

CURRICULUM VITAE

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Biomedical Sciences and Engineering Center (BSEC)
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EDUCATION: Duke University, Durham, NC
Ph.D. in Biomedical Engineering, 1993
*“Artificial neural networks for image analysis and
diagnosis in nuclear medicine”*
University of Thessaloniki, Thessaloniki, Greece
B.S. in Physics (minor in Biophysics), 1987

PROFESSIONAL TRAINING AND ACADEMIC CAREER:

9/1988 - 5/1991 Teaching Assistant
Biomedical Engineering, Duke University
9/1988 - 7/1993 Research Assistant
Radiology, Division of Nuclear Medicine, Duke University Medical Center
8/1993 - 2/1995 Research Associate
Radiology, Duke University Medical Center
3/1995 - 6/1996 Assistant Research Professor
Radiology, Duke University Medical Center
9/1996 - 8/1997 Assistant Research Professor
Diagnostic Radiology, University of Louisville
9/1997 – 5/2006 Assistant Research Professor
Radiology, Duke University Medical Center
1/2004 – 6/2004 Visiting Associate Professor

Computer Engineering and Computer Science, University of Louisville
 7/2004 – 6/2007 Adjunct Associate Professor
 Computer Engineering and Computer Science, University of Louisville
 5/2006 – 5/2011 Associate Professor
 Radiology and Medical Physics, Duke University Medical Center
 5/2011 – present Adjunct Professor
 Radiology, Duke University Medical Center
 6/2011 – present Director of Biomedical Sciences and Engineering Center (BSEC)
 Oak Ridge National Laboratory

PROFESSIONAL AND SCIENTIFIC ACTIVITIES

2008 Consultant to the Editor, *Radiology*
 2000-2007 Associate Editor, *Radiology*
 2007-present Associate Editor, *Neurocomputing*
 2007-present Editorial Board, *Intelligent Decision Technologies*
 2008 Guest Associate Editor, *Medical Physics*

Reviewer for the following journals

Medical Physics, Physics in Medicine and Biology, IEEE Transactions on Medical Imaging, IEEE Transactions on Nuclear Sciences, Radiology, American Journal of Roentgenology, Academic Radiology, Medical Decision Making, Journal of Electronic Imaging, Journal of Digital Imaging, Neurocomputing.

AAPM Joint Working Group for Research Seed Funding Initiative (2008 - 2011)

AAPM Computer Aided Detection in Diagnostic Imaging (CAD) Subcommittee (2008 - present)

AAPM Education Coordination Subcommittee (2008 - 2011)

RSNA Refresher Course Committees, RSNA (2008 - 2010) – AAPM Liaison

RSNA Co-director of Refresher Course “CAD: The hope, the hype, and the hard truth”, 2009-2011

RSNA Refresher Course Faculty for the Course “Breast Imaging: Physics, Technology and Clinical Applications” 2010, 2011

SPIE Medical Imaging Conference – CAD Committee Program Member (2010-present)

FDA Radiology Devices Review Panel (2008 – present)

NIH CSR Grant Reviewer

Charter Member, Biomedical Imaging Technology (BMIT) Study Section, 10/07 – 06/11

Guest Member, Special Emphasis Panel, “Novel Technologies for In Vivo Imaging”
ZRG1 SBIR, 04/04

Guest Member, Special Emphasis Panel, “Novel Technologies for In Vivo Imaging”
ZRG1 SBIB-J, 06/05, 10/05, 06/06, 11/06

Guest Member, NIH Biomedical Imaging Technology (BMIT) Study Section, 02/06

NIH Conflict Study Section, ZRG1 SBIB-S-02, 02/06, 02/07

American Institute of Biological Sciences

Mail-in reviewer, October 2005

Session Chair

2004 International Conference on Machine Learning and Applications (ICMLA)

Special Session: “Machine Learning in Medicine and Biology”

Louisville, KY, December 16-18, 2004

2011 SPIE Conference in Medical Imaging

Breast Imaging I Session

Orlando, FL, February 15, 2011

2009 Co-Organizer of International Joint Conference on Neural Networks (June 14-19, 2009)

Special Session: “Computational Intelligence in Medical Diagnosis”

Atlanta, GA, June 14-19, 2009

2010 Co-organizer of the Workshop on Machine Learning in Medical Imaging (MLMI) at the

13th International Conference on Medical Image Computing and Computer-assisted
Intervention (MICCAI 2010)

2010 Member of the International Program Committee for the 2nd KES International

Symposium on Intelligent Decision Technologies (IDT 2010)

2011 Organizer of Workshop on “Computational Image Analysis: From Desktop to Bedside”

2011 Biomedical Science and Engineering Conference (BSEC), Knoxville, TN (March 15, 2011)

2011 Organizer of Workshop on "Biomedical Instrumentation" 2011 Future of Instrumentation International Workshop (FIIW)", Oak Ridge National Laboratory, Oak Ridge, TN (November 7-8, 2011)

HONORS, AWARDS:

Graduate Fellowship, Duke University, 1988 - 1993

Undergraduate Fellowship, National Fellowship Foundation, Athens, Greece, 1983 – 1987

NIH Young Investigator's Award, 1994

AAPM 2006, Reviewer's Choice Award

My research work has been featured in:

The Economist (August 11, 2006) "The Bosom Buddy"

MIT Science and Technology Review

Oncology Times

Health-IT World Magazine

Physics Today

BreastCancer.Net News

AuntMinnie

PROFESSIONAL SOCIETIES:

Member of the Institute of Electrical and Electronics Engineers (IEEE)

Member of the International Society for Optical Engineering (SPIE)

Member of the American Association of Physicists in Medicine (AAPM)

Member of the Radiological Society of North America (RSNA)

Member of the International Neural Network Society (INNS)

Member of the Society for Imaging Informatics in Medicine (SIIM)

PUBLICATIONS:

Peer-Reviewed Journal Articles (* indicates first or senior author publication)

*1. **G.D. Tourassi**, C.E. Floyd Jr., M.T. Munley, J.E. Bowsher, and R.E. Coleman, "Improved Lesion Detection in SPECT Using MLEM Reconstruction", *IEEE Trans. Nucl. Sci.* NS-38: 780-783, 1991.

2. C.E. Floyd Jr., J.E. Bowsher, M.T. Munley, **G.D. Tourassi**, and R.E. Coleman, "Dual Collimation for High Resolution, Low Noise SPECT", IEEE Trans. Nucl. Sci. NS-38: 784-788, 1991.
3. M.T. Munley, C.E. Floyd Jr., J.E. Bowsher, **G.D. Tourassi**, and R.E. Coleman, "Out-of-Plane Photons In SPECT", IEEE Trans. Nucl. Sci. NS-38: 776-779, 1991.
4. C.E. Floyd, Jr. and **G.D. Tourassi**, "An Artificial Neural Network for Lesion Detection on Single Photon Emission Computed Tomographic Images", Investigative Radiology, 27(9): 667-672, 1992.
- *5. **G.D. Tourassi** and C.E. Floyd, Jr., "Artificial Neural Networks for SPECT: A Study of Cold Lesion Detection and Localization", Investigative Radiology, 28(8): 671-677, 1993. Abstracted for yearly review publications: MOSBY YEARBOOK OF NUCLEAR MEDICINE 1994
- *6. **G.D. Tourassi**, C.E. Floyd, Jr., H. D. Sostman, and R.E. Coleman, "An Artificial Neural Network for the Diagnosis of Acute Pulmonary Embolism", Radiology, 189: pp. 555-558, 1993. Abstracted for yearly review publications: MOSBY YEARBOOK OF NUCLEAR MEDICINE 1994
- *7. **G.D. Tourassi**, C.E. Floyd, Jr., H. D. Sostman, and R.E. Coleman, "Performance Evaluation of An Artificial Neural Network for the Diagnosis of Acute Pulmonary Embolism: Effect of Case and Observer Selection", Radiology, 194: 889-893, 1995. Abstracted for yearly review publications: MOSBY YEARBOOK OF NUCLEAR MEDICINE 1995
- *8. **G.D. Tourassi** and C.E. Floyd Jr., "Lesion Size Quantification In SPECT Using An Artificial Neural Network Classification Approach", Computers and Biomedical Research , 28: 257-270, 1995.
9. C.E. Floyd, Jr., J.Y. Lo, **G.D. Tourassi**, J.A. Baker, N.F. Vittitoe, and R. Vargas-Voracek, "Computer-Aided Diagnosis in Thoracic and Mammographic Radiology", Medical Imaging Technology, 6: 629-634, 1996.
- *10. **G.D. Tourassi** and C.E. Floyd Jr., "Effect of Data Sampling on the Performance Evaluation of Artificial Neural Networks for Medical Diagnosis", Medical Decision Making, 17(2): 186-192, 1996.
- *11. **G.D. Tourassi**, C.E. Floyd, Jr., and R.E. Coleman, "Improved Non-Invasive Diagnosis of Acute Pulmonary Embolism Using Optimally Selected Clinical and Chest Radiographic Findings", Academic Radiology, 3: 1012-1918, 1996.
- *12. **G.D. Tourassi**, C.E. Floyd, Jr., and R.E. Coleman, "Acute Pulmonary Embolism: Cost-Effectiveness Analysis of the Effect of Artificial Neural Networks on Patient Care", Radiology, 206: 81-88, 1998.
- *13. **G.D. Tourassi**, C.E. Floyd, Jr., "Application of Artificial Intelligence in Diagnosis of Acute Pulmonary Embolism", Current Topics in Radiology, 1: 91-100, 1998.

- *14. **G.D. Tourassi**, E.D. Frederick, N.F. Vittitoe, C.E. Floyd Jr, R.E. Coleman, "Fractal Texture Analysis of Perfusion Lung Scans", *Computers and Biomedical Research*, 33(3): 161-171, 2000.
15. C.E. Floyd, Jr., J.Y. Lo, **G.D. Tourassi**, "Breast Biopsy: Case-Based Reasoning Computer-Aid Using Mammography Findings for the Breast Biopsy Decisions", *American Journal of Roentgenology (AJR)* 175(5): 1347-1352, 2000.
- *16. **G.D. Tourassi**, E.D. Frederick, C.E. Floyd, Jr., " Computer-Assisted Diagnosis of Acute Pulmonary Embolism from Ventilation-Perfusion Lung Scans", *Current Topics in Radiology*, 2: 23-32, 2000.
- *17. **G.D. Tourassi**, E.D. Frederick, C.E. Floyd Jr, R.E. Coleman, "Multifractal Texture Analysis of Perfusion Lung Scans as a Computer Aid for Acute Pulmonary Embolism", *Computers and Biology and Medicine*, 31(1): 15-25, 2001.
- *18. **G.D. Tourassi**, M.K. Markey, J.Y. Lo, C.E. Floyd, Jr. "A Neural Network Approach to Breast Cancer Diagnosis as a Constraint Satisfaction Problem," *Medical Physics* 28(3): 804-811, 2001.
- *19. **G.D. Tourassi**, E.D. Frederick, M.K. Markey, C.E. Floyd, Jr., "Application of the Mutual Information Criterion for Feature Selection in Computer-Aided Diagnosis," 28(12): 2394-2402, 2001.
20. M.K Markey, J.Y. Lo, R.V. Vargas-Voracek, **G.D. Tourassi**, C.E. Floyd, Jr., "Perceptron Error Surface Analysis: A Case Study in Breast Cancer Diagnosis," *Computers and Biology and Medicine*, 32(2): 99-109, 2002.
21. M.K Markey, J.Y. Lo, **G.D. Tourassi**, C.E. Floyd, Jr., "Self-Organizing Map for Cluster Analysis of a Breast Cancer Database," *Artificial Intelligence in Medicine* 27(2): 113-127, 2003.
- *22. **G.D. Tourassi**, R. Vargas-Voracek, C.E. Floyd, Jr., "Computer-Assisted Detection of Mammographic Masses: A Template Matching Scheme based on Mutual Information," *Medical Physics* 30(8): 2123-2139, 2003.
23. M.K. Markey, **G.D. Tourassi**, C.E. Floyd, Jr., "Decision Tree Classification of Proteins Identified by Mass Spectrometry of Blood Serum Samples from People with and without Lung Cancer," *Proteomics*, 3: 1678-79, 2003.
24. M.P. Wachowiak, R. Smolikova, **G.D. Tourassi**, A.S. Elmaghraby, "Estimation of generalized entropies with sample spacings," *Pattern Analysis and Applications*, 8(1-2):95-101 (2005).
25. M.K. Markey, **G.D. Tourassi**, M. Margolis, D.M. DeLong: "Impact of missing data in evaluating artificial neural networks trained on complete data," *Computers in Biology and Medicine*, 36:516-525 (2006).

26. H.P. McAdams, E. Samei, J. Dobbins, **G.D. Tourassi**, C.E. Ravin, "Recent Advances in Chest Radiography," *Radiology*, 241:663-683 (2006).
- *27. **G.D. Tourassi**, D.M. DeLong, C.E. Floyd, Jr., "A study on the computerized analysis of screening mammograms for the automated detection of architectural distortion," *Physics in Medicine and Biology*, 51: 1299-1312 (2006).
- *28. A. Thomas, **G.D. Tourassi**, A.S. Elmaghraby, R. Valdes, Jr., S. Jortani, "Data mining in proteomic mass spectrometry," *Clinical Proteomics*, 2(1-2): 1559-0275 (2006).
29. C.E. Floyd, J.E. Bender, A.C. Sharma, A. Kapadia, B. Harrawood, **G.D. Tourassi**, J.Y. Lo, C. Howell, "Introduction to Neutron Stimulated Emission Computed Tomography," *Physics in Medicine and Biology*, 51: 3375-3390 (2006).
- *30. **G.D. Tourassi**, B. Harrawood, S. Singh, J.Y. Lo, C.E. Floyd, "Evaluation of information-theoretic similarity measures for content-based retrieval and detection of masses in mammograms," *Medical Physics* 34: 140-150 (2007).
- *31. P.A. Habas, N.H. Eltonsy, A.S. Elmaghraby, J. Zurada, **G.D. Tourassi**, "Reliability analysis of CAD decisions," *Medical Physics* 34: 763-772 (2007). *Also selected for the Virtual Journal of Biological Physics Research, vol. 13, no. 3, February 2007.
- *32. **G.D. Tourassi**, B. Harrawood, S. Singh, J.Y. Lo, "Information-Theoretic CAD System in Mammography: Entropy-Based Indexing for Computational Efficiency and Robust Performance," *Medical Physics* 34(8): 3193-3204 (2007).
33. C.E. Floyd Jr., J.E. Bender, A.C. Sharma, A. Kapadia, J.Q. Xia, B. Harrawood, **G.D. Tourassi**, J.Y. Lo, M.R. Kiser, R.A. Macri, R.S. Pedroni, S. Tajima, A.S. Crowell, C.R. Howell, "Neutron stimulated Emission Computed Tomography: Background Correction," *to appear in Nuclear Instruments and Methods in Physics Research Section B*, 254(2): 329-336 (2007).
- *34. N.H. Eltonsy, **G.D. Tourassi**, A.S. Elmaghraby, "Morphologic concentric layer analysis for the detection of masses in screening mammograms," *IEEE Transactions in Medical Imaging*, 26(6): 880-889 (2007).
- *35. A.C. Sharma, **G.D. Tourassi**, T.G. Turkington, C.E. Floyd, "Near-Field High Energy Spectroscopic Gamma Imaging Using a Rotation Modulation Collimator," *to appear in IEEE Transactions on Nuclear Science* (2007).
36. J.E. Bender, A.J. Kapadia, A.C. Sharma, **G.D. Tourassi**, C.E. Floyd, "Breast Cancer Detection Using Neutron Stimulated Emission Computed Tomography: Prominent Elements and Dose Requirements," *to appear in Medical Physics* (2007).
- *37. A.C. Sharma, **G.D. Tourassi**, A.J. Kapadia, B.P. Harrawood, A.S. Crowell, M.R. Kiser, C.R. Howell, C.E. Floyd, "Design and Development of a High-Energy Gamma Camera for use with NSECT Imaging: Feasibility for Breast Imaging," *to appear in IEEE Transactions on Nuclear Science* (2007).

38. A.J. Kapadia, A.C. Sharma, J.E. Bender, **G.D. Tourassi**, C.R. Howell, A.S. Crowell, M.R. Kiser, B.P. Harrawood, and C.E. Floyd CE, "Neutron Stimulated Emission Computed Tomography for Diagnosis of Breast Cancer," to appear in IEEE Transactions on Nuclear Science (2007).
39. J.L. Jesneck, L.W. Nolte, **G.D. Tourassi**, J.Y. Lo, "A Bayesian Method to Estimate the Minimum Sample Size for Decision Fusion," submitted to Medical Decision Making [03/07].
40. C.E. Floyd Jr., A. Kapadia, J.E. Bender, A.C. Sharma, J.Q. Xia, B. Harrawood, **G.D. Tourassi**, J.Y. Lo, A.S. Corwell, M.R. Kiser, C.R. Howell, "Neutron Stimulated Emission Computed Tomography of a Multi-element Phantom," *Physics in Medicine and Biology* 53:2313-2326 (2008).
- *41. M. Mazurowski, P.A. Habas, J.M. Zurada, **G.D. Tourassi**, "Decision optimization of case-based computer-aided decision systems using genetic algorithms with application to mammography," *Physics in Medicine and Biology*, 53 895-908 (2008).
- *42. M. Mazurowski, P.A. Habas, J.M. Zurada, J.Y. Lo, J.A. Baker, **G.D. Tourassi**, "Training Neural Network Classifiers for Medical Decision Making: The Effect of Imbalanced Datasets on Classification Performance," *Neural Networks* 21 (2-3): 427-436 (2008).
43. A.J. Kapadia, A.C. Sharma, **G.D. Tourassi**, et al. "Neutron Stimulated Emission Computed Tomography for Diagnosis of Breast Cancer," *IEEE Trans Nucl Science* 55(1): 501-509 (2008).
44. A.J. Kapadia, **G.D. Tourassi**, A.C. Sharma, et al, "Experimental detection of iron overload in liver through neutron stimulated emission spectroscopy," *Physics in Medicine and Biology* 53:2633-2649 (2008).
- *45. **G.D. Tourassi**, R. Ike, III, S. Singh, B. Harrawood, "Evaluating the Effect of Image Preprocessing on an Information-Theoretic CAD System in Mammography," *Academic Radiology* 15(5):626-34 (2008).
46. S. Singh, **G.D. Tourassi**, J.A. Baker, E. Samei, J.Y. Lo, "Automated Breast Mass Detection in 3D Reconstructed Tomosynthesis Volumes: A Featureless Approach," *Medical Physics* 35(2): 3626-3636 (2008).
- *47. M. Mazurowski, P.A. Habas, J.M. Zurada, **G.D. Tourassi**, "Decision optimization of case-based computer-aided decision systems using genetic algorithms with application to mammography," *Physics in Medicine and Biology*, 53 895-908 (2008). Featured in medicalphysicsweb on January 28, 2008. (<http://medicalphysicsweb.org>)
- *48. M.A. Mazurowski, J. Zurada, **G.D. Tourassi**, "Selection of Examples in Case-Based CAD Systems," *Physics in Medicine and Biology* 53:6079-6096 (2008).
- *49. M. O'Connor, **G.D. Tourassi**, C.G. Orton. "Point/Counterpoint: Molecular Breast Imaging will soon replace mammography as the screening modality of choice for high-risk women with dense breasts" to appear in *Medical Physics* [2009]. *Invited Debate*

- *50. M.A. Mazurowski, J. Zurada, **G.D. Tourassi**, "An Adaptive Incremental Approach to Constructing Ensemble Classifiers: Application in Information-Theoretic CAD System for Detection of Masses in Screening Mammograms" *Medical Physics* 36: 2976—2984 (2009).
- *51. M. A. Mazurowski, J. A. Baker, H. X. Barnhart, **G. D. Tourassi**, "Individualized computer-aided education in mammography based on user modeling: Concept and preliminary experiments", *Medical Physics* 37: 1152 -1160 (2010).
- *52. **G. D. Tourassi**, M. A. Mazurowski, B. P. Harrawood, E. A. Krupinski, "Exploring the potential of context-sensitive IT-CADe in screening mammography", *Medical Physics* 37(11): 5728–5736 (2010).
- *53. M.M. Mazurowski, J.M. Malof, **G.D. Tourassi**, "Comparative analysis of instance selection algorithms for instance-based classifiers in the context of medical decision support", *Phys Med Biol* 56: 473-489 (2011).
- *54. M.M. Mazurowski, , J.Y. Lo, B. P. Harrawood, **G.D. Tourassi**, "Mutual information-based template matching scheme for detection of breast masses: application to mammography and digital breast tomosynthesis", *J Biomedical Informatics* 44:815-822 (2011).
- *55. J.M. Malof, M.A. Mazurowski, **G.D. Tourassi**, "The effect of class imbalance on case selection for case-based classifiers: an empirical study in the context of medical decision support", *Neural Networks* 25: 141-145 (2012).
- *56. M.M. Mazurowski, H. Barnhart, J.A. Baker, **G.D. Tourassi**, "Identifying error-making patterns in assessment of mammographic BI-RADS descriptors among radiology residents using statistical pattern recognition", submitted to *Academic Radiology* [July 2011].

Editorial

- *1. **G.D. Tourassi**, "Journey toward computer-aided diagnosis: Role of image texture analysis" *Radiology*, 213:317-320, 1999.

Educational Material

- 1. **G.D. Tourassi**, E. Samei, J.A. Baker,
RSNA / AAPM Web-based Instructional Module: "Medical Image Perception, Performance Evaluation, and CAD" (appeared online in November 2010).

Book Chapters

- *1. **G.D. Tourassi**, E.D. Frederick, and R.E. Coleman, "Artificial neural networks as a computer-aid for lung disease detection and classification in ventilation-perfusion lung

scans" in *Practical Application of Soft Computing Techniques*, Editor L.C. Jain and P. DeWilde, Kluwer Academic Publishers, Norwell, MA, 2002.

- *2. **G.D. Tourassi**, "Current state of computer-assisted decision systems in mammography," to appear in *Intelligent Paradigms for Healthcare Enterprises*, Editor L.C. Jain, Springer-Verlag Publisher, 2005.
3. J.Y. Lo, A.O. Bilska-Wolak, M.K. Markey, **G.D. Tourassi**, J.A. Baker, C.E. Floyd, "Computer-aided diagnosis in breast imaging: Where do we go after detection" *Recent Advances In Breast Imaging, Mammography, And Computer-Aided Diagnosis Of Breast Cancer*, Editors Suri and Rangayyan, SPIE, 2006.
- *4. **G.D. Tourassi**, "Computer-Assisted Radiology" *Wiley Encyclopedia of Biomedical Engineering*, J. Wiley & Sons, Inc. Publishers, Hoboken, NJ, 2006.
- *5. **G.D. Tourassi**, "Receiver operating characteristics analysis: Basic concepts and practical application" *Handbook of Medical Image Perception and Techniques*, Cambridge University Press, Cambridge, UK, 2010.

Conference Articles

1. **G.D. Tourassi**, C.E. Floyd Jr., M.T. Munley, J.E. Bowsher, and R.E. Coleman, "Improved Lesion Detection in SPECT Using MLEM Reconstruction", 1990 IEEE Nuclear Science Symposium and Medical Imaging Conference, Crystal City, Virginia, October 22-27, Vol. 2, pp. 1610-1613.
2. M.T. Munley, C.E. Floyd Jr., **G.D. Tourassi**, and R.E. Coleman, "Cone Beam Filtering Using Artificial Neural Networks", 1991 IEEE Nuclear Science Symposium and Medical Imaging Conference, Santa Fe, New Mexico, November 2-9, Vol. 3, pp. 2189-2192.
3. C.E. Floyd Jr., J.E. Bowsher, M.T. Munley, **G.D. Tourassi**, and R.E. Coleman, "Dual Collimation for High Resolution, Low Noise SPECT", 1990 IEEE Nuclear Science Symposium and Medical Imaging Conference, Crystal City, Virginia, October 22-27, Vol. 2, pp. 1203-1207.
4. M.T. Munley, C.E. Floyd Jr., J.E. Bowsher, **G.D. Tourassi**, and R.E. Coleman, "Out-of-Plane Photons In SPECT", 1990 IEEE Nuclear Science Symposium and Medical Imaging Conference, Crystal City, Virginia, October 22-27, Vol. 2, pp. 1614-1617.
5. **G.D. Tourassi**, C.E. Floyd Jr., M.T. Munley, J.E. Bowsher, and R.E. Coleman, "Application of Artificial Neural Networks to Lesion Detection in SPECT", 1991 IEEE Nuclear Science Symposium and Medical Imaging Conference, Santa Fe, New Mexico, November 2-9, Vol. 3, pp. 2179-2183.
6. C.E. Floyd Jr., J.E. Bowsher, M.T. Munley, **G.D. Tourassi**, S. Garg, A.H. Baydush, J.Y. Lo, and R.E. Coleman, "Artificial Neural Networks for SPECT Image Reconstruction with

- Optimized Weighted Backprojection", 1991 IEEE Nuclear Science Symposium and Medical Imaging Conference, Santa Fe, New Mexico, November 2-9, Vol. 3, pp. 2183-2188.
7. **G.D. Tourassi** and C.E. Floyd Jr., "Lesion Size Quantification In SPECT Using Artificial Neural Networks", 1992 IEEE Nuclear Science Symposium and Medical Imaging Conference, Orlando, Florida, October 25-31, Vol. 2, pp. 1050-1052.
 8. **G.D. Tourassi**, C.E. Floyd Jr., H.D. Sostman, and R.E. Coleman, "Computer-Aided Diagnosis of Acute Pulmonary Embolism Using Artificial Neural Networks", 12th Conference on Computer Applications in Radiology and 8th Conference on Computer Assisted Radiology (S/CAR), Winston-Salem, North Carolina, June 12-15, 1994.
 9. **G.D. Tourassi** and C.E. Floyd, Jr., "A three-dimensional artificial neural network for lesion detection in SPECT " in Proceedings for SPIE Medical Imaging 1994: Image Processing, Newport Beach, CA, February 15-18, Vol. 2167, pp. 593-600.
 10. **G.D. Tourassi**, C.E. Floyd Jr., H.D. Sostman, and R.E. Coleman, "Performance Evaluation of An Artificial Neural Network for the Diagnosis of Acute Pulmonary Embolism Using the Cross-Validation, Jackknife, and Bootstrap Methods: A Comparison Study", in Proceedings of 1995 World Congress on Neural Networks (WCNN), Washington, DC, July 17-21, Vol. 2, pp. 897-900.
 11. C.E. Floyd Jr. and **G.D. Tourassi**, "Computer-Aided Diagnosis Using Genetic Algorithms and Neural Networks", in Proceedings of 1995 World Congress on Neural Networks (WCNN), Washington, DC, July 17-21, Vol. 2, pp. 863-866.
 12. C.E. Floyd Jr., M.S. Soo, **G.D. Tourassi**, and P.J. Kornguth, "Computer-Aided prediction of Breast Implant Rapture Based on Mammographic Findings", in Proceedings for SPIE Medical Imaging 1995: Image Processing, San Diego, CA, 27 February-2 March, Vol. 2434, pp. 471-477.
 13. **G.D. Tourassi**, C.E. Floyd Jr., and R.E. Coleman, "Computer-Aided Diagnosis of Acute Pulmonary Embolism: Merging Clinical and Radiographic Information", in Proceedings of 1996 World Congress on Neural Networks (WCNN), San Diego, CA, September 15-18, pp. 1236-1239.
 14. **G.D. Tourassi** and N.P. Xenopoulos, "An Artificial Neural Network to Predict Mortality in Patients who Undergo Percutaneous Coronary Interventions", in Proceedings of 1997 International Conference on Neural Networks (ICNN), Houston, TX, June 9-12, Vol. 4, pp. 2464-2467.
 15. E. D. Frederick, **G. D. Tourassi**, M. Gauger, C. E. Floyd, Jr., "Java interface to a computer-aided diagnosis system for acute pulmonary embolism using PIOPED findings", 1999 SPIE Medical Imaging Conference Meeting, San Diego, CA, Vol. 3661, pp. 1511-1515.

16. **G.D. Tourassi**, Carey E. Floyd Jr., and Joseph Y. Lo, "A constraint satisfaction neural network for medical diagnosis", presented at the 1999 International Conference on Neural Networks (ICNN), Washington, DC.
17. **G.D. Tourassi**, E.D. Frederick, Neal F. Vittitoe, C.E. Floyd, Jr., and R.E. Coleman, "Diagnostic Interpretation of Perfusion Lung Scans Using Multifractal Texture Analysis", presented at the 41st Annual Meeting of the American Association of Physicists in Medicine (AAPM), Nashville, TN, July 25-29, 1999.
18. **G.D. Tourassi**, C.E. Floyd Jr., and J.Y. Lo, "Use of a Constraint Satisfaction Neural Network for Breast Cancer Diagnosis and Dynamic Scenarios Simulation", 2000 SPIE Medical Imaging Conference, San Diego, CA, 13-17 February, Vol. 3979, pp. 46-54.
19. M.K. Markey, J.Y. Lo, **G.D. Tourassi**, C.E. Floyd, Jr., "Cluster Analysis of BI-RADS™ Descriptions of Biopsy-proven Breast Lesions," presented at the 2002 SPIE Medical Imaging Conference, San Diego, CA, 24-28 February, Vol. 4684, pp. 363-368.
20. M.P. Wachowiak, R. Smolikova, **G.D. Tourassi**, A.S. Elmaghraby, "Use Of General Ultrasound Speckle Models In Determining Scatterer Density," presented at the 2002 SPIE Medical Imaging Conference, San Diego, CA, 24-28 February, Vol. 4687, pp. 285-293.
21. R. Smolikova, M.P. Wachowiak, **G.D. Tourassi**, J.M. Zurada, "Neural Estimation of Ultrasound Effective Scatterer Density", 2002 International Joint Conference on Neural Networks (IJCNN) Proceedings, pp. 1696-1701.
22. M.P. Wachowiak, R. Smolikova, **G.D. Tourassi**, A.S. Elmaghraby, "Separation of Cardiac Artifacts from EMG Signals with Independent Component Analysis - Comparison with High-Pass and Wavelets Filtering", 16th International BIOSIGNAL Conference, Brno, Czech Republic, June 26-28, 2002.
23. R. Smolikova, M.P. Wachowiak, **G.D. Tourassi**, A.S. Elmaghraby, J.M. Zurada, "Characterization of Ultrasonic Backscatter Based on Generalized Entropy", 2002 IEEE Engineering in Medicine and Biology Society (EMBS) and the Biomedical Engineering Society (BMES) Joint Meeting, Houston, TX, October 23-26, 2002.
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74. M.A. Mazurowski, **G.D. Tourassi**, "Relational representation for improved decisions with an information-theoretic CADe system: initial experience," Proc. SPIE (2009).
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80. **G.D. Tourassi**, M.M. Mazurowski, E. A. Krupinski, "Perception-Driven IT-CADe Analysis for the Detection of Masses in Screening Mammography: Initial Investigation," accepted for oral presentation to the 2010 SPIE Conference in Medical Imaging.
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82. S. Xu S, K. Hudson, **G.D. Tourassi**, Predictive modeling of human perception subjectivity: feasibility study of mammographic lesion similarity, accepted for oral presentation at the 2012 SPIE Medical Imaging Conference: Image Perception, Observer Performance, and Technology Assessment.
83. S. Xu S, **G.D. Tourassi**, A novel local learning based approach with application to breast cancer diagnosis, accepted for poster presentation at the 2012 SPIE Medical Imaging Conference: Computer-Aided Diagnosis.

Abstracts

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9. **G.D. Tourassi**, C.E. Floyd Jr., H.D. Sostman, and R.E. Coleman, "Performance Evaluation of An Artificial Neural Network for the Diagnosis of Acute Pulmonary Embolism: Effect of Case and Observer Selection", 80th Scientific Assembly and Annual Meeting of the Radiological Society of North America (RSNA), Chicago, Illinois, November 27-December 2, 1994.
10. **G.D. Tourassi**, C.E. Floyd Jr., H.D. Sostman, and R.E. Coleman, "Application of Artificial Neural Network for Diagnosis of Acute Pulmonary Embolism from Ventilation-Perfusion Lung Scans", 41st Annual Meeting of the Society of Nuclear Medicine (SNM), Orlando, Florida, June 5-8, 1994.
11. **G.D. Tourassi**, C.E. Floyd Jr., H.D. Sostman, and R.E. Coleman, "Contribution of clinical information in the computer-aided diagnosis of acute pulmonary embolism", 42st Annual Meeting of the Society of Nuclear Medicine (SNM), Minneapolis, MN, June 12-15, 1995.
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13. E.D. Frederick, J.Y. Lo, **G.D. Tourassi**, and C.E. Floyd, Jr., "Interactive Computer-Aided Diagnosis of Acute Pulmonary Embolism", 82nd Scientific Assembly and Annual Meeting of the Radiological Society of North America (RSNA), Chicago, Illinois, December 1-December 6, 1996.
14. **G.D. Tourassi**, W. Raffelsberger, A. Iskren, and J.D. Wittliff, "Prediction of Progesterone Receptor Status in Human Breast Cancer Biopsies: A Comparison of Linear Discriminant

Analysis and Artificial Neural Networks", 23rd National Meeting of the Clinical Ligand Assay Society (CLAS), Chicago, Illinois, March 23-27, 1997.

15. **G.D. Tourassi**, E.D. Frederick, Neal F. Vittitoe, C.E. Floyd, Jr., and R.E. Coleman, "Fractal texture analysis of perfusion lung scans", 84th Scientific Assembly and Annual Meeting of the Radiological Society of North America (RSNA), Chicago, Illinois, November 30-December 5, 1998.
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19. M.P. Wachowiak, R. Smolikova, **G.D. Tourassi**, A.S. Elmaghraby, "Discriminatory Power Of Speckle Model Parameters In Determining Scatterer Densities In Ultrasonography," 1st IEEE International Symposium on Signal Processing and Information Technology, Cairo, Egypt, December 28-30, 2001.
20. R. Vargas-Voracek, **G.D. Tourassi**, C.E. Floyd, Jr., "Multi-Fractal Spectral Analysis Of Mammographic Images For The Detection Of Malignant Masses," 88th Scientific Assembly and Annual Meeting of the Radiological Society of North America (RSNA), Chicago, Illinois, 2002.
21. C.E. Floyd, C. Howell, A. Kapadia, B. Harrawood, J. Xia, **G.D. Tourassi**, "Cancer Diagnosis Using Neutron Scattering Analysis of Elemental Composition", 2004 American Association of Physicists in Medicine (AAPM) Conference, Pittsburgh, PA, July 25-29, 2004.
22. N.H. Eltonsy, **G.D. Tourassi**, A.S. Elmaghraby, "Investigating the performance of a morphology-based CAD scheme in detecting architectural distortion in screening mammograms," 2006 International Conference of Computer Assisted Radiology and Surgery, Osaka, Japan, June 28-July 1, 2006.
23. A.C. Sharma, **G.D. Tourassi**, A.J. Kapadia, B.P. Harrawood, A.S. Crowell, M.R. Kiser, C.R. Howell, C.E. Floyd, "Near-Field High-Energy Gamma Camera for Neutron Stimulated

Emission Computed Tomography (NNECT),” Imaging and Neutron 2006 Workshop, Spallation Neutron Source, Oak Ridge National Laboratory, Oak Ridge, TN, October 2006.

24. **G.D. Tourassi**, B. Harrawood, C.E. Floyd Jr., “Information-Theoretic CAD System in Mammography: Investigation of an Entropy-Based Indexing Scheme for Improved Computational Efficiency and Robust Performance,” presented at the 48th AAPM Meeting, Orlando FL, July 30 - August 3, 2006 (Reviewer’s Choice Award).
25. **G.D. Tourassi**, R. Saunders, E. Samei, “Mass Detection in Full Field Digital Mammograms: Validation of an Information-Theoretic Knowledge-Based System,” accepted for presentation at the 2006 RSNA Meeting, Chicago, IL, November 26 - December 1, 2006.
26. **G.D. Tourassi**, M.A. Mazurowski, B. Harrawood, “IT-SCAN: Information-theoretic System for Mass Detection in Screening Mammograms Using an Adaptive Library of Known Examples”, SPIE Medical Imaging CAD Demonstration Session, February 10, 2009.

TEACHING ACTIVITY

- 1994–1998 Guest Lecturer for BME233 graduate-level course entitled "Medical Imaging", BME Department, Duke University.
- Fall 2001, 2002 Guest Lecturer for graduate level course entitled "Biomedical Computing" in the Dept. of Computer Engineering and Computer Science, University of Louisville
- Spring 2004 Instructor for two graduate level courses, Department of Computer Engineering and Computer Science, University of Louisville:
- CECS 563: “Experimental Design in Engineering”
 - CECS 624: “Digital Image Processing”
- Spring 2007, 2009, 2011
- MEDPHYS 361 “Biostatistics for Medical Physicists” Graduate Level Course, Medical Physics Program, Duke University
- 1997 – present Regular Lecturer for the Medical Physics Seminar Series, Medical Physics Program, Duke University

GRADUATE AND UNDERGRADUATE STUDENT SUPERVISION

Advisor for the following Ph.D. Students

Duke University

Erik D. Frederick (BME, Duke University, June 2000, co-advising with C.E. Floyd)

Thesis: Computer-Assisted Diagnosis of Acute Pulmonary Embolism

Anuj J. Kapadia (BME, Duke University, August 2007)

Thesis: Evaluation of Accuracy and Patient Dose in NSECT Using Simulations in GEANT4

Amy C. Sharma (BME, Duke University, December 2007)

Thesis: Development and Design of a Near-Field High-Energy Gamma Camera for use with Neutron Stimulated Emission Computed Tomography

University of Louisville

Nevine H. Eltonsy (CECS, Univ. of Louisville, September 2006)

Thesis: Morphologic Concentric Layer Model for Computer Assisted Detection of Breast Masses (co-advising with A.S. Elmaghraby)

Piotr A. Habas (CECS, Univ. of Louisville, July 2007)

Thesis: Reliability Analysis of Computer-Aided Diagnosis Systems in Mammography (co-advising with J.M. Zurada)

Maciej Mazuroski (ECE, Univ. of Louisville, December 2008)

Thesis: Improving Case-Based Computer Aided Medical Decision Systems With Application To Mammography (co-advising with J.M. Zurada)

Primary M.S. Advisor

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Thesis: Information-Theoretic CAD in Mammography: Effect of Region Size on Mass Detection and Multi-Size Analysis for Performance Improvement

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Jessie Xia (BME, Duke University, 2007)

Erin H. Rickard, (CECS, Univ. of Louisville, 2008)

Amar Chawla (BME, Duke University, 2008)

Swatee Singh (BME, Duke University, 2008)

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Independent Study Advisor

Matthew Gauger, BS, (Dept. of Computer Science, Duke University, 1998)

Aleksey Fadeev, MS (Dept. of Physics, Univ. of Louisville, 2004-2005)

Anton Sidorov, MS (Dept. of Physics, Univ. of Louisville, 2004-2005)

Benjamin Pollard (Medical Physics Program, Duke University, 2007)

Jordan Mallof (Dept. of Electrical Engineering, Univ. of Louisville, Summer 2009)

INVITED PRESENTATIONS

- 1. Tourassi, G.D.:** " The Radiologist vs. the Computer: Application of Machine Learning to Diagnosis of Acute Pulmonary Embolism", Department of Computer Engineering and Computer Science, University of Louisville, February 15, 2002.
- 2. Tourassi, G.D.:** " Computational Intelligence and Biomedicine: Research overview and report on CAD of breast cancer in mammograms", Department of Computer Engineering and Computer Science, University of Louisville, March 12, 2004.
- 3. Tourassi, G.D.:** "Impact of Computational Intelligence on Breast Cancer Care", 2004 Research!Louisville, Special Session: Bioengineering with *Speed*, where Medicine Meets Engineering.
- 4. Tourassi, G.D.:** "Challenging the black-box paradigm: Efforts towards interactive and interpretive CAD systems," Department of Radiology, University of Pittsburgh, May 21, 2005.
- 5. Tourassi, G.D.:** "Interactive CAD systems in Mammography", Oak Ridge National Laboratory, November 3, 2005.

6. (Co-investigator) 1 R21 CA93461-01 (PI: Lo)
 “Predicting breast cancer with ultrasound and mammography”
 NIH/NCI 03/01/02-02/28/05
 Total Direct Costs: \$310,000
7. (Co-investigator) 1R21CA81309 (PI: Floyd)
 “Computer Aid for the Decision to Biopsy Breast Lesions”
 NIH/NCI 09/01/99 - 08/31/01
 Computer Aid for the Decision to Biopsy Breast Lesions
 Total Costs: \$310,000
8. **(Principal Investigator)** R21CA106873-01 (Floyd/Tourassi)
 “Breast Elemental Composition”
 NIH/NCI 04/01/04 - 03/31/07
 Total Costs: \$385,000
9. **(Principal Investigator)** R01CA101911
 “Information Theoretic Based CAD in Mammography”
 NIH/NCI 01/01/05 - 09/30/09
 Total Costs: \$973,280
10. **(Mentor)** BCRP (W81XWH-06-1—0484)
 Simulations to evaluate accuracy and patient dose in neutron stimulated emission
 computed tomography (NSECT) for breast cancer diagnosis”
 DOD Postdoctoral Fellowship 4/1/2006 – 3/31/2009
 Total Direct Costs: \$90,000
11. (Co-investigator) (Lo)
 “Knowledge-based optimization of radiation treatment planning for prostate cancer”
 Wallace H. Coulter Translational Partners Grant Program 4/1/08–3/31/010
 Total Costs: \$200,000
12. (Co-Investigator) BC084011 (PI: Anuj Kapadia)
 “In Vivo Diagnosis of Breast Cancer Using Gamma-Stimulated Emission-Computed
 Tomography”
 DOD Idea Grant 03/01/2009 - 02/28/2012
 Total Costs: \$583,693
13. (Co-Investigator) 1R01CA134658-01A1 (PI: Paul Segars)
 “3D Digital Breast Phantoms For Multimodality Research”
 NIH/NCI
 Total Costs: \$1,697,620

- 14. (Principal Investigator) 2R56CA101911-05**
“Information Theoretic Based CAD in Mammography”
NIH/NCI 08/01/09 - 12/31/10
Total Costs: \$270,000
- 15. (Principal Investigator) Bridge Funding**
“Information Theoretic Based CAD in Mammography”
Duke University School of Medicine 08/01/10 - 07/31/11
Total Costs: \$100,000
- 16. (Principal Investigator) Laboratory Directed Research and Development Fund**
“Perception-Driven Decision Support in Medical Imaging”
Oak Ridge National Laboratory/Department of Energy 11/01/11 - 10/31/13
Total Costs: \$789,382