977-1981	University of Toronto, Toronto, Canada	B.Sc., 1981	Honours Physics

GRADUATE:

1981-1984	University of Toronto, Toronto, Canada	M.Sc., 1984	Medical Biophysics
1984-1990	University of Toronto, Toronto, Canada	Ph.D., 1990	Medical Biophysics

APPOINTMENTS and POSITIONS

1989 - 1992	Department of Radiology, The University of Chicago, Chicago, Illinois	Research Associate,
1993 - 2000	Department of Radiology, The University of Chicago, Chicago, Illinois	Assistant Professor
2000 - 2013	Associate Professor, Department of Radiology, The University of Chicago, Chicago, Illinois	Associate Professor
2006 – 2013	Carl J. Vyborny Translational Laboratory for Breast Imaging Research, The University of Chicago, Chicago, Illinois	Director
2007	Department of Physics, Kungliga Tekniska Högskolan (Royal Institute of Technology), Stockholm, Sweden	Guest Professor
2008 – 2013	Imaging Sciences: Analysis and Evaluation, Department of Radiology, The University of Chicago, Chicago, Illinois	Section Chief
2013 – 2016	Department of Radiology, University of Pittsburgh, Pittsburgh, PA	Visiting Professor
2013 - 2016	Clinical Translational Medical Physics Lab, Department of Radiology, University of Pittsburgh, Pittsburgh, PA	Director
2016- Present	Department of Radiology, University of Pittsburgh, Pittsburgh, PA	Professor
2016 - present	Imaging Research Lab, Department of Radiology, University of Pittsburgh, Pittsburgh, PA	Director

MEMBERSHIP in PROFESSIONAL and SCIENTIFIC SOCIETIES

American Association for the Advancement of Science (AAAS)	1990
American Association of Physicists in Medicine (AAPM)	1982
Medical Image Perception Society (MIPS)	1995
Society of Breast Imaging (SBI)	1995
SPIE – The International Society for Optics and Photonics	1990
American Institute for Medical and Biological Engineering (AIMBE)	2015

HONORS

Fellow of American Association of Physicists in Medicine	2003
Fellow of the Society of Breast Imaging	2013
Distinguished Investigator, Academy of Radiology Research	2014
Senior Member, SPIE – The International Society for Optics & Photonics	2015
Fellow of the College of American Institute for Medical and Biological Engineering (AIMBE)	2016
Fellow of SPIE – The International Society for Optics & Photonics	2017
Visiting Professorship. Tokyo Institute of Agriculture and Technology, Japan	1998
Visiting Professorship. Royal Institute of Technology, Sweden	2007
Visiting Professorship. Delaware State University, Delaware	2010
Visiting Professorship. Kyushu University, Japan	2010
Visiting Professorship. Kumamoto University, Japan	2014
Visiting Professorship. Emory University, Georgia	2014
Excellence in Diagnostic Imaging Awards in the category of Innovation from Diagnostic Imaging Magazine (awarded to Kurt Rossmann Laboratories for Radiologic Image Research; **RM Nishikawa** is senior member of the Lab).	2001
Number One use of Technology in 2002 from InfoWorld top 100 list for the National Digital Mammography Archive. This is a multi-institutional collaboration between the Universities of Pennsylvania, Chicago, North Carolina (Chapel Hill), and Toronto and Advanced Computing Technologies at BWXT Y-12 at Oak Ridge National Laboratory. (**RM Nishikawa** is PI of the effort at the University of Chicago.)	2002
Sylvia Fedoruk Prize in Medical Physics for "the best article describing work in Medical Physics carried out wholly or mainly in a Canadian institution." (Authors: **Nishikawa RM**, Mawdsley GE, Fenster A, Yaffe MJ)	1988
Stauffer Award for the best basic science paper in Academic Radiology in 1999. (Authors: Jiang Y, **Nishikawa RM**, Schmidt RA, Metz CE, Giger ML,	2000

and Doi K).

Selected as one of 25 articles in Highlights of 2011 for Physics in Medicine and Biology; paper entitled: Detection of clustered microcalcifications using spatial point process modeling. (Authors: Jing H, Yang Y**, Nishikawa RM)** 2012

The Kurt Rossmann Award for Excellence in Teaching, the Graduate Programs in Medical Physics, The University of Chicago. 2000

Third prize at the Young Investigators' Symposium held at the First Inter-American Meeting of Medical Physicists in conjunction with the 26th Annual Meeting of the American Association of Physicists in Medicine, Chicago, IL. (Presenter: **Nishikawa RM**) 1984

Certificate of Merit, Scientific Exhibit: *Development of a digital duplication system for portable chest radiographs*. Presented at the 77th Assembly and annual meeting of the Radiological Society of North America. (Authors: Hoffmann K, Doi K, MacMahon H, Giger ML, **Nishikawa RM**). 1992

Magna Cum Laude, Scientific Exhibit: *Computer-aided diagnosis: Potential usefulness of real-time computer output to interpretations of radiologists.* Presented at the 78th Assembly and annual meeting of the Radiological Society of North America. (Authors: Doi K, Giger ML, **Nishikawa RM**, Hoffmann KR, MacMahon H, Schmidt RA) 1993

Cum Laude, Scientific Exhibit: *Computer-aided radiographic interpretation on intelligent workstations.* Presented at the 82nd Scientific Assembly and Annual Meeting of the Radiological Society of North America. (Authors: Doi K, Giger ML, **Nishikawa RM**, Hoffmann KR, MacMahon H, Schmidt RA) 1996

Certificate of Merit, Scientific Exhibit: *Can computers help radiologists decide who needs a breast biopsy?* Presented at the 83rd Scientific Assembly and Annual Meeting of the Radiological Society of North America. (Authors: Schmidt RA, **Nishikawa RM**, Jiang Y, Metz CE, Wolverton DE, Doi K). 1997

Excellence in Design, Scientific Exhibit. *Computer-aided diagnostic schemes in mammography, chest radiography, angiography, and computed tomography.* Presented at the 83rd Scientific Assembly and Annual Meeting of the Radiological Society of North America. (Authors: Doi K, Giger ML, **Nishikawa RM**, Hoffmann KR, Schmidt RA, MacMahon H) 1997

Merit Award, Scientific Exhibit: *Comparison of the acceptability and performance of image processing algorithms in visualizing known lesions in digital mammograms.* Presented at the 84th Scientific Assembly and Annual 1998

Meeting of the Radiological Society of North America. (Authors: Pisano ET, Braeuning MP, Burke ET, Conant EF, Fajardo LL, Kornguth PJ, **Nishikawa RM**)

Cum Laude, Scientific Exhibit: *Computer aided diagnosis of breast lesions: An interactive demonstration.* Presented at the 84th Scientific Assembly and Annual Meeting of the Radiological Society of North America. (Authors: Jiang Y, **Nishikawa RM**, Giger ML, Huo Z, Schmidt RA, Wolverton DE) 1998

Cum Laude, Educational Exhibit. *Implementation of computer-aided diagnosis into the clinical mammography workflow.* Presented at the 86th Scientific Assembly and Annual Meeting of the Radiological Society of North America. (Authors: **Nishikawa RM**, Giger ML, Jiang Y, Huo Z, Vyborny CJ, Jokich P). 2000

Merit Award, Educational Exhibit. *Multi-Modality Workstation for Computer-aided Diagnosis (CAD) in Breast Imaging*. Presented at the 87th Scientific Assembly and Annual Meeting of the Radiological Society of North America. (Authors: Giger ML, **Nishikawa RM**, Huo Z, Jiang Y, Horsch K, Hendrick RE). 2001

Excellence in Design, Education Exhibit. *On-line demonstration of computer-aided diagnosis (CAD) of malignant and benign breast lesion.* Presented at the 88th Scientific Assembly and Annual Meeting of the Radiological Society of North America. (Authors: Jiang Y, **Nishikawa RM**, Giger ML, Papaioannou J, Lan L, Vyborny CJ, Schmidt RA, Newstead GM). 2002

Honorable Mention Poster Award: *Differences between Mono- And Poly-Energetic Spectra in Modeling DQE(f)*. Presented at SPIE Medical Imaging Conference. (Author: **Nishikawa RM**). 2003

Merit Award, Educational Exhibit: Integration of multi-modality breast CAD into the clinical workflow. Presented at 90th Scientific Assembly and Annual Meeting of the Radiological Society of North America, November 2004, Chicago, IL. (Authors: Giger ML, **Nishikawa RM**, Jiang Y, Schmidt FA, Newstead GM *et al.*) 2004

Honorable Mention Poster Award: *The relevance vector machine technique for the automatic detection of clustered microcalcifications*. Presented at SPIE Medical Imaging Conference. (Author: Wei L, Yang Y, **Nishikawa RM**). 2005

Cum Laude Poster Award: *Microcalcification detectability in tomosynthesis.* Presented at SPIE Medical Imaging Conference, February 2008, San Diego, CA. (Authors: Lau BA, Reiser I, **Nishikawa RM**). 2008

Merit Award: Educational Exhibit: Common Deficiencies in ROC Studies. Presented at 98th Scientific Assembly and Annual Meeting of the Radiological Society of North America, November 2008, Chicago, IL. (Authors: Pesce LL **Nishikawa RM**, Papaioannou J). 2008

Cum Laude Poster Award: Changes in frequency of recall recommendations of examinations depicting cancer with the availability of either priors or digital breast tomosynthesis. Presented at the Image Perception, Observer Performance, and Technology Assessment Conference, SPIE Medical Imaging. (Authors: CM Hakim, AI Bandos, MA Ganott, VJ Catullo, DM Chough, AE Kelly, DD Shinde, JH Sumkin, LP Wallace, **RM Nishikawa**, D Gur) 2016

Honorable Mention Poster Award: Agreement between a computer-assisted tool and radiologists to classify lesions in breast elastography images. Presented at the Computer-aided Diagnosis Congerence, SPIE Medical Imaging. (Authors: KD Marcomini, EFC Fleury, VM. Oliveira, AO. Carneiro, H Schiabel, **RM Nishikawa)** 2017

Publications

I. Refereed Articles

J1. **Nishikawa RM**, Yaffe MJ. Signal-to-noise properties of mammographic film-screen systems. Medical Physics 1985;12(1):32-39

J2. Yaffe MJ, Johns PC, **Nishikawa RM**, Mawdsley GE, Caldwell CB. Anthropomorphic radiologic phantoms. Radiology. 1986;158(2):550-552

J3. **Nishikawa RM**, Mawdsley GE, Fenster A, Yaffe MJ. Scanned-projection digital mammography. Medical Physics 1987;14(5):717-727

J4. **Nishikawa RM**, Yaffe MJ, Holmes RB. Effect of finite phosphor thickness on detective quantum efficiency. Medical Physics 1989;16(5):773-780

J5. **Nishikawa RM**, Yaffe MJ. Model of the spatial-frequency-dependent detective quantum efficiency of phosphor screens. Medical Physics 1990;17(5):894-904

J6. **Nishikawa RM**, Yaffe MJ. Effect of various noise sources on the detective quantum efficiency of phosphor screens. Medical Physics 1990;17(5):887-893

J7. Doi K, Giger ML, MacMahon H, Hoffmann KR, **Nishikawa RM**, Schmidt RA, Chua KG, Katsuragawa S, Nakamori N, Sanada S. Computer-aided diagnosis: development of automated schemes for quantitative analysis of radiographic images. Seminars in Ultrasound, CT and MR. 1992;13(2):140-152

J8. Wu Y, Doi K, Giger ML, **Nishikawa RM**. Computerized detection of clustered microcalcifications in digital mammograms: applications of artificial neural networks. Medical Physics 1992;19(3):555-560

J9. Yin FF, Giger ML, Doi K, Yoshimura H, Xu XW, **Nishikawa RM**. Evaluation of imaging properties of a laser film digitizer. Physics in Medicine and Biology 1992;37(1):273-280

J10. Doi K, Giger ML, **Nishikawa RM**, Hoffmann KR, MacMahon H, Schmidt RA, Chua KG. Digital radiography. A useful clinical tool for computer-aided diagnosis by quantitative analysis of radiographic images. Acta Radiologica 1993;34(5):426-439

J11. Giger ML, Doi K, MacMahon H, **Nishikawa RM**, Hoffmann KR, Vyborny CJ, Schmidt RA, Jia H, Abe K, Chen X. An "intelligent" workstation for computer-aided diagnosis. Radiographics. 1993;13(3):647-656

J12. **Nishikawa RM**, Giger ML, Doi K, Vyborny CJ, Schmidt RA. Computer-aided detection of clustered microcalcifications: an improved method for grouping detected signals. Medical Physics 1993;20(6):1661-1666

J13. MacMahon H, Xu X-W, Hoffmann KR, Giger ML, Yoshimura H, Doi K, Carlin M, Kano A, Yao L, Abe K, Montner SM, **Nishikawa RM**, Chen X: Clinical experience with an advanced laser digitizer for cost-effective digital radiography. RadioGraphics 1993;13:635-645.

J14. Hoffmann KR, Doi K, MacMahon H, Giger ML, **Nishikawa RM**, Xu XW, Yao L, Kano A, Carlin M. Development of a digital duplication system for portable chest radiographs. J Digit Imaging. 1994;7(3):146-153

J15. **Nishikawa RM**, Giger ML, Doi K, Metz CE, Yin FF, Vyborny CJ, Schmidt RA. Effect of case selection on the performance of computer-aided detection schemes. Medical Physics 1994;21(2):265-269

J16. Zhang W, Doi K, Giger ML, Wu Y, **Nishikawa RM**, Schmidt RA. Computerized detection of clustered microcalcifications in digital mammograms using a shift-invariant artificial neural network. Medical Physics 1994;21(4):517-524

J17. Bick U, Giger ML, Schmidt RA, **Nishikawa RM**, Wolverton DE, Doi K. Automated segmentation of digitized mammograms. Academic Radiology 1995;2(1):1-9

J18. Ema T, Doi K, **Nishikawa RM**, Jiang Y, Papaioannou J. Image feature analysis and computer-aided diagnosis in mammography: reduction of false-positive clustered microcalcifications using local edge-gradient analysis. Medical Physics 1995;22(2):161-169

J19. Metz CE, Wagner RF, Doi K, Brown DG, **Nishikawa RM**, Myers KJ. Toward consensus on quantitative assessment of medical imaging systems. Medical Physics 1995;22(7):1057-1061

J20. **Nishikawa RM**, Doi K, Giger ML, Schmidt RA, Vyborny CJ, Monnier-Cholley L, Papaioannou J, Lu P. Computerized detection of clustered microcalcifications: evaluation of performance on mammograms from multiple centers. Radiographics. 1995;15(2):443-452

J21. **Nishikawa RM**, Giger ML, Doi K, Vyborny CJ, Schmidt RA. Computer-aided detection of clustered microcalcifications on digital mammograms. Med Biol Eng Comput. 1995;33(2):174-178

J22. Bick U, Giger ML, Schmidt RA, **Nishikawa RM**, Doi K. Density correction of peripheral breast tissue on digital mammograms. Radiographics. 1996;16(6):1403-1411

J23. Carlin MD, **Nishikawa RM**, MacMahon H, Doi K. The effect of x-ray beam alignment on the performance of antiscatter grids. Medical Physics 1996;23(8):1347-1350

J24. Jiang Y, Metz CE, **Nishikawa RM**. A receiver operating characteristic partial area index for highly sensitive diagnostic tests. Radiology. 1996;201(3):745-750

J25. Jiang Y, **Nishikawa RM**, Wolverton DE, Metz CE, Giger ML, Schmidt RA, Vyborny CJ, Doi K. Malignant and benign clustered microcalcifications: automated feature analysis and classification. Radiology. 1996;198(3):671-678

J26. Yoshida H, Doi K, **Nishikawa RM**, Giger ML, Schmidt RA. An improved computer-assisted diagnostic scheme using wavelet transform for detecting clustered microcalcifications in digital mammograms. Academic Radiology 1996;3(8):621-627

J27. Zhang W, Doi K, Giger ML, **Nishikawa RM**, Schmidt RA. An improved shift-invariant artificial neural network for computerized detection of clustered microcalcifications in digital mammograms. Medical Physics 1996;23(4):595-601

J28. Doi K, Giger ML, **Nishikawa RM**, Schmidt RA. Computer-aided diagnosis of breast cancer on mammograms. Breast Cancer. 1997;4(4):228-233

J29. Krupinski EA, **Nishikawa RM**. Comparison of eye position versus computer identified microcalcification clusters on mammograms. Medical Physics 1997;24(1):17-23

J30. Anastasio MA, Kupinski MA, **Nishikawa RM**. Optimization and FROC analysis of rule-based detection schemes using a multiobjective approach. IEEE Transactions on Medical Imaging 1998;17(6):1089-1093

J31. Anastasio MA, Yoshida H, Nagel R, **Nishikawa RM**, Doi K. A genetic algorithm-based method for optimizing the performance of a computer-aided diagnosis scheme for detection of clustered microcalcifications in mammograms. Medical Physics 1998;25(9):1613-1620

J32. Nagel RH, **Nishikawa RM**, Papaioannou J, Doi K. Analysis of methods for reducing false positives in the automated detection of clustered microcalcifications in mammograms. Medical Physics 1998;25(8):1502-1506

J33. **Nishikawa RM**. Mammographic databases. Breast Disease 1998;10(3-4):137-150

J34. Zhang W, Yoshida H, **Nishikawa RM**, Doi K. Optimally weighted wavelet transform based on supervised training for detection of microcalcifications in digital mammograms. Medical Physics 1998;25(6):949-956

J35. Doi K, MacMahon H, Katsuragawa S, **Nishikawa RM**, Jiang Y. Computer-aided diagnosis in radiology: potential and pitfalls. Eur J Radiol. 1999;31(2):97-109

J36. Jiang Y, **Nishikawa RM**, Schmidt RA, Metz CE, Giger ML, Doi K. Improving breast cancer diagnosis with computer-aided diagnosis. Academic Radiology 1999;6(1):22-33

J37. **Nishikawa RM**. Computer-aided diagnosis complements full-field digital mammography. Diagn Imaging (San Franc). 1999;21(9):47-51, 75

J38. Pisano ED, Cole EB, Major S, Zong S, Hemminger BM, Muller KE, Johnston RE, Walsh R, Conant E, Fajardo LL, Feig SA, **Nishikawa RM**, Yaffe MJ, Williams MB, Aylward SR. Radiologists' preferences for digital mammographic display. The International Digital Mammography Development Group. Radiology. 2000;216(3):820-830

J39. Jiang Y, **Nishikawa RM**, Papaioannou J. Dependence of computer classification of clustered microcalcifications on the correct detection of microcalcifications. Medical Physics 2001;28(9):1949-1957

J40. Jiang Y, **Nishikawa RM**, Schmidt RA, Toledano AY, Doi K. Potential of computer-aided diagnosis to reduce variability in radiologists' interpretations of mammograms depicting microcalcifications. Radiology. 2001;220(3):787-794

J41. Beiden SV, Wagner RF, Doi K, **Nishikawa RM**, Freedman M, Lo SC, Xu XW. Independent versus sequential reading in ROC studies of computer-assist modalities: analysis of components of variance. Academic Radiology 2002;9(9):1036-1043

J42. Edwards DC, Kupinski MA, Metz CE, **Nishikawa RM**. Maximum likelihood fitting of FROC curves under an initial-detection-and-candidate-analysis model. Medical Physics 2002;29(12):2861-2870

J43. **Nishikawa RM**: Assessment of the performance of computer-aided diagnosis and computer-aided diagnosis systems. Seminars in Breast Disease 2002;5(4):217-222, 2002.

J44. El-Naqa I, Yang Y, Wernick MN, Galatsanos NP, **Nishikawa RM**. A support vector machine approach for detection of microcalcifications. IEEE Trans Med Imaging. 2002;21(12):1552-1563

J45. Salfity MF, **Nishikawa RM**, Jiang Y, Papaioannou J. The use of a priori information in the detection of mammographic microcalcifications to improve their classification. Medical Physics 2003;30(5):823-831

J46. Edwards DC, Lan L, Metz CE, Giger ML, **Nishikawa RM**. Estimating three-class ideal observer decision variables for computerized detection and classification of mammographic mass lesions. Medical Physics 2004;31(1):81-90

J47. El-Naqa I, Yang Y, Galatsanos NP, **Nishikawa RM**, Wernick MN. A similarity learning approach to content-based image retrieval: application to digital mammography. IEEE Trans Med Imaging. 2004;23(10):1233-1244

J48. Paquerault S, Yarusso LM, Papaioannou J, Jiang Y, **Nishikawa RM**. Radial gradient-based segmentation of mammographic microcalcifications: observer evaluation and effect on CAD performance. Medical Physics 2004;31(9):2648-2657

J49. Reiser I, **Nishikawa RM**, Giger ML, Wu T, Rafferty E, Moore RH, Kopans DB. Computerized detection of mass lesions in digital breast tomosynthesis images

using two- and three dimensional radial gradient index segmentation. Technol Cancer Res Treat. 2004;3(5):437-441

J50. Wilkie JR, Giger ML, Chinander MR, Vokes TJ, **Nishikawa RM**, Carlin MD. Investigation of physical image quality indices of a bone densitometry system. Medical Physics 2004;31(4):873-881

J51. Edwards DC, Metz CE, **Nishikawa RM**. The hypervolume under the ROC hypersurface of "near-guessing" and "near-perfect" observers in N-class classification tasks. IEEE Trans Med Imaging. 2005;24(3):293-299

J52. Wei L, Yang Y, **Nishikawa RM**, Jiang Y. A study on several machine-learning methods for classification of malignant and benign clustered microcalcifications. IEEE Trans Med Imaging. 2005;24(3):371-380

J53. Wei L, Yang Y, **Nishikawa RM**, Wernick MN, Edwards A. Relevance vector machine for automatic detection of clustered microcalcifications. IEEE Trans Med Imaging. 2005;24(10):1278-1285

J54. Jiang Y, **Nishikawa RM**, Schmidt RA, Metz CE. Comparison of independent double readings and computer-aided diagnosis (CAD) for the diagnosis of breast calcifications. Academic Radiology 2006;13(1):84-94. PMID: 16399036.

J55. Chen G, Johnson J, Weber R, **Nishikawa R**, Schweizer S, Newman P, MacFarlane D: Fluorozirconate-based nanophase glass ceramics for high-resolution medical x-ray imaging. Journal of Non-Crystalline Solids 2006;352:610-614.

J56. Reiser I, **Nishikawa RM**. Identification of simulated microcalcifications in white noise and mammographic backgrounds. Medical Physics 2006;33(8):2905-2911. PMID: 16964867.

J57. Reiser I, **Nishikawa RM**, Giger ML, Wu T, Rafferty EA, Moore R, Kopans DB. Computerized mass detection for digital breast tomosynthesis directly from the projection images. Medical Physics 2006;33(2):482-491. PMID: 16532956.

J58. Rana RS, Jiang Y, Schmidt RA, **Nishikawa RM**, Liu B. Independent evaluation of computer classification of malignant and benign calcifications in full-field digital mammograms. Academic Radiology 2007;14(3):363-370. PMCID: 3654797

J59. Reiser I, **Nishikawa RM**, Edwards AV, Kopans DB, Schmidt RA, Papaioannou J, Moore RH. Automated detection of microcalcification clusters for digital breast tomosynthesis using projection data only: a preliminary study. Medical Physics 2008;35(4):1486-1493. PMCID: 2811555

J60. **Nishikawa RM**, Acharyya S, Gatsonis C, Pisano ED, Cole EB, Marques HS, D'Orsi CJ, Farria DM, Kanal KM, Mahoney MC, Rebner M, Staiger MJ, Digital Mammography Image Screening Trial investigators. Comparison of soft-copy and hard-copy reading for full-field digital mammography. Radiology. 2009;251(1):41-49. PMCID: 2663585

J61. **Nishikawa RM**, Pesce LL. Computer-aided detection evaluation methods are not created equal. Radiology. 2009;251(3):634-636. PMID: 19474371.

J62. Engström E, Reiser I, and **Nishikawa RM**: Comparison of power spectra for tomosynthesis projections and reconstructed images. Medical Physics 2009;36: 1753-1758. PMCID: 19544793

J63. Sidky EY, Pan X, Reiser IS, **Nishikawa RM**, Moore RH, Kopans DB. Enhanced imaging of microcalcifications in digital breast tomosynthesis through improved image-reconstruction algorithms. Medical Physics 2009;36(11):4920-4932. PMCID: 2773453

J64. Wei L, Yang Y, **Nishikawa RM**. Microcalcification classification assisted by content-based image retrieval for breast cancer diagnosis. Pattern Recognition 2009;42(6):1126-1132. PMCID: 2678744

J65. Oto A, Kulkarni K, **Nishikawa R**, Baron RL. Contrast enhancement of hepatic hemangiomas on multiphase MDCT: Can we diagnose hepatic hemangiomas by comparing enhancement with blood pool? American Journal of Roentgenology 2010;195(2):381-386. PMID: 20651193.

J66. Reiser I, **Nishikawa RM**. Task-based assessment of breast tomosynthesis: effect of acquisition parameters and quantum noise. Medical Physics 2010;37(4):1591-1600. PMCID: 2852443

J67. Jing H, Yang Y, **Nishikawa RM**. Detection of clustered microcalcifications using spatial point process modeling. Physics in Medicine and Biology 2011;56(1):1-17. PMCID: 3169193

J68. Reiser I, Lee S, **Nishikawa RM**. On the orientation of mammographic structure. Medical Physics 2011;38(10):5303-5306. PMCID: 3189972

J69. **Nishikawa RM** and Pesce LL: Fundamental limitations in developing computer-aided detection for mammography. Nuclear Instruments and Methods in Physics Research Section A 2011;648(Supplement 1), S251-S254.

J70. Cole EB, Zhang Z, Marques HS, **Nishikawa RM**, Hendrick RE, Yaffe MJ, Padungchaichote W, Kuzmiak C, Chayakulkheeree J, Conant EF, Fajardo LL, Baum J, Gatsonis C, Pisano E. Assessing the stand-alone sensitivity of computer-aided detection with cancer cases from the Digital Mammographic Imaging Screening Trial. American Journal of Roentgenology 2012;199(3):W392-401. PMCID: 3649852

J71. Jing H, Yang Y, **Nishikawa RM**. Regularization in retrieval-driven classification of clustered microcalcifications for breast cancer. International Journal of Biomedical Imaging. 2012;2012:463408. PMCID: 3418652

J72. Jing H, Yang Y, **Nishikawa RM**. Retrieval boosted computer-aided diagnosis of clustered microcalcifications for breast cancer. Medical Physics 2012;39(2):676-685. PMCID: 3267793

J73. Jing H, Yang Y, Wernick MN, Yarusso LM, **Nishikawa RM**. A comparison study of image features between FFDM and film mammogram images. Medical Physics 2012;39(7):4386-4394. PMCID: 3396708

J74. Lau BA, Reiser I, **Nishikawa RM**, Bakic PR. A statistically defined anthropomorphic software breast phantom. Medical Physics 2012;39(6):3375-3385. PMCID: 3371078

J75. **Nishikawa RM**, Schmidt RA, Linver MN, Edwards AV, Papaioannou J, Stull MA. Clinically missed cancer: how effectively can radiologists use computer-aided detection? American Journal of Roentgenology 2012;198(3):708-716. PMID: 22358014.

J76. Reiser I, **Nishikawa RM**, Giger ML, Boone JM, Lindfors KK, Yang K. Automated detection of mass lesions in dedicated breast CT: a preliminary study. Medical Physics 2012;39(2):866-873. PMCID: 3277607

J77. Altman MB, Flynn MJ, **Nishikawa RM**, Chetty IJ, Barton KN, Movsas B, Kim JH, Brown SL. The potential of iodine for improving breast cancer diagnosis and treatment. Medical Hypotheses 2013;80(1):94-98. PMID: 23171625.

J78. D'Orsi CJ, Getty DJ, Pickett RM, Sechopoulos I, Newell MS, Gundry KR, Bates SR, **Nishikawa RM**, Sickles EA, Karellas A, D'Orsi EM. Stereoscopic digital mammography: improved specificity and reduced rate of recall in a prospective clinical trial. Radiology 2013;266(1):81-88. PMID: 23150865.

J79. **Nishikawa RM**, Pesce LL. Estimating sensitivity and specificity for technology assessment based on observer studies. Academic Radiology 2013;20(7):825-830. PMID 23660073.

J80. Reiser I, Edwards A, **Nishikawa RM**. Validation of a power-law noise model for simulating small-scale breast tissue. Physics in Medicine and Biology 2013;58(17):6011-6027. PMC3802539.

J81. Chen X, **Nishikawa RM**, Chan S-T, Lau BA, Zhang L, Mou X. Algorithmic scatter correction in dual-energy digital mammography. Medical Physics 2013:40(11), 111919. PMID 24320452.

J82. Wang J, Jing H, Wernick MN, **Nishikawa RM**, Yang Y. Analysis of perceived similarity between pairs of microcalcification clusters in mammograms. Medical Physics 2014: 41, 051904. PMC4000405

J83. **Nishikawa RM**, Gur D. CADe for early detection of breast cancer—Current status and why we need to continue to explore new approaches. Academic Radiology 2014; 21:1320-1321. PMID: 25086951.

J84. de Sisternes L, Brankov JG, Zysk AM, Schmidt RA, **Nishikawa RM** and Wernick MN. A computational model to generate simulated three-dimensional breast masses. Medical Physics 2015: 42, 1098-1118. PMC4320152. [2015 Editor's Pick]

J85. Tanaka R, Takamori M, Uchiyama Y, **Nishikawa RM**, Shiraishi J. Using breast radiographers' reports as a second opinion for radiologists' reading in digital mammography. British Journal of Radiology 2015: 88, 20140565 . PMC4651194.

J86. Lee J, **Nishikawa RM**, Reiser I, Boone JM, Lindfors KK. Local curvature analysis for classifying breast tumors: Preliminary analysis in dedicated breast CT. Medical Physics 2015: 42(9), 5279-5489. PMC4552705 [2015 Editor's Pick]

J87. Wang J, Yang Y, **Nishikawa RM**. Improving the Accuracy in Detection of Clustered Microcalcifications with a Context-Sensitive Classification Model. Medical Physics 2016; 43(1), 159-. PMC4691250

J88. Wu S, Berg WA, Zuley ML, Kurland BF, Jankowitz RC, **Nishikawa RM**, Gur D and Sumkin JH. Breast MRI contrast enhancement kinetics of normal parenchyma correlate with presence of breast cancer. Breast Cancer Research 2016:18, 76. PMC4957890

J89. de Cea MS, **Nishikawa RM** and Yang Y. Estimating the Accuracy Level Among Individual Detections in Clustered Microcalcifications. IEEE Transactions on Medical Imaging 2017:36(4), 1162–1171

J90. Lee J, **Nishikawa RM**, Reiser I, Boone JM. Optimal reconstruction and quantitative image features for Computer-Aided Diagnosis tools for breast CT. Medical Physics 2017:44(5), 1846-1856, [Editor's Choice]

J91. Wang J, **Nishikawa RM**, Yongyi Y. Global detection approach for clustered microcalcifications in mammograms using a deep learning network. Journal of Digital Imaging 2017;4:4-10.

J92. Lee J, **Nishikawa RM**, Reiser IS, Zuley ML, Boone JM. Lack of agreement between radiologists: implications for image-based model observers. Journal of Digital Imaging 2017;4:4-11.

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II. Invited Reviews and Commentary

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VII. Letters

1. Jiang Y, **Nishikawa RM**, Wolverton DE, Schmidt RA, Vyborny CJ: Malignant and benign clustered microcalcifications: Automated feature analysis and classification (Reply letter). Radiology 1996; 201:581-582.
2. **Nishikawa RM**: Comment on: "Quantitative classification of breast tumors in digitized mammograms" [Medical Physics 23, 1337-1345 (1996)]. Medical Physics 1997; 24(2) 313.
3. **Nishikawa RM**, Schmidt RA, Metz CE. Computer-aided screening mammography. N Engl J Med. 2007;357(1):84; author reply 85
4. **Nishikawa RM**, Schmidt RA, and Metz CE: Computer-aided screening mammography (Letter to the Editor). New England Journal of Medicine 2007; **357**:83-85. PMCID: 17615630
5. **Nishikawa RM**, Giger ML, Jiang Y, Metz CE. Re: effectiveness of computer-aided detection in community mammography practice. Journal of the National Cancer Institute 2012;104(1):77; author reply 78-79. PMCID: 3692379

Professional Activities

I. TEACHING

Year	Course	Responsibility	Location	# of Students	# of Lectures
1982-1985	1st year undergraduate physics	Tutorial leader and laboratory demonstrator	Dept. of Physics, University of Toronto	30	39
1986	Quality assurance course for radiological technicians	Laboratory demonstrator	Dept. of Radiology, University of Toronto.	40	1
1987	Physics for first year radiology residents	Laboratory demonstrator	Dept. of Radiology, University of Toronto	20	1
1988	Medical Imaging for medical students	Lecturer	Faculty of Medicine, University of Toronto	80	1
1990-	Physics of Diagnostic	Lecturer	The	4	10

1998	Radiology (Radiology 387 graduate Medical Physics)		University of Chicago		
1990-1992	Practicum in the Physics of Diagnostic Radiology (Radiology 343 graduate Medical Physics)	Lecturer	The University of Chicago	4	5
1992-1994	Interactions of Ionizing Radiation (Radiology 350 graduate Medical Physics)	Lecturer	The University of Chicago	4	6
1993-1998	Practicum in the Physics of Diagnostic Radiology (Radiology 343 graduate Medical Physics)	Course coordinator and lecturer	The University of Chicago	4	5
1994-2011	Physics of Mammography (MPHY39100 graduate Medical Physics)	Course coordinator and lecturer	The University of Chicago	6	24
1999-2012	Medical Imaging I (MPHY38600 graduate Medical Physics)	Course coordinator and lecturer	The University of Chicago	4	7
2014-present	Radiology Resident Physics Lectures	Lecture moderator	University of Pittsburgh	30	1

Student Mentoring

Summer Students and College Students

Eric Bosworth, 1991
Lang Tang, 1992
Yanlin Mao, 1993
Peter Photikoi, 1994
Kyle Munn, 1994, 1995
Darrin C. Edwards, 1995
Laura M. Yarusso, 1996
Evon Lewis, 1997
Kittiwan Mattan, 1998
Jason P. Peterson, 1999
Simon Lee, 2000
Jeremy Schmidt 2002, 2003 (US Army Undergraduate Fellowship)
Jill Schmitz, 2003 (US Army Undergraduate Fellowship)
Brian Frisch, 2004 (US Army Undergraduate Fellowship)

Toshio Yoshimatsu, 2004, 2005
Deron Brize, 2005 (American Cancer Society Selected High School Student)
Hobbs White, 2005 (US Army Undergraduate Fellowship)
Grant Larson 2005
Ryan Pescnick, 2006
Zihao Jiang, 2011-2012
Sydney Pacelli 2015
Warren Auston, 2016
Margaret Stapleton, 2016
Cierra Leber, 2016
Kimberly Piechowski, 2017
Kynadi Mauney, 2017

High School Students (year-long research project)
Si Si, 2009-2010
Naomi Liu, 2009-2010
Michael White 2010-2011

Medical Students
Laura Han, 2004
Diane Chang, 2008
Santhosh Joseph, 2008

Senior Thesis Supervision
Simon Lee, 2000-2001
Hobbs White 2005-2006

Mentorships during Laboratory Rotation
Kang-Hyun Ahn, 2001
Yahui Peng, 2002
Seungryong Cho, 2005
Sunny Arkani-Hamed, 2005
Payam Seifi, 2006
Beverly Lau, 2007
Anita Dhyani, 2008
Kevin Little, 2009
Zachary Grelewicz, 2009

Graduate Students – Principal Advisor
Yulei Jiang, M.S., 1991 - 1997
Rufus H. Nagel, A.B., 1992 - 2000
Yanlin Mao, B.S. 1993-1995
Darrin C. Edwards, B.S., 1995 - 2003
Laura M. Yarusso, B.S., 1996 – 2007
Payam Seifi, M.Sc., 2006
Beverly Lau, B.S., 2006- 2012

Graduate Students – Dissertation Committee

Fang-Fang Yin, B.S., 1993
Joel Wilke, B.S., 2004-2006
Chisako Matsumura 2005-2007
Yanhui Peng 2006-2009
Richard Zur 2006-2010
Andrew Jamieson, 2009-2012
Jungou Bian, 2009-2012
Neal Corson, 2010-2011

Graduate Students from other Universities (I directed parts or all of their thesis or dissertation research)

Francisco Lopez Valverde, 1997-2000 (University of Malaga, Malaga, Spain)
Javier A. Vargas, B.S. 1999 – 2002 (University of Illinois at Urbana-Champaign, Illinois)
Maria Fernanda Salfity, 2001 – 2002 (Instituto de Física Rosario, Rosario - Santa Fe, Argentina)
Emma Engström, 2007 (Royal Institute of Technology, Stockholm, Sweden)
Xi Chen, 2009 (Xi'an Jiaotong University, Xi'an, China)
Safi Ullah Marwat, 2011-2013 (Department of Computer Science, National University of Computer and Emerging Sciences, Pakistan)
Karem D. Marcomini, 2015-2016 (Department of Electrical Engineering, University of São Paulo, Brazil)

Post-Doctoral Fellows

Datong Wei, Ph.D., 1994-1996
Regina Bitelli Medeiros, Ph.D., 1997-1998
Iris Castro, M.D., 1998
Pablo Tahoces, Ph.D., 2002
Ingrid Reiser, Ph.D., 2002-2006
Yinghui Zhang, Ph.D., 2003-2004
Michael Chinander, Ph.D., 2004-2006
Seunghee Lee, Ph.D., 2009-2010
Juhun Lee, Ph.D., 2014-2016

External Examiner/Appraiser for Ph.D. Dissertation

Janne Nappi, University of Turku, Finland, 2000
Kristen McLoughlins, University of Canterbury, Christchurch, New Zealand, 2003
Hans Bornefalk, Royal Institute of Technology, Stockholm, Sweden, 2006
Jacob Levman, University of Toronto, Toronto, Canada, 2009
Jesse Tanguay, University of Western Ontario, London, Canada, 2013
Amit Kamra, Sant Longowal Institute of Engineering and Technology, Punjab, India, 2015

II. RESEARCH

Grants

(only those for which I am or was the Principal Investigator are listed)
35 external grants for total costs of $12,832,154

Current Grant Support:

	Grant #	Title	Role, %Effort	Years	Total Costs
1	NIH/NIBIB R01 EB013680	A New Approach to Optimizing and Evaluating Computer-Aided Detection Schemes	PI, 45%	9/1/13-8/31/18	$1,729,688
2	NIH/NCI	Improving Perception in Digital Breast Tomography	PI on subcontract to Brigham and Women's Hospital (Jeremy Wolfe, PI), 25%	7/1/16 – 6/30/21	$853,000
3	NIH/NCI	Detecting Mammographically-Occult Cancer in Women with Dense Breasts	PI, 20%	4/1/17 – 3/31/19	$428,001

Pending Grant Support:

	Grant #	Title	Role, %Effort	Years	Total Costs
1	NIH/NIBIB	Improving the Efficiency of Reading Digital Breast Tomosynthesis Exams	PI, 25%	12/1/16-11/30/20	$ 2,018,436

Past Grant Support:

	Grant #	Title	Role, %Effort	Years	Total Costs
1	Whitaker Foundation Bioengineering Grant	Development of an Intelligent Workstation for Mammographic Breast Cancer Detection	PI, 100%	12/1/91-11/30/94	$179,726
2	NIH/NCI Grant RO1 CA60187	Computer-Aided Diagnosis in Digital Mammography	PI, 40%	1/1/94-12/31/02	$2,343,167
3	Department of Central Intelligence	Pattern recognition tools/early detection of breast cancer	PI on subcontract to National Information Display Laboratory (John Pearson, PI), 10%	8/1/95-1/31/96	$19,998 for subcontract
4	Illinois Department of Public Health	Computer-Aided Analysis of Lesions Missed by Mammography	PI, 30%	2/1/95-6/30/97	$121,700
5	NIH/NLM 467-MZ-802349	Telemammography for the Next Generation Internet	PI on subcontract to University of Pennsylvania (Mitchell Schnall, PI), 5%	9/20/98-6/30/99	$19,995 for subcontract
6	USHHS	Transfer of Intelligence Technologies to Improve Breast	PI on subcontract to University of Pennsylvania	10/1/96-6/30/99	$264,565 for subcontract

		Cancer Imaging	(Mitchell Schnall, PI), 20%		
7	US Army Grant BC971468	Application of Information Theory to Improve Computer-Aided Diagnosis Systems	PI on subcontract to Sarnoff Corporation (Paul Sajda, PI), 5%	7/1/98-6/30/01	$40,405 for subcontract
8	NIH/NCI	Telemammography for the Next Generation Internet	PI on subcontract to University of Pennsylvania (Mitchell Schnall, PI), 25%	10/02/99-5/30/03	subcontract: $400,000
9	US Army Grant DAMD17-94-J-4076	Development of a Common Database for Digital Mammography Research	PI, 35%	9/15/94-9/14/03	$1,172,731
10	Susan G. Komen Breast Cancer Foundation	An Intelligent Mammography Workstation to Aid Radiologist in Diagnosing Breast Cancer	PI, 20%	12/31/98-6/30/03	$199,990
11	FujiFilm Medical Systems USA, Inc.	Comparative Accuracy of FCR versus Screen-Film Mammography in Detection of Breast Cancer	PI, 10%	7/1/03-10/31/03	$32,933
12	FujiFilm Medical Systems USA, Inc.	Comparative Feature Analysis of FCR Softcopy Display versus FCR Hardcopy	PI, 25%	1/1/02-9/30/02	$175,374

13	Illinois Department of Public Health	3D Computerized Mass Detection for Digital Tomosynthesis Images of the Breast.	PI, 10%	7/1/03-6/30/04	$35,000 (Post-doc Award to Ingrid Reiser)
14	US Army Grant DAMD17-99-1-9122	A Method for Producing Simulated Mammograms	PI, 30%	8/1/99-7/30/04	$301,651
15	US Army Grant DAMD-17-96-1-6229	Cancers Missed on Mammography	PI, 20%	9/1/96-7/31/04	$407,995
16	Susan G. Komen Breast Cancer Foundation	Development of a Computerized Mass and Microcalcification Detection Scheme for Digital Tomosynthesis Images of the Breast	PI, 0%	7/1/04-6/30/07	$145,000 (Post-doc Award to Ingrid Reiser; declined)
17	US Army Grant BC023165	Computerized Identification of Normal Mammograms	PI, 20%	9/1/03-8/31/05	$133,000
18	NIH/NCI R01 CA10233	Improving Softcopy Reading of Mammograms using CAD	PI, 25%	6/1/03 – 5/31/06	$351,000
19	Illinois Department of Public Health	Observer Evaluation of a Method for Producing Simulated Mammograms	PI, 10%	7/1/05-6/30/06	$35,000 (Post-doc Award to Michael Chinander)

20	NIH/NIBIB R21 EB004021	Using CAD as a Surrogate Reader in Observer Studies	PI, 20%	7/1/05-6/30/07	$409,295
21	NIH/NIBIB R03 EB005456	A Novel Method for Determining Image Similarity	PI, 15%	7/1/05-6/30/07	$152,500
22	Eastman Kodak Company	Mammography Computer Aided Detection Study for the University of Chicago	PI, 10%	1/1/07-9/30/07	$50,000
23	Illinois Department of Public Health	Comparison of Computer-aided Detection on Digital and Film Mammography	PI, 25%	7/1/06-6/30/07	$75,000
24	NIH/NCRR S10RR021039	High-Performance Computer Cluster for Image Analysis	PI, shared instrumentation grant 0%	3/1/07-2/28/09	$237,000
25	NIH/NCI R21/R33 CA109963	Computerized Lesion Detection in Breast Tomosynthesis	PI, 25%	8/1/04-7/31/09	$1,095,405
26	Oak Ridge National Laboratory internal grant	DAMSEL	PI on subcontract to Oak Ridge National Lab (PI: Beckerman), 5%	11/01/08-09/30/10	$25,000, for subcontract
27	NIH/NCI R01 EB006145	Advanced High-Resolution Two-Dimensional X-Ray Detector For Mammography	PI on subcontract to University of Tennessee (PI: Johnson), 20%	02/01/08-11/30/11	$252,140, for subcontract

28	DOD USAMRMC W81XWH-08-1-0353	Optimization of Breast Tomosynthesis Imaging Systems for Computer Aided Detection	(PI for awardee Beverly A. Lau, predoctoral student), 10%	4/1/08-3/31/11	$97,200
29	NIH/SBIR HHSN261201000113C	Nanophase Glass Ceramic X-Ray Imaging Materials – Phase II	PI on subcontract to MDI (PI: Weber), 20%	09/30/10-09/29/12	$58,062, for subcontract
30	VuComp, Inc.	Mammography Data Collection Agreement	PI, 15%	9/1/2011-2/28/2013	$10,500
31	NIH/NIBIB R01 CA132973	A Suite of Diagnostic Aids Based on Image Retrieval	PI on subcontract to Illinois Institute of Technology (PI: Yongyi Yang), 25%	08/01/09-07/31/13	$551,133 for subcontract
32	NIH/NIBIB R21 EB015053	Quantitative Evaluation of Reconstruction Algorithms	PI, 25%	7/1/12-6/30/14	$429,000

III. Seminars and Invited Lectures:

1. **Nishikawa RM**, Yaffe MJ: A theoretical model of the detective quantum efficiency of phosphor screens. Presented at the World Congress on Medical Physics and Biomedical Engineering, July, 1991, Kyoto, Japan.
2. **Nishikawa RM**, Giger ML, Doi K, Vyborny CJ, Schmidt RA: Computerized detection of clustered microcalcifications in mammograms. Presented at the Third Kumamoto Medical Imaging Forum, July, 1991, Kumamoto, Japan.
3. **Nishikawa RM**, Giger ML, Doi K, Vyborny CJ, Schmidt RA: Computerized detection of clustered microcalcifications in mammograms. Presented at Konica Corporation, July 1991, Hino, Japan.

4. **Nishikawa RM**, Giger ML, Doi K, Vyborny CJ, Schmidt RA: Computerized detection of clustered microcalcifications in mammograms. Presented at Toshiba Corporation, July 1991, Nasu, Japan.
5. **Nishikawa RM**, Giger ML, Doi K, Vyborny CJ, Schmidt RA: Computerized detection of clustered microcalcifications in mammograms. Presented at Iwate Medical University, July 1991, Morioka, Japan
6. **Nishikawa RM**: Computer-aided diagnosis in mammography, Sunnybrook Health Science Centre, University of Toronto, January, 1992, Toronto, Canada.
7. **Nishikawa RM**, Doi K, Giger ML, Hoffmann KR, MacMahon H, Schmidt RA, Vyborny CJ: Computer-aided diagnosis: Hardware and software requirements for clinical implementation. Presented at the SPIE Medical Imaging VI, Engineering Problems and Solutions Workshop on Medical Imaging Workstations, February 1992, Newport Beach.
8. **Nishikawa RM**: Design of a common database for research in mammogram image analysis. Presented at the Biomedical Image Processing IV Conference, February 1993, San Jose.
9. **Nishikawa RM**: Applications of computer-vision techniques to radiologic image analysis. Presented at the Department of Electrical and Computer Engineering, Illinois Institute of Technology, October 1993, Chicago, IL.
10. **Nishikawa RM**: Computerized second opinions as an aid to radiographic interpretation. Presented at the Med Tech '93 meeting, November 1993, London, Canada.
11. **Nishikawa RM**: Overview of computer-aided diagnosis in mammography. Presented at the Planning Meeting for the Conference on "New Frontiers in Breast Cancer Imaging and Early Detection." July, 1994, Washington DC.
12. **Nishikawa RM**, Giger ML, Schmidt RA, Vyborny CJ, Haldemann RC, Wolverton DE, Doi K: Computer-aided diagnosis: Retrospective and prospective studies at the University of Chicago. Presented at Medical Imaging and Information Sciences Workshop '95, June, 1995, Chicago, IL.
13. **Nishikawa RM**: The ABC's of DQE and other related parameters. Presented at 37th Annual Meeting of the American Association of Physicists in Medicine, July, 1995, Boston, MA.
14. **Nishikawa RM**: Research in computer-aided diagnosis outside of Japan. Presented at the 55th Annual Meeting of the Japan Radiological Society, April 1996, Yokohama, Japan.
15. **Nishikawa RM**: Application of computer-aided diagnosis to screening mammography. Presented to the Japan Society of Breast Cancer Screening, April 1996, Yokohama, Japan.

16. **Nishikawa RM**: Digital Imaging: Opportunities for improving the early diagnosis of cancer. Presented at the Canadian Organization of Medical Physicists/Canadian College of Physicists in Medicine 42nd Annual General Meeting, June 1996, Vancouver, Canada.
17. **Nishikawa RM**: The transfer of intelligence community and other imaging technologies to improve women's health. Presented at the 1997 Annual Fall Symposium of the American Medical Informatics Association, Nashville, TN, October, 1997.
18. **Nishikawa RM**: Variations in measured performance due to database and scoring protocol. Presented at SPIE Medical Imaging 98, February 1998, San Diego CA.
19. **Nishikawa RM**: Methods for computer-aided diagnosis in mammography. Presented at the Tokyo Institute of Agriculture and Technology, June 1998, Tokyo, Japan.
20. **Nishikawa RM**: Computer-aided diagnosis in mammography. Presented at the National Cancer Center Hospital East, June 1998, Chiba, Japan.
21. **Nishikawa RM**, Gatsonis C, Schnall MD, Giger ML, Sajda P, Chen M-H, Kundel H: Transfer of intelligence technologies to improve breast cancer care. Presented at the U.S. Public Health Service's Office on Women's Health, Federal Technology Transfer Program, Progress Report Assembly, July 1998, Washington DC.
22. **Nishikawa RM**: The fundamentals of MTF, Wiener spectra, and DQE. Presented at the 40th Annual Meeting of the American Association of Physicists in Medicine, August 1998, San Antonio, TX.
23. **Nishikawa RM**: Computer-aided diagnosis of microcalcifications: Retrospective and prospective evaluations. Presented at the Workshop on Computer-Aided Diagnosis and 3-D Image Analysis and Display sponsored by the Department of Health and Human Services Public Health Service's Office of Women's Health and the National Cancer Institute, October, 1998, Boston, MA.
24. **Nishikawa RM**, Giger ML: Using the results of human perception studies in the development of computer-aided diagnosis. Presented at SPIE Medical Imaging 99, February 1999, San Diego CA.
25. **Nishikawa RM**, Gatsonis C, Schnall MD, Giger ML, Sajda P, Chen M-H, Kundel H: Mammogram CAD reader study results. Presented at the U.S. Public Health Service's Office on Women's Health, Federal Technology Transfer Program to Advance Novel Breast Imaging for Early Diagnosis and Treatment of Breast Cancer, April 1999, Washington DC.
26. **Nishikawa RM**: Application of computer-aided diagnosis to digital mammography. Presented at the Society for Breast Imaging Meeting, May 1999, Boston MA.
27. **Nishikawa RM**: Full-field digital mammography and computer-aided diagnosis. Presented at the 41st Annual Meeting of the American Association of Physicists in Medicine, July 1999, Nashville, TN.

28. **Nishikawa RM**: The basics of MTF, Wiener spectra, and DQE. Presented at the 41st Annual Meeting of the American Association of Physicists in Medicine, July 1999, Nashville, TN.
29. **Nishikawa RM**: Recent advances in breast imaging. Presented at the annual Horizon of Hope Meeting (Northwest Chicago Land Chapter). August, 1999, Bartlett, IL.
30. **Nishikawa RM**: Current developments in digital mammography and computer-aided diagnosis. Presented at the National Cancer Center Hospital, October 1999, Tokyo, Japan.
31. **Nishikawa RM**: Full-field digital mammography and the computer-aided diagnosis. Presented at Fuji Photo Film Co. Ltd., October 1999, Miyanodai Technical Research Center, Tokyo, Japan.
32. **Nishikawa RM**: Computer-aided diagnosis: current status and future directions. Presented at 85th Scientific Assembly of the Radiological Society of North America, November 1999, Chicago, IL.
33. **Nishikawa RM**: Computer-aided diagnosis of mammograms. Presented at the Mammography 2000: Changing Technologies, Changing Requirements symposium, May 2000, Minneapolis, MN.
34. **Nishikawa RM**, Evaluation of CAD systems. Presented at SPIE Medical Imaging 2001, February 2001, San Diego CA.
35. **Nishikawa RM**: Computer-aided diagnosis and digital mammography. Presented at the semi-annual meeting of the American College of Radiology Imaging Network. February 2001, Tempe, AZ.
36. **Nishikawa RM**: Current status of computer-aided diagnosis in digital mammography. Presented at the Society for Breast Imaging Meeting, May 2001, San Diego, CA.
37. **Nishikawa RM**: Computer-aided diagnosis: What it can do for you. Presented at the Karolinska Hospital, June 2002, Stockholm, Sweden.
38. **Nishikawa RM**: Application of computer-aided diagnosis to full-field digital mammography. Presented at the Royal Institute of Technology, June 2002, Stockholm, Sweden.
39. **Nishikawa RM**: Funding opportunities in medical imaging. Presented at the American Association of Physicists in Medicine Grantsmanship Workshop, July 2002, Mont Tremblant, Canada.
40. **Nishikawa RM**: Research projects with the ImageChecker M1000 and NDMA project status. Presented at R2 Technology, Inc. January 2003, Carmel, CA.
41. **Nishikawa RM**: Full-field digital mammography: the door to new advances in breast imaging. Presented at the Semi-Annual Meeting of the Mammographers of Southeastern Wisconsin. October 2003, Waukesha, WI.

42. **Nishikawa RM**: Validation of computer-aided diagnosis. Presented to the NIH Imaging Study Section. October 2003, Washington DC.
43. **Nishikawa RM**: Computer-aided diagnosis. Presented at the 8th Annual Digital X-Ray & PACS: An Educational Forum. February 2004, St. Pete Beach, FL.
44. **Nishikawa RM**: Funding opportunities in medical imaging. Presented at the American Association of Physicists in Medicine Grantsmanship Workshop, July 2004, Pittsburgh, PA.
45. **Nishikawa RM**: Image quality metrics in mammography. Presented at 90th Scientific Assembly and Annual Meeting of the Radiological Society of North America, November 2004, Chicago, IL.
46. **Nishikawa RM**: Integration of multi-modality breast CAD into the clinical workflow. Presented at 90th Scientific Assembly and Annual Meeting of the Radiological Society of North America, November 2004, Chicago, IL.
47. **Nishikawa RM**: What to expect when CAD is implemented in screening mammography. Presented at 7th International Workshop on Computer-Aided Diagnosis, Berlin, Germany. June 2005.
48. **Nishikawa RM**: Measuring the clinical impact of CAD on screening mammography. Presented at the 47st Annual Meeting of the American Association of Physicists in Medicine, Seattle, WA. July 2005.
49. **Nishikawa RM**: What to expect when CAD is implemented in screening mammography. Presented at University of Pennsylvania, September 2005, Philadelphia, PA.
50. **Nishikawa RM**: Image quality metrics in mammography. Presented at 91st Scientific Assembly and Annual Meeting of the Radiological Society of North America, November 2005, Chicago, IL.
51. **Nishikawa RM,** Computer-aided detection in breast tomosynthesis. Presented at the Royal Institute of Technology, March 2006, Stockholm, Sweden.
52. **Nishikawa RM**, Image science and CAD: In pursuit of a fundamental theoretical basis for CAD development. Presented at the 48th Annual Meeting of the American Association of Physicists in Medicine, July 2006, Orlando, FL.
53. **Nishikawa RM**: CAD: how it works, how to measure performance, and how to measure its impact on screening. Presented at The Chicago International Breast Course, October 2006, Chicago, IL.
54. **Nishikawa RM**: Physics Keynote Speaker: the role of computer-aided diagnosis in digital tomosynthesis. Presented at 92nd Scientific Assembly and Annual Meeting of the Radiological Society of North America, November 2006, Chicago, IL.
55. **Nishikawa RM**: Image quality metrics in mammography. Presented at 92nd Scientific Assembly and Annual Meeting of the Radiological Society of North America, November 2006, Chicago, IL.

56. **Nishikawa RM**: Computer-aided detection: Where are we now? Presented at 92nd Scientific Assembly and Annual Meeting of the Radiological Society of North America, November 2006, Chicago, IL.
57. **Nishikawa RM**: Clinical requirements for CAD. Presented at SPIE Medical Imaging 2007, February 2007, San Diego CA.
58. **Nishikawa RM**: Computer-aided detection in digital breast tomosynthesis. Presented at Dexela, Inc., London, UK, June 2007.
59. **Nishikawa RM**: Computer-aided diagnosis: An overview of techniques and clinical results. Presented at Royal Institute of Technology, Stockholm, Sweden, June 2007.
60. **Nishikawa RM**: An overview of computer-aided diagnosis and application to digital breast tomosynthesis. Presented at XCounter, AB, Stockholm, Sweden, September 2007.
61. **Nishikawa RM**: Computer-aided diagnosis: get ready, it's coming to a workstation near you! Presented at the 4th Annual Practical Course in Medical Digital Imaging & Teleradiology, March 2008, Toronto, Canada.
62. **Nishikawa RM**: Imaging in the age of medical bioinformatics. Presented at the First Annual Oak Ridge National Laboratory Biomedical Science And Engineering Conference, March 2009, Oak Ridge, TN.
63. **Nishikawa RM**: Breast tomosynthesis: Optimization and clinical translation. At the 95th Scientific Assembly and Annual Meeting of the Radiological Society of North America, November 2009, Chicago, IL. (Declined)
64. **Nishikawa RM**: The statistical perspective: the limitations of clinical CADe studies. Presented at 95th Scientific Assembly and Annual Meeting of the Radiological Society of North America, November 2009, Chicago, IL.
65. **Nishikawa RM**: CAD in breast cancer screening: from the lab to the reading room. Presented at Sunnybrook Health Sciences Centre, December 2009, Toronto, Canada.
66. **Nishikawa RM**: Computer-aided diagnosis in mammography: from the desktop to the clinic. Presented at the Breast Cancer Basics Seminar, Delaware State University, April 2010, Dover, DE.
67. **Nishikawa RM**: Digital mammography and computer-aided diagnosis: a tale of two technologies. Presented at Ryerson University, May, 2010, Toronto, Canada.
68. **Nishikawa RM:** Current status and future directions of computer-aided diagnosis in mammography. International Conference on Medical Biometrics, June 2010, Hong Kong. (declined).
69. **Nishikawa RM**: Image simulation and system optimization for computer and human observers. Presented at 66th Annual Scientific Congress of the Japanese Society of Radiological Technology. April, 2010, Yokohama, Japan.

70. **Nishikawa RM**: Teaching Medical Physics. Presented at Kyushu University, April 2010, Fukaoka, Japan.
71. **Nishikawa RM**: Computer-aided diagnosis: past, present and vision for the future. Presented at the Medical Center Innovators of Today and Tomorrow Luncheon. The University of Chicago, June 2010, Chicago, IL.
72. **Nishikawa RM**: Computer-aided diagnosis: application to mammographic screening. Presented at Imaging 2010, June 2010, Stockholm, Sweden.
73. **Nishikawa RM**: The statistical perspective: the limitations of clinical cade studies. Presented at the 96th Scientific Assembly and Annual Meeting of the Radiological Society of North America, November 2010, Chicago, IL.
74. **Nishikawa RM**: A perspective on the FDA approval process for medical imaging devices. Presented at the SPIE Medical Imaging 2011, February 2011, Orlando, FL.
75. **Nishikawa RM**: How to make computer-aided detection systems more effective for radiologists. Presented at the Visual Attention Laboratory, Department of Surgery, Brigham & Women's Hospital, May 2011, Cambridge, MA.
76. **Nishikawa RM**: Multi-modality image analysis in breast imaging. Presented at Algorithm Development for Security Applications: Fusing Technologies. May 2011, Cambridge, MA.
77. **Nishikawa RM**: The limitations of clinical studies. Presented at the 13th International Workshop on Computer-Aided Diagnosis, June 2011, Berlin, Germany.
78. **Nishikawa RM**: Clinical needs, clinical evaluation, technical evaluation, and technical requirements for development of practical CAD systems. Presented at the 13th International Workshop on Computer-Aided Diagnosis, June 2011, Berlin, Germany.
79. **Nishikawa RM**: Three-dimensional breast phantoms for x-ray imaging. Presented at the 53rd Annual Meeting of the American Association of Physicists in Medicine, July 2011, Vancouver, Canada.
80. **Nishikawa RM**: Lessons learned from computer-aided detection in medical imaging. Presented at the Algorithm Development for Security Applications: Development of automated threat recognition (ATR) algorithms for explosion detection systems. October 2012, Cambridge, MA.
81. **Nishikawa RM**: Image quality models in advanced CT applications: Historical overview. Presented at the 55th Annual Meeting of the American Association of Physicists in Medicine, August 2013, Indianapolis, IN.
82. **Nishikawa RM**: Myth Busters: How to Evaluate Computer-Aided Detection Systems in the Lab and in the Clinic. Presented at Department of Medical Biophysics, University of Toronto, January 16, 2014, Toronto, Canada.

83. **Nishikawa RM**: Computer-aided detection versus computer-aided diagnosis in breast imaging. Presented at SPIE Medical Imaging Conference, February 2014, San Diego, CA.
84. **Nishikawa RM**: Clinical evaluation of computer-aided detection systems. Presented at Department of Radiological Sciences, Osaka University, March, 2014.
85. **Nishikawa RM**: Clinical evaluation of computer-aided detection systems. Presented at Department of Medical Physics, Kyushu University, March 2014.
86. **Nishikawa RM**: Clinical evaluation of computer-aided detection systems. Presented at Department of Radiological Physics, Kumamoto University, March 2014.
87. **Nishikawa RM**: Caveat Medicus: Measuring the effectiveness of computer-aided detection in screening mammography. Presented at Grand Rounds, Department of Radiology, Emory University, Atlanta GA, April 2014.
88. **Nishikawa RM**: Surrogate Endpoints for Screening Mammography. Presented at the "Research in Progress" series, Department of Radiology, Emory University, Atlanta GA, April 2014.
89. **Nishikawa RM**: Validation From the Broader Clinical Perspective. Presented at SPIE Medical Imaging 2016, February 2016, San Diego CA.
90. **Nishikawa, RM**: Effective Use of Breast Computer-Aided Diagnosis in Clinical Practice. Presented at the 102nd Scientific Assembly and Annual Meeting of the Radiological Society of North America, November 2016, Chicago, IL.
91. **Nishikawa, RM**: Implementing Digital Breast Tomosynthesis. Presented at the Annual meeting of the Society of Breast Imaging, April 2017, Los Angeles, CA.

III. Other Research Related Activities

Patents

1. **Nishikawa RM**, Giger ML, Doi K: Method *for computer-aided detection of clustered microcalcifications from digital mammograms.* US Pat. 5,537,485.
2. **Nishikawa RM**, Doi K, Ema T, Yoshida H: Computerized *detection of clustered microcalcifications in mammograms.* US Pat. 5,673,332.
3. **Nishikawa RM**, Doi K, Ema T, Yoshida H: Computer-*aided method for image feature analysis and diagnosis in mammography*. US Pat. Serial No. 5,666,434.
4. **Nishikawa RM**, Doi K, Ema T, Yoshida H: Computer-*aided method for image feature analysis and diagnosis in mammography*. US Pat. Serial No. 5,740,268.
5. **Nishikawa RM**, Doi K, Ema T, Yoshida H: Computer-*aided method for image feature analysis and diagnosis in mammography*. US Pat. Serial No. 5,598,481.
6. **Nishikawa RM**, Jiang Y, Ashizawa K, Doi K: Methods *for improving the accuracy in differential diagnosis in radiologic examinations*. US Pat. Serial No. 6,058,322.
7. Yoshida H, Zhang W, **Nishikawa RM**, Doi K: A *method for determining an optimally weighted wavelet transform based on supervised training for detection of microcalcifications in digital mammograms*. US Pat. Serial No. 6,075,878.

Editorial Board

- Journal of Medical Imaging

Guest Associate Editor for:

- Medical Physics

Reviewer for the following Journals:

- Academic Radiology
- American Journal of Roentgenology
- Breast Cancer Research and Treatment
- IEEE Transactions on Biomedical Engineering
- IEEE Transactions on Medical Imaging
- International Journal of Computer Assisted Radiology and Surgery
- Journal of the American Medical Association
- Journal of Medical Imaging
- Journal of the Optical Society of America A
- Medical Physics
- Nature Communications
- New England Journal of Medicine
- Nuclear Instruments and Methods in Physics Research Section A
- Psychological Science
- Physics in Medicine and Biology
- RadioGraphics
- Radiology

Study Section Memberships

- US Army Medical Research and Materiel Command (Member Breast Cancer Imaging study section, 1995-1996)
- National Institutes of Health (Member, study section to review SIG applications, Oct. 1998)
- Susan G. Komen Breast Cancer Foundation (Study Section Leader for Imaging applications, 1999-2001)
- National Institutes of Health (Ad hoc member, DMG study section 2000-2002)
- National Institutes of Health (Member, special study section to review P01, Sep. 2003)
- National Institutes of Health (charter member of the Biomedical Imaging Technology (BMIT) Study Section, 2003-2007)
- National Institutes of Health (Assistant Chair of the Biomedical Imaging Technology Study (BMIT) Section, Oct 2005)
- National Institutes of Health (Chair of the Biomedical Imaging Technology Study (BMIT) Section, Feb. 2007)

- National Institutes of Health (Member, special study section to review Population-based Research Optimizing Screening through Personalized Regimens (PROSPR) applications, ZCA1 SRLB-R (O1) June 2011)
- National Institutes of Health (Member, special study section, ZCA1 TCRB-B (C2), SBIR, NCI-140605-SCH, June 2014).
- National Institutes of Health (Ad hoc member, BMIT-B study section, Oct. 2014)
- National Institutes of Health (Member, special study section, K-Awards, ZEB1 OSR-A J1 S, Dec. 2014).
- National Institutes of Health (Ad hoc Member, special study section on Clinical and Translational Imaging Applications, 2015/10 ZRG1 DTCS-A (81) S, May. 2015).
- National Institutes of Health (Ad hoc Member: Cancer, Cardiovascular and Sleep Epidemiology Panel B (CASE-EPIC Panel B) Study Section, ZRG1 PSE-U (90) June 2015)
- National Institutes of Health (Member, special study section, K-Awards, ZEB1 OSR-A J1 S, Dec. 2015).
- National Institutes of Health (Ad hoc Member: Cancer, Heart, and Sleep Epidemiology B Study Section Population Sciences and Epidemiology Integrated Review Group. October 2016)

Grant reviewer for the following agencies:

- Medical Research Council of Canada (1996-1997)
- National Cancer Institute of Canada (1997)
- Alberta Heritage Foundation for Medical Research (1997-2002)
- National Institutes of Health (Review Challenge Grant applications, June 2009)
- Dutch Cancer Society (Reviewer, 2011)
- National Institutes of Health (Ad hoc reviewer for translational/clinical study section, Jan, 2012, ZRG1 DTCS U(81))
- National Institutes of Health (Ad-hoc reviewer for NIH Director's Early Independence Award, April, 2012, ZRG1 BBBP-E (53))
- The Israel Science Foundation (Reviewer, 2012)
- Skolkovo Foundation, Russia (Reviewer 2012)
- Canadian Breast Cancer Foundation (Reviewer, 2013)

Member of the following National or International committees or groups:

- Member: National Digital Mammography Development Group - Executive Committee (1993-1997)
- Member: American Association of Physicist in Medicine (AAPM) Task Group #16: Standards for noise power spectrum analysis (1994-2004).

- Member: Breast Imaging Group sponsored by the Office of Women's Health, Department of Health and Human Services. Chaired by Susan Blumenthal, Assistant Surgeon General (1994-1997).
- Member: "New Frontiers in Image-Guided Breast Cancer Diagnosis and Treatment" formed by the Office of Women's Health, Department of Health and Human Services, in collaboration with the National Cancer Institute (1996-1997).
- Member: International Advisory Board of the journal Physics in Medicine and Biology (1996-2002).
- Member: National Mammography Quality Assurance Advisory Committee (NMQAAC), Center for Devices and Radiological Health, Food and Drug Administration (1998-2002)
- Co-chair: Working Group on Computer-Aided Diagnosis and 3-D Image Analysis and Display formed by the Office of Women's Health, Department of Health and Human Services (1998)
- Member: ACRIN Digital Mammography Screening Trial - Executive Committee (1999-2001, 2006-2013)
- Member, Research Committee, American Association of Physicist in Medicine (AAPM) (1999-2004)
- Member: Susan G. Komen Breast Cancer Foundation Research Program Task Force (2001)
- Membership Committee for the Association of University Radiologists (2003-2006).
- Member, Breast Committee, American College of Radiology Imaging Network (ACRIN) (2004 – 2012)
- Member: Informatics Committee, American College of Radiology Imaging Network (ACRIN) (2004-2012)
- Chair, Imaging Research Subcommittee, American Association of Physicist in Medicine (AAPM) (2004-2008)
- Member American Association of Physicist in Medicine (AAPM) Imaging Physics Committee (2005-2017)
- Member, Science Council, American Association of Physicist in Medicine (AAPM) (2005-2008)
- Member, RSNA Education Coordination Subcommittee, American Association of Physicist in Medicine (AAPM) (2007-2008)
- Co-Chair of the Working Group on Computer-Aided Diagnosis for the American Association of Physicist in Medicine (2011-present)
- Member: International Advisory Board for the journal Physics in Medicine and Biology (2012-2017)
- Member: Breast Committee, ECOG-ACRIN Cancer Research (2012-present)
- Member: American College of Radiology, Clinical Data Science Committee (2016-2017)

. CONFERENCE COMMITTEES

- Organizing Committee for the 3rd International Workshop on Digital Mammography (1996).
- Technical Program Committee for the 19th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (1997).
- Workshop on "Issues in Assessment of CAD Systems" for the Image Processing Session at the SPIE Medical Imaging 98 conference (1998).
- Scientific Committee for the 4th International Workshop on Digital Mammography (1998).
- Organizing Committee for the 8th Far West Conference on Image Perception (1999).
- Organizing Committee for the 5th International Workshop on Digital Mammography (2000).
- Program Committee for International Workshop on Computer-Aided Diagnosis (2000-present).
- Program Committee for the SPIE Physics of Medical Imaging Conference (2005-2015)
- Moderator, Physics Case of the Day, Radiological Society of North America (2007-2008)
- Moderator, Special Focus Session on Photon Counting: Is It the Future of X-ray Imaging from Mammography to CT? Radiological Society of North America (Nov. 2008)
- Member, Physics Subcommittee of the Scientific Program Committee, Radiological Society of North America, Dec. 2009 – Nov 2011.
- Co-Chair, Program Committee for the SPIE Physics of Medical Imaging Conference (2010-2013)
- Organize Imaging Symposium on Three-Dimensional Breast Models for the annual meeting of the American Association of Physicists in Medicine, July 2011.
- Program Committee for the SPIE Image Perception, Observer Performance, and Technology Assessment Conference (2015)
- Chair, Program Committee for the SPIE Image Perception, Observer Performance, and Technology Assessment Conference (2016-present)
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3. LIST of CURRENT RESEARCH INTERESTS

1. Computer-aided detection (CADe) for mammography. I am interest in quantifying clinical performance and methods for improving clinical outcomes when CADe is used.
2. Technology assessment. I am developing quantitative methods for evaluating image quality and diagnostic performance.

3. Virtual clinical trials. I am developing models that can be used to simulate clinical trials in breast imaging. The simulation can be used to measure the efficacy of different breast imaging technologies on detection of cancer, on radiologists' performance, and ultimately on patient outcome (i.e. mortality and the effects of false positive detections).
4. X-ray imaging techniques for breast imaging. Characterizing basic imaging properties and clinical effectiveness of tomosynthesis and computed tomography (CT) of the breast.
5. Radiomics. I am interest in developing models or imaging biomarkers as applied to detection, diagnosis and treatment of breast cancer.

4. SERVICE

1. University and Medical School

- Member: Publicity Committee for the Graduate Programs in Medical Physics (1991-1996)
- Member: University of Chicago Cancer Research Center (1994-2013)
- Member: Admissions Committee for the Graduate Programs in Medical Physics (1997-2005)
- Member: Curriculum Committee for the Graduate Programs in Medical Physics (1997-1999)
- Organizer of the Summer Research Opportunities in Medical Physics program, Graduate Programs in Medical Physics (1998)
- Chair: Curriculum Committee for the Graduate Programs in Medical Physics (1999-2013)
- Member: Committee on Teaching Assistants, Biological Sciences Division (1999-2013)
- Member: *ad hoc* committee to review the Committee on Cell Physiology, Biological Sciences Division (2000).
- Member: Radiation Safety Committee, The University of Chicago (2000-2013).
- Scientific Director of the Scientific Image Reconstruction and Analysis Facility (SIRAF) within the University of Chicago Cancer Research Center (2003-present).
- Volunteer: Faculty contact for advising other faculty on family issues (2004-2007).
- Volunteer: Grant Application Mentor, Biological Sciences Division (2005-2007).
- Member: Appointments and Promotions Committee, Department of Radiology (2008-2013)
- Member: Graduate Education Committee, Biological Sciences Division (2012-2013)

2. Community activities

Scientific/Medical Advisory Board

- Medical Advisory Board for Imaging Diagnostic System, Inc. (Florida) (1999-2001)
- Scientific Advisory Board for Dexela Limited (London, UK) (2006-2011)

Consultant

- Eastman Kodak Company (2006)
- Fuji Medical Systems USA (2007)
- Carestream Health (2008-2009)
- Siemens Medical Systems (2009)
- Hologic, Inc. (2011-2012)
- iCAD, Inc. (2012-2016)
- USystems, Inc. (2012)