

Summary of
CURRICULUM VITAE

Willis J. Tompkins, Ph.D.

Willis J. Tompkins received the B.S. and M.S. degrees in electrical engineering from the University of Maine at Orono in 1963 and 1965, respectively, and the Ph.D. degree in biomedical electronic engineering from the University of Pennsylvania in 1973. His past employment includes academic, industrial, and hospital experience.

From 1965 to 1968, he was an electrical engineer at Sanders Associates, Inc. where he did research and development of data storage systems. He was employed from 1973 to 1974 at the Hospital of the University of Pennsylvania as a biomedical engineer where he did computing support for pulmonary research.

He is currently Professor of Biomedical Engineering and Electrical and Computer Engineering at the University of Wisconsin-Madison, where he has been on the faculty since 1974. He previously served for five years as Chair of the Department of Electrical and Computer Engineering. His teaching specialty is on the topic of computers in medicine, an area in which he has developed two courses. One of these two courses, he has evolved and taught for 36 consecutive years. He has received a number of education awards including the University of Wisconsin Chancellor's Award for Excellence in Teaching. His research interests include development of microprocessor-based medical instrumentation, on-line biomedical computing, and real-time computer processing of electrocardiograms.

Dr. Tompkins has published more than 260 journal papers, book chapters, and conference articles. He has served as research advisor for about 100 M.S. and Ph.D. graduates. He has published four textbooks: 1) *Biomedical Digital Signal Processing*, Prentice Hall, 1993; 2) *Design of Microcomputer-Based Medical Instrumentation*, Prentice Hall, 1981 (with J. G. Webster); 3) *Interfacing Sensors to the IBM PC*, Prentice Hall, 1988 (with J. G. Webster); and 4) *Electronic Devices for Rehabilitation*, Chapman Hall, 1985 (with J. G. Webster, A. M. Cook, and G. C. Vanderheiden).

Dr. Tompkins is a Life Fellow of the IEEE (Institute of Electrical and Electronics Engineers), a Founding Fellow of the AIMBE (American Institute for Medical and Biological Engineering), and an Inaugural Fellow of the Biomedical Engineering Society. He is a past President of the IEEE Engineering in Medicine and Biology Society and has received the IEEE EMBS Career Achievement Award. He is also a member of the IEEE Computer Society, the IEEE Education Society, and the American Society for Engineering Education (ASEE). He is a Registered Professional Engineer in Wisconsin.

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PERSONAL DATA:

Born 7/20/41 (Presque Isle, Maine); Male, Married, 2 children

EDUCATION:

1963 B.S. University of Maine (Electrical Engineering)
1965 M.S. University of Maine (Electrical Engineering)
1973 Ph.D. University of Pennsylvania (Biomedical Electronic Engineering)

PROFESSIONAL EXPERIENCE:

1965 Instructor, Electrical Engineering Department, University of Maine, Orono, Maine
1965–1968 Electrical Engineer, Sanders Associates, Inc., Nashua, New Hampshire
1973–1974 Associate of Bioengineering in Medicine, Department of Medicine, University of
 Pennsylvania, Philadelphia, Pennsylvania
1974–1980 Assistant Professor, Department of Electrical and Computer Engineering,
 University of Wisconsin-Madison, Madison, Wisconsin
1980–1985 Associate Professor, Department of Electrical and Computer Engineering,
 University of Wisconsin-Madison, Madison, Wisconsin
1985–1999 Professor, Department of Electrical and Computer Engineering, University of
 Wisconsin-Madison, Madison, Wisconsin
1986–1990 Associate Chair for Undergraduate Activities, Department of Electrical and
 Computer Engineering, University of Wisconsin-Madison, Madison, Wisconsin
1994–1999 Chair, Department of Electrical and Computer Engineering, University of
 Wisconsin-Madison, Madison, Wisconsin
1999–present Affiliate Professor, Department of Electrical and Computer Engineering,
 University of Wisconsin-Madison, Madison, Wisconsin
1999–present Associate Chair for Undergraduate Activities, Department of Biomedical
 Engineering, University of Wisconsin-Madison, Madison, Wisconsin
1999–present Professor, Department of Biomedical Engineering, University of Wisconsin-
 Madison, Madison, Wisconsin

HONORS AND AWARDS:

- NIH Research Career Development Award, “Analysis of the high frequency ECG and arrhythmias,” 1980–1985
- “Distinguished Engineering and Technology Award” from the University of Maine for “...outstanding technical, educational, and administrative contributions to biomedical engineering,” 1989
- Fellow of the IEEE (Institute of Electrical and Electronics Engineers), 1992. Advanced to Life Fellow, 2007.
- Founding Fellow of the AIMBE (American Institute for Medical and Biological Engineering), 1992
- Outstanding Electrical and Computer Engineering Instructor Award, Polygon Engineering Council, University of Wisconsin-Madison, March 1993
- Honorary member of Kappa Eta Kappa electrical engineering fraternity for “...dedication to the students of electrical engineering in ways that work with and for the students,” University of Wisconsin-Madison, April 1993
- Centennial Certificate, American Society for Engineering Education (ASEE), for “exceptional contribution to the ASEE and the profession of engineering,” June 1993
- Chancellor’s Award for “Excellence in Teaching,” University of Wisconsin-Madison, April 1994
- Theo C. Pilkington Outstanding Educator Award from the Biomedical Engineering Division of the ASEE, June 1995
- Benjamin Smith Reynolds Award for Excellence in Teaching Engineers, November 1997
- Co-President, World Congress on Medical Physics and Biomedical Engineering, July 2000
- IEEE Millennium Medal, July 2000
- Outstanding Biomedical Engineering Instructor Award, Polygon Engineering Council, University of Wisconsin-Madison, April 2001
- Outstanding Biomedical Engineering Instructor Award, Polygon Engineering Council, University of Wisconsin-Madison, April 2002
- EMBS Career Achievement Award, IEEE Engineering in Medicine and Biology Society, October 2002.
- The Dr. Brenda Pfaehler Award of Excellence, TRIO Student Support Services Program, University of Wisconsin-Madison, December 2002.
- Outstanding Biomedical Engineering Instructor Award, Polygon Engineering Council, University of Wisconsin-Madison, April 2003.
- Biomedical Engineering Professor of the Year Award, Biomedical Engineering Society, University of Wisconsin-Madison, April 2003.
- Fellow of the University of Wisconsin Teaching Academy, April 2004.
- Outstanding Biomedical Engineering Instructor Award, Polygon Engineering Council, University of Wisconsin-Madison, April 2004.
- Inaugural Fellow of the Biomedical Engineering Society, January 2005.
- Biomedical Engineering Professor of the Year Award, Biomedical Engineering Society, University of Wisconsin-Madison, April 2005.
- Biomedical Engineering Professor of the Year Award, Biomedical Engineering Society, University of Wisconsin-Madison, May 2008.

- Outstanding Biomedical Engineering Instructor Award, Polygon Engineering Council, University of Wisconsin-Madison, May 2009.

TEACHING ACTIVITIES:

- BME/ECE 463, Computers in Medicine (Developed, taught 36 times)
- BME/ECE 763, Projects in Computers in Medicine (Developed, taught 21 times)
- ECE 453, Digital Microprocessors (Taught 9 times)
- ECE 360, Digital System Fundamentals (Taught 2 times)
- ECE 361, Advanced Digital Systems (Taught 1 time)
- ECE 312, Biomedical Engineering Laboratory (Taught 1 time)
- EPD 160, Introduction to Engineering (Taught 1 time)
- BME 200/300, Sophomore/Junior Biomedical Engineering Design (Taught 8 times)
- BME 201, Sophomore Biomedical Engineering Design (Taught 4 times)
- BME 301, Junior Biomedical Engineering Design (Taught 8 times)
- BME 400, Senior Biomedical Engineering Capstone Design (Taught 6 times)
- BME 402, Senior Biomedical Engineering Design (Taught 5 times)
- BME 515, Therapeutic Medical Devices (Taught 4 times)
- EPICS (Engineering Projects in Community Service) (Taught 6 times)

PROFESSIONAL ACTIVITIES:

American Society for Engineering Education (Member)

-Vice President for Professional Activities of ASEE Biomedical Engineering Division - 1995–1996.

-Program Chair for ASEE Biomedical Engineering Division Conference - 1999.

-Chair of ASEE Biomedical Engineering Division - 1999–2000.

-Past ASEE Biomedical Engineering Division Chair and Chair of Nominating Committee - 2000–2001.

- ASEE Biomedical Engineering Division Awards Committee, 2009–present.

Biomedical Engineering Society (Inaugural Fellow)

American Institute for Medical and Biological Engineering (Founding Fellow)

World Congress on Medical Physics and Biomedical Engineering–2000 (Co-President)

Registered Professional Engineer in Wisconsin

Institute of Electrical and Electronics Engineers (Life Fellow)

- Engineering in Medicine and Biology Society (IEEE EMBS)
 - President - 1988, 1989
 - Past President and Member of the Executive Committee - 1990, 1991
 - Vice President for Publications and Member Activities - 1987
 - Vice President for Technical and Conference Activities - 1986
 - Vice President for Technical Activities - 1985
 - Member of Administrative Committee (AdCom) - Region 4 (1983–1984 & 1985–1986); At-Large (1987-1989)
 - Education Program Chairman for Annual Conference - 1985
 - Chairman of Career Achievement Award Committee - 1985, 1986
 - Chairman of Logo Design Committee - 1990, 1991
 - Chairman of Nominating Committee - 1990, 1991
 - EMBS Representative, Delegation to Soviet Union Popov Society, 1990
 - Member of Nominating Committee – 1992-1995
 - Member of Emerging Technologies Committee – 1994-1996
 - Member of Publications Committee – 1994-2000
 - Member of Advisory Board to the Editor, *IEEE Transactions on Biomedical Engineering*, 1996-2000
 - Member of Search Committee for Editor-in-Chief of *IEEE EMB Magazine*, 1996-1997
 - Treasurer for the Second Annual International IEEE-EMBS Special Topic Conference on Microtechnologies in Medicine and Biology, 2001–2002.
- Computer Society
- Member of TAB Administration Council - 1990
- Member of the RAB/TAB Transnational Committee - 1990
- Program Co-Chair/Proceedings Editor for IEEE Colloquium in South America - 1990
- Chairman of TAB New Ventures Committee - 1991, 1992
- Editor-in-Chief of TAB/Press Book Series Committee, 1993–1995
- Member of IEEE Ad Hoc Publications Board Review Committee, 1996–1997

JOURNAL PUBLICATIONS:

1. W. J. Tompkins, A new laboratory minicomputer language for biomedical applications. *Comput. and Biomed. Res.*, **9**:365-391, 1976.
2. W. J. Tompkins, An approach for physiological signal processing by laboratory minicomputer. *Comput. Programs in Biomed.*, **8**:16-28, 1978.
3. H. Baharestani, W. J. Tompkins, J. G. Webster, and R. B. Mazess, Heart rate recorder. *Med. & Biol. Eng. & Comput.*, **17**:719-723, 1979.
4. W. J. Tompkins, Modular design of microcomputer-based medical instruments. *Med. Instrum.*, **14**(6):315-318, 1980.
5. D. Patek and W. J. Tompkins, A fast microcomputer language for signal acquisition, processing, and display. *Comput. Programs in Biomed.*, **12**:230-242, 1980.
6. J. Zicker, W. J. Tompkins, R. T. Rubow, and J. H. Abbs, A portable microprocessor-based biofeedback training device. *IEEE Trans. Biomed. Eng.*, **BME-27**:509-515, 1980.
7. I. Chien, W. J. Tompkins, and S. A. Briller, Computer methods for analyzing the high frequency electrocardiogram. *Med. & Biol. Eng. & Comput.*, **18**:303-312, 1980.
8. B. M. Tompkins, W. J. Tompkins, E. Loder, and A. F. Noonan, A computer assisted preanesthesia interview: value of a computer generated summary of patient historical data in the preanesthesia visit. *Anesthesia and Analgesia*, **59**(1):3-10, 1980.
9. W. J. Tompkins and N. V. Thakor, A lecture/laboratory course on microcomputer-based medical instrumentation. *IEEE Trans. Educ.*, **E-24**(1):96-101, 1981.
10. Y. Kim, and W. J. Tompkins, Forward and inverse high-frequency electrocardiography. *Med. & Biol. Eng. & Comput.*, **19**:11-22, 1981.
11. M. Fiore, J. L. Atlee, J. G. Webster, and W. J. Tompkins, A microcomputer-based neuromuscular blockade monitor. *IEEE Trans. Biomed. Eng.*, **BME-28**(11):775-783, 1981.
12. S. Weisner, W. J. Tompkins, and B. M. Tompkins, A compact, microprocessor-based ECG ST-segment monitor for the operating room. *IEEE Trans. Biomed. Eng.*, **BME-29**(9):642-649, 1982.
13. N. Thakor, J. G. Webster, and W. J. Tompkins, A battery-powered digital modem for telephone transmission of ECG data. *IEEE Trans. Biomed. Eng.*, **BME-29**(5):355-359, 1982.
14. J. P. Abenstein and W. J. Tompkins, A new data reduction algorithm for real-time ECG analysis. *IEEE Trans. Biomed. Eng.*, **BME-29**(1):43-48, 1982.
15. M. Ahlstrom and W. J. Tompkins, Automated high-speed analysis of Holter tapes with microcomputers. *IEEE Trans. Biomed. Eng.*, **30**(10):651-657, 1983.
16. Y. Kim, J. G. Webster, and W. J. Tompkins, Electrical impedance imaging of the thorax. *J. Microwave Power*, **18**(3):245-257, 1983.
17. A. V. Sahakian, W. J. Tompkins, B. M. Tompkins, and J. F. Kreul, A microprocessor-based arrhythmia monitor/recorder for the operating and recovery rooms. *Medical Instrumentation*, **17**(2):131-134, 1983.
18. G. Furno and W. J. Tompkins, A learning filter for removing noise interference. *IEEE Trans. Biomed. Eng.*, **BME-30**(4):234-235, 1983.
19. N. V. Thakor, J. G. Webster, and W. J. Tompkins, Optimal QRS detector. *Med. & Biol. Eng. & Comput.*, **21**:343-350, 1983.
20. N. V. Thakor, J. G. Webster, and W. J. Tompkins, Estimation of QRS complex power spectra for design of a QRS filter. *IEEE Trans. Biomed. Eng.*, **BME-31**(11):702-706, 1984.

21. Y. Kim, J. G. Webster, and W. J. Tompkins, Simulated and experimental studies of temperature elevation around electrosurgical dispersive electrodes. *IEEE Trans. Biomed. Eng.*, **BME-31**(11):681-692, 1984.
22. N. V. Thakor, J. G. Webster, and W. J. Tompkins, Design, implementation, and evaluation of a microcomputer-based portable arrhythmia monitor. *Med. & Biol. Eng. & Comput.*, **22**:151-159, 1984.
23. E. Woo, Y. Kim, and W. J. Tompkins, Development and applications of an interactive digital filter design program. *Computer Methods and Programs in Biomedicine*, **21**:11-21, 1985.
24. M. Ahlstrom and W. J. Tompkins, Digital filters for real-time ECG signal processing using microprocessors. *IEEE Trans. Biomed. Eng.*, **BME-32**(9): 708-713, 1985.
25. K. Kaczmarek, P. Bach-y-Rita, W. J. Tompkins, and J. G. Webster, A tactile vision substitution system for the blind: computer-controlled partial image sequencing. *IEEE Trans. Biomed. Eng.*, **BME-32**(8):602-608, 1985.
26. A. V. Sahakian, W. J. Tompkins, and J. G. Webster, Electrode motion artifacts in electrical impedance pneumography. *IEEE Trans. Biomed. Eng.*, **BME-32**(6):448-451, 1985.
27. J. Pan and W. J. Tompkins, A real-time QRS detection algorithm. *IEEE Trans. Biomed. Eng.*, **BME-32**(3):230-236, 1985.
28. J. Ge and W. J. Tompkins, High frequency electrocardiogram analyzer, *IEEE Trans. Biomed. Eng.*, **BME-33**(12):1137-1140, 1986.
29. P. S. Hamilton and W. J. Tompkins, Quantitative investigation of QRS detection rules using the MIT/BIH arrhythmia database, *IEEE Trans. Biomed. Eng.*, **BME-33**(12):1157-1165, 1986.
30. M. Qu, Y. Zhang, J. G. Webster, and W. J. Tompkins, Motion artifact from spot and band electrodes during impedance cardiography. *IEEE Trans. Biomed. Eng.*, **BME-33**(11):1029-1036, 1986.
31. Y. Zhang, M. Qu, J. G. Webster, W. J. Tompkins, B. A. Ward, and D. R. Bassett, Jr. Cardiac output monitoring by impedance cardiography during treadmill exercise. *IEEE Trans. Biomed. Eng.*, **BME-33**(11):1037-1042, 1986.
32. W. Cumming, W. J., Tompkins, R. M. Jones, and S. A. Margolis, Microprocessor-based weight shift monitors for paraplegic patients. *Archives of Physical Medicine and Rehabilitation*, **67**:172-174, 1986.
33. A. Potvin, W. G. Crosier, E. Fromm, J. C. Lin, M. R. Neuman, T. C. Pilkington, C. J. Robinson, L. W. Schneider, J. W. Strohhahn, P. Szolovits, and W. J. Tompkins, Report of an IEEE task force—An IEEE opinion on research needs for biomedical engineering systems. *IEEE Trans. Biomed. Eng.*, **BME-33**(1):48-59, 1986.
34. T. Yorkey, J. G. Webster, and W. J. Tompkins, An improved perturbation technique for electrical impedance imaging with some criticisms. *IEEE Trans. Biomed. Eng.*, **BME-34**(11):898-901, 1987.
35. T. Yorkey, J. G. Webster, and W. J. Tompkins, Comparing reconstruction algorithms for electrical impedance tomography. *IEEE Trans. Biomed. Eng.*, **BME-34**(11):843-852, 1987.
36. S. Frisken-Gibson, P. Bach-y-Rita, W. J. Tompkins, and J. G. Webster, A 64-solenoid, 4-level fingertip search display for the blind. *IEEE Trans. Biomed. Eng.*, **BME-34**(12): 963-965, 1987.
37. C. Pfister, J. W. Hamilton, P. Bass, J. G. Webster, and W. J. Tompkins, Use of spectral analysis in detection of frequency differences in the electrogastrograms of normal and diabetic patients. *IEEE Trans. Biomed. Eng.*, **BME-35**(11): 935-941, 1988.

38. P. Hua, J. G. Webster, and W. J. Tompkins, A regularised electrical impedance tomography reconstruction algorithm, *Clinical Physics and Physiological Measurement*, **9** (Suppl. A): 137-141, 1988.
39. C. Pfister, M. A. Harrison, J. W. Hamilton, W. J. Tompkins, and J. G. Webster, Development of a 3-channel, 24-h ambulatory esophageal pressure monitor, *IEEE Trans. Biomed. Eng.*, **BME-36**(4): 487-490, 1989.
40. A. Patel, M. Kothari, J. G. Webster, W. J. Tompkins, and J. J. Wertsch, A capacitance pressure sensor using a phase-locked loop, *Journal of Rehabilitation Research and Development*, **26**(2): 55-62, 1989.
41. H. Zhu, N. Maalej, J. G. Webster, W. J. Tompkins, P. Bach-y-Rita, and J. J. Wertsch, An umbilical data-acquisition system for measuring pressures between the foot and shoe, *IEEE Trans. Biomed. Eng.*, **BME-37**: 908-911, 1990.
42. K. Kaczmarek, J. G. Webster, P. Bach-y-Rita, and W. J. Tompkins, Electrotactile and vibrotactile displays for sensory substitution systems, *IEEE Trans. Biomed. Eng.*, **BME-38**: 1-16, 1991.
43. P. S. Hamilton and W. J. Tompkins, Compression of the ambulatory ECG by average beat subtraction and residual differencing, *IEEE Trans. Biomed. Eng.*, **BME-38**(3): 253-259, 1991.
44. P. S. Hamilton and W. J. Tompkins, Theoretical and experimental rate distortion performance in compression of ambulatory ECG's, *IEEE Trans. Biomed. Eng.*, **BME-38**(3): 260-266, 1991.
45. H. Zhu, G. F. Harris, J. J. Wertsch, W. J. Tompkins, and J. G. Webster, A microprocessor-based data-acquisition system for measuring plantar pressures from ambulatory subjects, *IEEE Trans. Biomed. Eng.*, **BME-38**(7): 710-714, 1991.
46. P. Hua, E. J. Woo, J. G. Webster, and W. J. Tompkins, Iterative reconstruction methods using regularization and optimal current patterns in electrical impedance tomography, *IEEE Trans. Medical Imaging*, **10**(4): 621-628, 1991.
47. J. J. Wertsch, J. G. Webster, and W. J. Tompkins, A portable insole plantar pressure measurement system, *Journal of Rehabilitation Research and Development*, **29**(1): 13-18, 1992.
48. E. J. Woo, P. Hua, J. G. Webster, W. J. Tompkins, and R. Pallás-Areny, Skin impedance measurements using simple and compound electrodes, *Med. & Biol. Eng. & Comput.*, **30**: 97-102, 1992.
49. E. J. Woo, P. Hua, J. G. Webster, and W. J. Tompkins, Measuring lung resistivity using electrical impedance tomography, *IEEE Trans. Biomed. Eng.*, **BME-39**(7): 756-760, 1992.
50. E. J. Woo, P. Hua, J. G. Webster, W. J. Tompkins, and R. Pallás-Areny, Walsh function current patterns and data synthesis for electrical impedance tomography, *IEEE Trans. Medical Imaging*, **11**(4): 554-559, 1992.
51. P. Hua, E. J. Woo, J. G. Webster, and W. J. Tompkins, Improved methods to determine optimal currents in electrical impedance tomography, *IEEE Trans. Medical Imaging*, **11**(4): 488-495, 1992.
52. Q. Xue, Y. H. Hu, and W. J. Tompkins, Neural-network-based adaptive matched filtering for QRS detection, *IEEE Trans. Biomed. Eng.*, **BME-39**(4): 317-329, 1992.
53. S. Luo, V. X. Afonso, J. G. Webster, and W. J. Tompkins, The electrode system in impedance-based ventilation measurement, *IEEE Trans. Biomed. Eng.*, **BME-39**(11): 1130-1141, 1992.
54. P. Hua, E. J. Woo, J. G. Webster, and W. J. Tompkins, Using compound electrodes in electrical impedance tomography, *IEEE Trans. Biomed. Eng.*, **BME-40**(1): 29-34, 1993.

55. P. Hua, E. J. Woo, J. G. Webster, and W. J. Tompkins, Finite element modeling of electrode–skin contact impedance in electrical impedance tomography, *IEEE Trans. Biomed. Eng.*, **BME-40**(4): 335–343, 1993.
56. E. J. Woo, P. Hua, J. G. Webster, and W. J. Tompkins, A robust image reconstruction algorithm and its parallel implementation in electrical impedance tomography, *IEEE Trans. Medical Imaging*, **12**(2): 137–146, 1993.
57. D. Panescu, Y. H. Hu, W. J. Tompkins, J. Lackey, and W. H. Smith, A fast pipelined CORDIC-based adaptive lattice predictor (abstract), *IEEE Trans. on Signal Processing*, **41**(3): 1485, 1993.
58. Y. H. Hu, W. J. Tompkins, J. L. Urrusti, and V. X. Afonso, Applications of artificial neural networks for ECG signal detection and classification, *Journal of Electrocardiology*, **26** (suppl): 66–73, 1994.
59. K. P. Cohen, D. Panescu, J. H. Booske, J. G. Webster, and W. J. Tompkins, Design of an inductive plethysmograph for ventilation measurement, *Physiological Measurement*, **15**: 217–229, 1994.
60. E. J. Woo, P. Hua, J. G. Webster, and W. J. Tompkins, Finite element method in electrical impedance tomography, *Med. & Biol. Eng. & Comput.*, **32**: 530–536, 1994.
61. M. J. Mayotte, J. G. Webster, and W. J. Tompkins, A comparison of electrodes for potential use in pediatric/infant apnea monitoring, *Physiological Measurement*, **15**: 459–467, 1994.
62. D. Panescu, J. G. Webster, W. J. Tompkins, and R. A. Stratbucker, Optimization of cardiac defibrillation by three-dimensional finite element modeling of the human thorax, *IEEE Trans. Biomed. Eng.*, **42**(2): 185–192, 1995.
63. D. Panescu, J. G. Webster, W. J. Tompkins, and R. A. Stratbucker, Optimization of transcutaneous cardiac pacing by three-dimensional finite element modeling of the human thorax, *Med. & Biol. Eng. & Comput.*, **33**(6): 769–775, 1995.
64. D. Panescu, J. G. Webster, W. J. Tompkins, R. L. Staley, J. Johnson, D. Schlageter, R. A. Stratbucker, A database of cardiac arrhythmias, *Acad. Emerg. Med.*, **2**: 46–49, 1995.
65. D. Panescu, Y. H. Hu, and W. J. Tompkins, Fast pipelined CORDIC-based adaptive lattice predictor: algorithms and architecture, *IEE Proc. on Vision, Image and Signal Processing*, **142**(5): 339–344, 1995.
66. S. Luo and W. J. Tompkins, Parameter evaluation of the inverse power law spectrum of heart rate—a quantitative approach for ECG arrhythmia analysis, *Journal of Electrocardiology*, **27** (suppl): 46–52, 1995.
67. V. X. Afonso and W. J. Tompkins, Detecting ventricular fibrillation, *IEEE Engineering in Medicine and Biology Magazine*, **14**(2): 152–159, 1995.
68. M. J. Mayotte, J. G. Webster, and W. J. Tompkins, Reduction of motion artifacts during paediatric/infant apnoea monitoring, *Med. & Biol. Eng. & Comput.*, **34**(1): 93–96, 1996.
69. V. X. Afonso, W. J. Tompkins, T. Q. Nguyen, K. Michler, and S. Luo, Comparing stress ECG enhancement algorithms: With an introduction to a filter bank based approach, *IEEE Engineering in Medicine and Biology Magazine*, **15**(3): 37–44, 1996.
70. K. P. Cohen, W. Ladd, D. M. Beams, W. Sheers, R. G. Radwin, W. J. Tompkins, and J. G. Webster, Comparison of impedance and inductance ventilation sensors on adults during breathing, motion and simulated airway obstruction, *IEEE Trans. Biomed. Eng.*, **44**: 555–566, 1997.
71. Y. H. Hu, S. Palreddy and W. J. Tompkins, A patient-adaptable ECG beat classifier using a mixture of experts approach, *IEEE Trans. Biomed. Eng.*, **44**(9): 891–900, 1997.
72. V. X. Afonso, W. J. Tompkins, T. Q. Nguyen, and S. Luo, ECG beat detection using filter banks, *IEEE Trans. Biomed. Eng.*, **46**(2): 192–202, 1999.

73. O. Wieben, V. X. Afonso, and W. J. Tompkins, Classification of premature ventricular complexes using filter bank features, induction of decision trees and a fuzzy-rule-based system, *Medical & Biol. Eng. & Comput.*, **37**(5): 560–565, 1999.
74. Hewitt, A., Hind, J., Kays, S., Nicosia, M., Doyle, J., Tompkins, W., Gangnon, R., and Robbins, J. Standardized instrument for lingual pressure measurement, *Dysphagia*, 23:16–25, 2008. (Published on-line in June 2007).

BOOKS AND BOOK CHAPTERS:

1. W. J. Tompkins, S. A. Briller, and D. B. Geselowitz, Body surface mapping by equivalent generator techniques. In S. Rush and E. Lepeschkin (eds.) *Advances in Cardiology*. Vol. 10. Basel, Switzerland: Karger, pp. 161-166, 1974.
2. W. J. Tompkins, Portable microcomputer-based instrumentation. In H. S. Eden and M. Eden (eds.) *Microcomputers in patient care*. Park Ridge, NJ: Noyes Medical Publications, pp. 174–181, 1981.
3. W. J. Tompkins and J. G. Webster (eds.) *Design of microcomputer-based medical instrumentation*. Englewood Cliffs, NJ: Prentice Hall, 1981 (also Russian edition, 1983).
4. J. G. Webster, A. M. Cook, W. J. Tompkins, and G. C. Vanderheiden (eds.) *Electronic devices for rehabilitation*. London: Chapman Hall, 1985.
5. W. J. Tompkins, Ambulatory monitoring. In J. G. Webster (ed.) *Encyclopedia of Medical Devices and Instrumentation*. New York: John Wiley, 1:20–28, 1988.
6. W. J. Tompkins and J. G. Webster (eds.) *Interfacing sensors to the IBM PC*. Englewood Cliffs, NJ: Prentice Hall, 1988 (also Russian edition, 1992).
7. W. J. Tompkins (ed.) *Proceedings of the 1990 IEEE Colloquium in South America*, 1990.
8. C. D. Geisler, W. J. Tompkins, and J. G. Webster. Biomedical engineering in the ECE department. In J. M. Harkness, T. J. Higgins, V. C. Rideout, and J. J. Skiles (eds.) *Electrical Engineering at the University of Wisconsin in Madison: 1891–1991*. pp. 124–134, 1991.
9. H. T. Nagle and W. J. Tompkins (eds.) *Case Studies in Medical Instrument Design*, New York: IEEE, 1992.
10. W. J. Tompkins (ed.) *Biomedical Digital Signal Processing: C Language Examples and Laboratory Experiments for the IBM[®] PC*. Englewood Cliffs, NJ: Prentice Hall, 1993.

CONFERENCE AND OTHER PUBLICATIONS:

1. Silage, D. A., Briller, S. A., Hagerty, J.M., and Tompkins, W. J. Automatic gain control in an electrocardiographic preamplifier. *Proc. 25th Annu. Conf. on Eng. in Medicine and Biol.*, p. 305, 1972.
2. Tompkins, W. J., and Briller, S. A. Computer vectorcardiography. *Proc. 26th Annu. Conf. on Eng. in Medicine and Biol.*, p. 116, 1973.
3. Chien, I., and Tompkins, W. J. Time and frequency domain analysis of wide-band electrocardiograms. *Proc. 28th Annu. Conf. on Eng. in Medicine and Biol.*, p. 390, 1975.
4. Tompkins, W. J. A new minicomputer language for real-time biomedical applications. *Proc. 28th Annu. Conf. on Eng. in Medicine and Biol.*, p. 280, 1975.
5. Blau, F. M., and Tompkins, W. J. An inexpensive light pen for biomedical applications. *Proc. 28th Annu. Conf. on Eng. in Medicine and Biol.*, p. 507, 1975.
6. Tompkins, W. J. CONVLINC - A new laboratory computer language. *Proc. of the DECUS Fall Symposium*, pp. 557-560, 1975.

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182. A. Nimunkar, S. Bernardoni, T. Lark, and W. J. Tompkins, Student Initiated Supplemental Training Curriculum for Support of BME Design Projects, *Proceedings of 2009 Annual Conf. of the American Society for Engineering Education*, Austin TX, June 2009.
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185. W. J. Tompkins, Mini-symposium talk, Evolution of microcomputer-based medical instrumentation, *Proc. Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, Minneapolis, MN, pp. 6590–6593, September 2009.

SHORT COURSES:

1. Tompkins, W. J. and Webster, J. G. One-week-long short course—*Design of microcomputer-based medical instrumentation*, University of Wisconsin-Extension, **Madison WI**, August 21–25, 1978, June 11–15, 1979, August 25–29, 1980, June 8–12, 1981, and August 23–27, 1982; **Minneapolis MN**, Medtronic Corp., January 8–12, 1979; **Singapore**, July 3–5, 1991.
2. Tompkins, W. J. (Course director and lecturer). One-day-long short course—*Microprocessors in the health care industry II—applications*. 4th Annu. Great Lakes Biomed. Conf., Racine, WI, May 2, 1980.
3. Tompkins, W. J. Three-day-long short course—*Microcomputers in medical instrumentation*, George Washington University, Continuing Engineering Education, Washington DC, May 3-5, 1982 and March 7-9, 1983.
4. Tompkins, W. J. Short course—*Medical applications of microprocessor technology*. Regional Meeting of the Assoc. for the Advancement of Medical Instrum., Detroit, MI, September 7, 1983.
5. Tompkins, W. J., Webster, J. G., and Amey, D. Three-day short course—*Interfacing sensors with computer systems*. University of Wisconsin-Extension, Madison, WI, January 16–18, 1984.
6. Tompkins, W. J., and Webster, J. G. One-day short course—*Interfacing sensors to the IBM PC*. Annual Conf. of the IEEE Eng. in Med. Biol. Society, Chicago IL, September 30, 1985.
7. W. J. Tompkins, “The Evolution of Intelligent Medical Instrumentation”, In Two-day short course—*Advances in Biomedical Technologies: Outlook for the 1990's*. University of Wisconsin, Department of Engineering and Professional Development, September 28–29, 1987.
8. Tompkins, W. J., and Webster, J. G. Three-day short course—*Interfacing sensors with the IBM PC*. University of Wisconsin, Department of Engineering and Professional Development, **Madison, WI**, January 13–15, 1986; January 12–14, 1987; January 11–13, 1988; January 18–20, 1989; January 17–19, 1990; January 14–16, 1991; January 15–17, 1992; January 11–13, 1993. **Munich, Germany**, June 22–24, 1988; June 19–21, 1989; June 25–27, 1990.
9. Tompkins, W. J., and Webster, J. G. Three-day short course—*Interfacing sensors with the IBM PC*. IEEE, **Singapore**, July 2–4, 1991; Dries Associates, **Munich, Germany**, June 10–12, 1992.
10. W. J. Tompkins, Three-day short course—*Digital Signal Processing*. Dries Associates, **Munich, Germany**, June 14–16, 1993; June 13–15, 1994.

REPORT/THESIS RESEARCH SUPERVISED:

I-chu Chien	M.S.	8/76	Thesis: <i>Computer notch analysis of the wideband electrocardiogram in the time and frequency domains</i>
Amreesh Modi	M.S.	12/76	Thesis: <i>Computerized spectrum analysis of the electromyogram in neuromotor speech disorders</i>
Patrick Wilson	M.S.	12/76	Report: <i>A bit-slice microcomputer for dedicated applications</i>
Dilish Adhikari	M.S.	5/77	Thesis: <i>Computerized mental status exam</i>
John P. Abenstein	M.S.	5/78	Thesis: <i>A study of data reduction algorithms for digitized electrocardiogram signals</i>
Hossein Baharestani	M.S.	8/78	Thesis: <i>Heart rate histogram recorder</i>
Handayani Tjandrasa	M.S.	12/78	Thesis: <i>Two-dimensional analysis of the electrical field distribution in the thorax and reconstruction of a cross section from its projections</i>
Yongmin Kim	M.S.	5/79	Thesis: <i>Forward and inverse high frequency electrocardiography</i>
Alan V. Sahakian	M.S.	8/79	Thesis: <i>An arrhythmia monitor for the operating and recovery rooms</i>
John E. Zicker	M.S.	8/79	Thesis: <i>A portable microprocessor-based feedback training device</i>
David R. Patek	M.S.	5/80	Thesis: <i>A fast microcomputer language for signal acquisition and processing</i>
Piyush G. Patel	M.S.	5/80	Report: <i>Digital cassette transport controller</i>
Mark L. Ahlstrom	M.S. (BME)	5/81	Thesis: <i>Automated high-speed analysis of Holter tapes with microcomputers</i>
James Woodburn, Jr.	M.S.	5/81	Thesis: <i>Design and development of a microcomputer-based waveform generator for neurophysiological research</i>
Steven J. Weisner	M.S. (BME)	8/81	Thesis: <i>A compact microprocessor-based ECG ST-segment monitor for the operating room</i>
John R. La Londe	M.S. (BME)	8/81	Thesis: <i>A real-time interactive signal averager for use in neurophysiological signal analysis</i>
Barbara M. Brinsko	M.S. (BME)	8/81	Thesis: <i>Applications of a portable microcomputer to problems in communicative disorders</i>

Paul Kaaraaka	M.S. (BME)	5/82	Report: <i>The rationale behind trace anesthetic gas monitoring with emphasis on two experiments to simplify monitoring technique</i>
Blair Leavell	M.S. (BME)	5/82	Report: <i>Finding volume blood flow in real time using the power spectrum of a Doppler ultrasound device</i>
Mauricio Wilches	M.S. (BME)	5/82	Report: <i>Elimination of electrosurgical artifacts in the Model 78208A ECG amplifier</i>
Gregory S. Furno	M.S.	8/82	Thesis: <i>QRS detection using automata theory in a battery-powered microprocessor system</i>
Yongmin Kim	Ph.D.	8/82	Thesis: <i>A three-dimensional modifiable computer body model and its applications</i>
Miten M. Marfatia	M.S. (BME)	12/82	Report: <i>A microprocessor-based system to automate data acquisition and analysis of an impedance pneumograph</i>
Gregory S. Furno	M.S. (BME)	5/83	Thesis: <i>Nonlinear transfer functions for correcting abnormal auditory evoked responses in the hearing impaired</i>
Shardul Kazi	M.S.	12/83	Thesis: <i>Software interfacing between a graphics terminal and an XY plotter</i>
Chanda Deshpande	M.S.	12/83	Thesis: <i>Evaluation of a non-linear reconstruction algorithm for impedance imaging</i>
Hong-Tai Chou	M.S.	12/83	Report: <i>A communication interface for the HERO robot</i>
Alan V. Sahakian	Ph.D.	5/84	Thesis: <i>Algorithms, architecture, and electrode studies for apnea monitoring using a multiple-microcomputer system</i>
Andrew Pias	M.S.	5/84	Thesis: <i>Design of a microprocessor-based EEG analyzer</i>
Ying Shi	M.S.	5/84	Thesis: <i>Quantitative analysis of tremors: a microprocessor-based method</i>
William T. Cumming	M.S.	5/84	Thesis: <i>Microprocessor-based weight shift monitors for paraplegics</i>
Thomas A. Dumas	M.S.	5/84	Report: <i>Computer interpretation of the pointing motions of severely handicapped individuals</i>
Hyung-geun Park	M.S.	5/84	Report: <i>Interface for a digital tape recorder</i>
Jon Gunderson	M.S.	8/84	Thesis: <i>Long range optical pointer for screen-based headpointing for the severely physically handicapped</i>

Shardul Kazi	M.S.	8/84	Thesis: <i>Software interface between an x-y plotter and a graphics display terminal</i>
Asit Shah	M.S.	12/84	Report: <i>Microprocessor-based ST-segment analyzer</i>
Jiu An	M.S.	12/84	Thesis: <i>A voice-output heart-rate computer for exercise</i>
Stephen C. Kettman	M.S.	12/84	Report: <i>An infrared control transmitter/receiver for a handicapped environment</i>
Mehrdad Shahabi	M.S.	5/85	Report: <i>A software interface for linking the PC graphics display and an x-y plotter</i>
Farzin A. Abedzadeh	M.S.	5/85	Thesis: <i>Reliability estimation of averaged auditory brainstem responses</i>
Gordon T. Geheb	M.S.	5/85	Report: <i>Software design of a computer-controlled infrared remote controller for the handicapped</i>
John A. Gregg	M.S.	8/85	Report: <i>Data conversion and storage interface unit</i>
Patrick S. Hamilton	M.S. (BME)	12/85	Thesis: <i>Development and evaluation of a new QRS detection algorithm using the IBM PC</i>
Tony Blasczyk	M.S.	12/85	Report: <i>A battery-operated, stand-alone digital filter for ECG signal processing</i>
Soo Young Lee	M.S.	8/86	Report: <i>HERO robot utility program</i>
Hartono Pranjoto	M.S.	5/87	Thesis: <i>Digital analog data acquisition for the Superconductive Quantum Interference Device (SQUID)</i>
Qiuzhen Xue	M.S.	8/87	Report: <i>Methods for recognizing pellets using the microbeam system</i>
Omar Abu Sufah	M.S.	12/87	Thesis: <i>Graphics processing microcomputer</i>
Chee Khiang Seow	M.S.	12/87	Report: <i>A program for pulmonary mechanics analysis</i>
Larry Silvermintz	M.S.	5/88	Thesis: <i>Design and construction of a caloric consumption monitor using a 3-d accelerometer combined with a heart-rate monitor</i>
Scott A. Wiener	M.S. (BME)	5/88	Thesis: <i>Design and development of a device to measure ultrasonic velocity in the human os calcis</i>
Joseph Y. Fang	M.S.	5/88	Thesis: <i>Study of the hidden Markov model in speech recognition</i>

Catherine Pfister	M.S.	5/88	Thesis: <i>Development of an ambulatory esophageal pressure monitor and some preliminary data from 24-hour recordings</i>
David B. Doak	M.S.	12/88	Thesis: <i>A center-of-pressure system for analysis of pressure distribution between the shoe and sole</i>
Robert J. Onesti	M.S.	5/89	Thesis: <i>Design of a portable electrotactile stimulator for sensory substitution applications</i>
Patrick S. Hamilton	Ph.D.	5/89	Thesis: <i>Algorithms for real-time compression and analysis of electrocardiograms</i>
Dharmesh Mehta	M.S.	8/89	Thesis: <i>Analysis of foot pressure waveforms</i>
Jian Yuan	M.S.	12/89	Report: <i>A satellite PET image processing system</i>
Dan J. Baxter	M.S.	12/89	Report: <i>Instrumentation for genetic sequencing</i>
Ammar Rabbat	M.S.	12/89	Report: <i>Introduction to electron microscopes and x-ray microanalysis</i>
Anand H. Gandhi	M.S.	5/90	Report: <i>A PC-based auscultatory method for the measurement of blood pressure</i>
Mohammad R. Akbarzadeh	M.S.	5/90	Thesis: <i>Improving impedance pneumography for apnea monitoring</i>
Ying Shi	Ph.D.	12/90	Thesis: <i>M-pulse sequences in the study of nonlinear behavior of auditory evoked potentials</i>
Ren Zhou	M.S.	5/91	Thesis: <i>Study of electrodes and correlation techniques in apnea monitoring</i>
Qiuzhen Xue	Ph.D.	5/91	Thesis: <i>Biomedical signal processing and pattern recognition by artificial neural networks</i>
Shu Chen	M.S.	8/91	Thesis: <i>Computer modeling of photoreceptors with object-oriented programming approach</i>
Joseph Chi Kong Chan	M.S.	8/91	Report: <i>Estimation of eardrum sound pressure: an acoustic method of determining microphone probe location</i>
Aparna Mokshagundam	M.S.	12/91	Thesis: <i>Cancellation of ECG artifact in an EMG</i>
Jon D. Pfeffer	M.S.	12/91	Thesis: <i>A study of multi-sensor flow measurements of unknown gas compositions</i>
Jiashu Chen (Co-Advisor with Barry Van Veen)	Ph.D.	12/92	Thesis: <i>External ear modeling and virtual auditory environment simulation</i>

José L. Urrusti-Alonso	M.S.	8/93	Thesis: <i>Evaluation of relative performance of a QRS complex detection algorithm</i>
Valtino X. Afonso	M.S.	8/93	Thesis: <i>Quantitative measures of respiratory sinus arrhythmia for apnea detection</i>
Rafael Arce Nazario	M.S.	12/93	Report: <i>Development of a multisensory interface to allow blind user access to graphics</i>
Cheng-Hsiung Chen	M.S.	12/93	Report: <i>Design and analysis of a measurement system using infrared diodes for continuously monitoring cell growth</i>
Ke-Chin Chiu	M.S.	12/93	Report: <i>Applications of biomedical digital signal processing using MATLAB</i>
Steven A. Murray	P.D.	12/93	Report: <i>A software validation methodology for the medical devices industry</i>
Shen Luo	Ph.D.	5/94	Thesis: <i>Studies of sensor systems and statistical processing of ventilation monitoring and electrocardiogram measurements</i>
Kevin Hugo	M.S.	5/94	Report: <i>A data acquisition system for biomedical signals</i>
Adrianus Djohan	M.S.	5/95	Report: <i>ECG compression using discrete symmetric wavelet transform</i>
Mark Werkheiser	M.S.	5/95	Report: <i>A computerized system for real-time synchronization of upper airway images and respiratory signals during sleep</i>
Beejahn Afsari	M.S.	5/95	Report: <i>Blood pressure measuring device (bpSure)</i>
Thomas Hundt	M.S.	8/95	Thesis: <i>A study comparing JPEG and wavelet compression of medical images</i>
Basel Taha	Ph.D.	12/95	Thesis: <i>Computer-based detection and biological significance of sleep disordered breathing events</i>
Mark J. Hickey	M.S.	5/96	Report: <i>Recording neural discharges in the cerebellum</i>
Oliver Wieben	M.S.	12/96	Thesis: <i>The classification of PVCs using filter bank features, induction of decision trees, and a fuzzy-rule-based system</i>
Surekha Palreddy	Ph.D.	12/96	Thesis: <i>User adaptation of ECG beat classifiers</i>
Joanna Ruchala	M.S.	5/97	Thesis: <i>Removal of eye motion artifact from EEG by source localization</i>
Valtino X. Afonso	Ph.D.	5/97	Thesis: <i>Improving ECG processing algorithms using filter banks</i>

Susanne A. Clark	M.S.	8/97	Thesis: <i>Assessment of inspiratory flow limitation during sleep</i>
Thomas F. Woods	P.D.	12/98	Report: <i>Variable area display of electrograms and electrocardiograms</i>
Jeeyune Jung	M.S. (BME)	5/99	Thesis: <i>Investigation of the cellular basis of epilepsy with an in vitro rat model</i>
Dean Skuldt	M.S.	8/99	Thesis: <i>Projection dephaser gradients in catheter tracking</i>
Chor Kuen Eddy Hui	M.S.	5/01	Report: <i>Biometrics for ECG recognition</i>
Venkatanand Venkatachalapathy	M.S. (BME)	12/01	Report: <i>On the design of biomedical signal databases</i>
Tsu-Wang David Shen	M.S. (BME)	12/01	Thesis: <i>ECG analysis for human identification</i>
Oliver Wieben (Co-Advisor with Walter Block and Charles Mistretta)	Ph.D.	8/02	Thesis: <i>Novel acquisition strategies for time-resolved 3D magnetic resonance angiography</i>
Youngkyoo Jung	M.S. (ECE)	5/04	Thesis: <i>Detecting and classifying life-threatening ECG ventricular arrhythmias using wavelet decomposition</i>
Tsu-Wang David Shen	Ph.D. (BME)	5/05	Thesis: <i>Biometric identity verification based on electrocardiogram</i>
Amit Nimunkar (Co-advisor with John Webster)	Ph.D. (BME)	12/09	Thesis: <i>Ventricular fibrillation and blood chemistry from single and multiple TaserX26 discharges on pigs and proposed safety</i>