

# Robert Allen Malkin, PhD, PE, FAIMBE

Professor of the Practice of Biomedical Engineering Department  
Duke University  
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## EDUCATION

**Ph.D., Electrical Engineering**, May 1993

DUKE UNIVERSITY, Durham NC

- Title: Estimating Defibrillation Efficacy Using Upper Limit of Vulnerability Testing
- Advisor: Dr. Theo Pilkington

**M.S., Electrical Engineering**, December, 1990

DUKE UNIVERSITY, Durham NC

- Title: Optimal Bayesian Sequential Estimation of Defibrillation Parameters
- Advisor: Dr. Theo Pilkington

**B.S., Electrical Engineering / B.S., Computer Engineering**, May, 1984

THE UNIVERSITY OF MICHIGAN, Ann Arbor, MI

- Magna Cum Laude
- Senior Research Project: Extracting the Fetal ECG from the Maternal ECG
- Senior Research Advisor: Dr. Janice Jenkins

**PROFESSIONAL ENGINEERING LICENSE (PE in TN-#106969):** 2001-

## SOCIAL ENTERPRISE EXPERIENCE

2009-present

GLOBAL PUBLIC SERVICE ACADEMIES, Raleigh, NC

**Founder, Chair, Board of Directors (2009-)**

2008-present

PHOTOGENESIS MEDICAL EQUIPMENT CORPORATION, Durham, NC

**Founding Board Member; Chair, Board of Directors (2008-2010)**

2001-2012

ENGINEERING WORLD HEALTH Corporation, Memphis, TN

**Founder; Board of Directors (2001-2012); Chair, Board of Directors 2001-2008; Director 2001-2008**

## ACADEMIC EXPERIENCE

2011 – present

IMPERIAL COLLEGE, London, England

**Visiting Professor, Department of Bioengineering**

2004-present

DUKE UNIVERSITY, Durham, NC

**Professor of the Practice of Biomedical Engineering**

2004-present

DEVELOPING WORLD HEALTHCARE TECHNOLOGY LABORATORY

Formerly: Duke University – Engineering World Health

**Director**

2003-2004

THE UNIVERSITY OF MEMPHIS, Memphis, TN

**Professor of Biomedical Engineering**

2000-2003

THE UNIVERSITY OF MEMPHIS, Memphis, TN

**Herbert Herff Associate Professor of Biomedical Engineering**

1999 - 2003

THE UNIVERSITY OF MEMPHIS, Memphis, TN

**Associate Professor of Biomedical Engineering**

2000-2004

UNIVERSITY OF TENNESSEE, Memphis, TN

**Adjunct Associate Professor of Biomedical Engineering**

1995 - 1999	THE UNIVERSITY OF MEMPHIS, Memphis, TN <b>Assistant Professor of Biomedical Engineering</b>
1995 - 2000	COLUMBIA UNIVERSITY, New York, NY <b>Adjunct Associate Research Scientist</b>
1995- 2000	UNIVERSITY OF TENNESSEE, Memphis, TN <b>Adjunct Assistant Professor of Biomedical Engineering</b>
1993 - 1995	THE CITY COLLEGE OF NEW YORK, New York, NY <b>Assistant Professor of Electrical Engineering</b>
1993	DUKE UNIVERSITY, Durham, NC <b>Postdoctoral Fellow</b> , Directed by Dr. Raymond Ideker,

**INDUSTRIAL EXPERIENCE**

1987 - 1989	EM MICROELECTRONICS, Marin, Switzerland <b>IC Design Engineer and Project Engineer</b>
	<ul style="list-style-type: none"> <li>Designed very low power, low cost, high volume analog and digital integrated circuits for the watch and pacemaker industry. Coordinated project planning and follow-up.</li> </ul>
1984 - 1987	CORDIS CORP., Miami, Florida <b>IC Design Engineer and Project Coordinator</b>
	<ul style="list-style-type: none"> <li>Designed low power, high reliability, analog and digital circuits for pacemakers.</li> <li>Researched, created and tested software for implantable microcomputers.</li> <li>Scheduled, planned, designed and coordinated electronics development for a rate-responsive pacemaker</li> </ul>
1983 - 1984	SARNS-3M, INC., Ann Arbor, MI <b>Programming Consultant</b>
	<ul style="list-style-type: none"> <li>Programmed a microprocessor in a control system to automatically maintain and display venous blood temperature in a heart lung machine.</li> </ul>

**Short Term Technical Experience**

CARDIAC PACEMAKERS, INC.	Saint Paul, MN	1991
<ul style="list-style-type: none"> <li>Designed estimation protocols for defibrillation efficacy.</li> </ul>		
IBM	Poughkeepsie, NY	1983
<ul style="list-style-type: none"> <li>Designed testing equipment for microprocessors.</li> </ul>		
IMPERIAL COLLEGE	London, England	1983
<ul style="list-style-type: none"> <li>Designed student labs for beginning electronics.</li> </ul>		
STANDARD OIL COMPANY	Cleveland, Ohio	1982
<ul style="list-style-type: none"> <li>Tested solar cell efficiency and durability.</li> </ul>		
NASA	Cleveland, Ohio	1981
<ul style="list-style-type: none"> <li>Designed automated testing equipment for tribology experiments.</li> </ul>		

## HONORS AND AWARDS

- Save the Children \$1M Award, Shared for HIV work
  - Certificate Of Excellence in Recognition of Excellence in Teaching, Duke-Pratt 2015
  - Named One of Today's Engineering Heroes, IEEE Spectrum 2015
  - Winner, John L. Imhoff Distinguished Teaching Award, Engineering, Duke University, 2010
  - Member, WHO Technical Advisory Group 2009-
  - Fellow of the American Institute of Medical and Biological Engineering, 2009
  - Member of the Duke Global Health Institute, 2007-
  - Appointed to Represent IFMBE to the World Health Organization, 2007-2008
  - Plenary Speaker, 2007 Bioengineering Conference
  - Cleveland Heights High School Hall of Fame, 2006
  - BMES Poster Award, Hassan Deni, 2006
  - Selected as a Instructional Technology Fellow, Duke University 2005-2006
  - Selected as Memphis "Stand-Out" by Memphis Daily News, May 2004
  - Jefferson Award Winner, for public service, 2004
  - Memphis Engineering Council featured engineer of the year (UofM), 2004
  - Second Place, UM Student Research Forum, Shivani Patel (graduate student), 2003
  - First Place, TN BME Conference Poster Competition, Jacqui McLaughlin (graduate student), 2002
  - First Place, UM Student Research Forum, Jacqui McLaughlin (graduate student), 2002
  - Recognition of Service Excellence from The Ministry of Health of the Republic of Nicaragua, 2002
  - ABME Merit Award , Manish Malik 2001
  - Second Place, UM Student Research Forum, Vijaya Ramanathan (graduate student), 2001
  - Received Herff Outstanding Faculty Research Award, 2001
  - Named to Herbert Herff Endowed Chair, 2000
  - Diploma Especial de Reconocimiento from Corazones Abiertos, Nicaragua, 2001
  - First Place, UM Student Research Forum, Ron Davis (graduate student), 2000
  - IEEE Service Award for Chairing EMBS Memphis Section 2000
  - Award of Excellence, Doctoral Candidate (Losicco), TNBME Student Poster Competition, 1999
  - Outstanding Service Award, IEEE-Memphis Section, 1998
  - Senior Member Grade Award, IEEE, 1998
  - Established Investigator Award, American Heart Association, 1997
  - R3 Finalist Doctoral Candidate (Li), IEEE/EMBS Student Paper Competition, 1998
  - Innovation and Excellence in Undergraduate Education Award, CCNY President, 1995
  - Degani Young Investigator Award Finalist, Computers in Cardiology, 1993
  - NSF / ERC Eli Lilly Fellow, Center for Emerging Cardiovascular Technologies
  - Honorable Mention, NSF Graduate Research Fellow
  - EM Microelectronics Service Award, Yield Improvement Work
  - Cordis Quality Workplace Citation, In-House Training
  - Tau Beta Pi Engineering Honor Society
  - National Merit Scholar
- 
- Judge, Computers in Cardiology Young Investigator Award, 2001, 2002
  - Reviewer, Journal of Interventional Cardiac Electrophysiology, 2006-present
  - Reviewer, Circulation Research, 2001-present
  - Reviewer, IEEE Transactions on Biomedical Engineering, 1993 – Present
  - Reviewer, Med, Biol, Eng & Comput, 1997 - Present
  - Reviewer, PACE, 2000 – Present
  - Reviewer, Journal of Clinical Electrophysiology, 1997 – Present
  - Reviewer, Journal of Cardiovascular Electrophysiology, 2000 – Present
  - Reviewer Medicine, Biosciences, Biotechnology Symposium, 1998
  - Reviewer, Annals of Biomedical Engineering, 1999 – Present
  - Reviewer, Online Journal for Global Engineering Education, 2007-Present

- Reviewer, National Science Foundation

## TEACHING EXPERIENCE

### Courses in Electrical Engineering Department at CCNY

- Electronics I [EE241 - pre-junior]
- Communications/Lab IV [EE424 - senior]
- Control Systems/Lab IV [EE424 - senior]
- Biomedical Signal Processing [EE598.2 - senior/graduate]

### Courses in Biomedical Engineering Department at UM

- Biomedical Instrumentation [BIOM 7/8209 - graduate]
- Biostatistics (team taught) [BIOM 7/8110 - graduate]
- Advanced Cardiac Electrophysiology [BIOM 7/8215 - graduate]
- Biomedical Engineering Seminar [BIOM 7/8114 - graduate]
- Bioelectricity - [BIOM 7/8203 -graduate]
- Advanced Instrumentation and Measurements [BIOM 7/8220 - graduate]
- Research Studies [BIOM 4902 - undergraduate]
- Introduction to Biomedical Instruments [BIOM 4910 - undergraduate]

### Courses in Biomedical Engineering Department at Duke University

- Design for the Developing World [BME 261, BME 262]
- Electronic Medical Measurements I (Circuits) [BME 153]
- Electronic Medical Measurements II (Instrumentation) [BME 154]

### Non-University Courses Taught

- Introduction to Implantable Microcomputers [Cordis in-house training]
- MainSail IC Testing Language [EM Microelectronics in-house training]

### Non-Technical Courses Taught

- English as a foreign language for adults, YMCA: Chiangmai, Thailand, 1989  
Taught English as a foreign language, and created computer tools as teaching aids.
- Hebrew as a foreign language for 4-8th grade, Temple Emanu El, Temple Israel, 1977-1980.
- Hebrew as a foreign language: private and classroom, 1977-1980.

**STUDENT ADVISING AND MENTORING**

## Undergraduate and Graduate Independent Study Courses Taught at Duke University

- Duke: Mike Scott 12/2004, Bilal Aijazi 5/2006, Heather Gray 12/2004, Shingayi Sikipa 12/2005, Bryant Mersereau 12/2006, Zach Jones 12/2005, Todd Joseph 5/2005, Brittany Zick and Nick Bonazza 5/2007, Allison Keane 5/2008, 12/2008, 5/2009, Mhoire Murphy and Kathleen Murphy 5/2009, Michael Spohn 12/2008, 5/2009; Jenna Maloka 12/2008, 5/2009, Henry Jue (5/2009), Marian Dickinson (12/2009), Shannon Skinner, Peter Horgan 12/2009, 5/2010, Margaret Finch (5/2010), Patrick Ye (GC Scholar, 5/2010), Michele Torosis (5/2011), Brett Cook (5/2011), Megan Finley (5/2011), Amanda Britt (5/2012), Grace Howard (5/2012), Michael Moranzano (BME 2013), Jennifer Arnold (BME2013), Gavin McAlister (2013), Alexa Choy (2014), Caroline Seng (2014), Bianca Bracht (2015), Jessie Wilson (2015), Ashely Reid (2016).
- CCNY: Mia Mia Thi: 5/94, "Raymond" Lay K Maung 5/94,
- UM: Jennifer Lasch 5/97, David Thompson 5/00, Chris Powell 5/00

## Undergraduate Summer Research Projects

- Duke when Grad Student: Jennifer Penzotti, Tamara Richardson, Tatjana "TJ" George, Sharon Washington, Janice Song & Aliko Compos
- CCNY: Yussi Mosak
- UM: Kathryn Hicks, Ezana Azene, Jacqueline McLaughlin, Chad Rowan, Dave Thompson, Chris Powell, Phil Rybarcick, David Scott, Meg Stokes, Tom O'hara, Stephanie Jackson, Kim Tran, Jennifer Nguyen, Sandra Cassandra

## Master's Projects

- CCNY: Mohammed Ansari, Zafar Mahmood, "Grace" Gu Xiaokai, Hyder Asif
- UM: Vani Narasimhan (now at Medtronic), Nan Luo, Jacob Rassmussen, Cartik Kothari, Peng Chen, Tino Losicco, Meera Gopalakrishnan, Vijaya Ramanathan

## Master's Theses Co-Chair

- Kelu Gu: UM, 5/97, Wenjie Hua: UM, 8/98

**Master's Theses Chairman**

- Neeraja Penumetcha (MGH, 12/2012)
- Sridhar Ganapathy: UM, 5/97
- Qiuying Huang: UM, 5/97
- Indira Muthayyah: UM, 8/97
- Pin Lu: UM, 8/98
- Manish Malik 5/02
- Jaqueline McLaughlin 5/02
- Benjamin Schnitz 8/02
- Chris Powell 8/02
- Shivani Patel 5/03
- Keith Martin 5/04

**Doctoral Dissertation Chairman**

- Hui "Holly" Li: UM, 4/98
- Tino Losicco: UM 8/03
- Nicolle Kramer: UM 5/04
- Meera Gopalakrishnan UM 5/04

**Post-Doctoral Training Supervisor**

- James Eason: UM, 8/98 (Now at BME department Tulane)
- Douglas Guan: UM 6/03
- Jean-Noel Eynard 9/97 (Co-Supervisor, now at UPENN)

## Committee Membership (non-chair)

Amy DeJongh

Sihong Wong

Jan Neyens

Emilia Entcheva Justin Lo

Bishaka Bhattacharya  
Chris Ohmen

Nicholas Pergola  
Tamara Patterson

Qiuju Huang  
Leslie Hunt

Sandeep Pandit  
Shelley Marak

Jing Zhang  
Manish Gupta

## Additional Undergraduate Advising

- Faculty Advisor, Biomedical Engineering Society CCNY, 1994 - 1995
- EE Students of the Center for Biomedical Engineering (20 students) CCNY, 1994 - 1995
- Undergraduate Academic Advisor (50 students) CCNY, 1993 – 1995
- Undergraduate Academic Advisor (10-20 students) Duke 2004-
- Faculty Advisor, Duke-EWH Chapter Duke, 2004-

## PEER REVIEWED PUBLICATIONS

1. Dahinten, A; Dow, D; Cunningham, C; Msuya, L; Mmbaga, B; Malkin, R, Providing safe and effective preventative antiretroviral prophylaxis to HIV-exposed newborns via a novel drug delivery system in Tanzania, *Ped Inf Dis J*, 2016 (accepted and in print).
2. Dahinten, A, Malkin R The Pratt Pouch Provides a Three-Fold Access Increase to Antiretroviral Medication for Births outside Health Facilities in Southern Zambia, *The Open Biomedical Eng J*, 2016, v10, 12-18.
3. Choy, A, Malkin RA, Ortiz, Accurate Dosing of Antiretrovirals at Home Using a Foilized, Polyethylene Pouch to Prevent the Transmission of HIV from Mother to Child", *Medicine*, 2015 v94(25), pp1-5.
4. Malkin RA, Calman LJ, Service-Learning in Biomedical Engineering: Engineering World Health (EWH), *International Journal for Service Learning in Engineering*, Special Edition, pp. 39-47, January 2015
5. Whittle, C, Makin, RA: Capacity Building for Medical Equipment Technicians Improves Healthcare, *J Clin Eng*, v39(3), 2014, pp 142-147).
6. Malkin RA, Foilized Pouches Can Prevent the Transmission of HIV from Mother to Child Using Multi-Drug Therapies. *J. Biomedical Science and Engineering*, 2014, 7, 45-47.
7. Malkin RA, Whittle C. Biomedical Equipment Technician Capacity Building Using a Unique Evidence-based Curriculum Improves Healthcare, *J Clin Eng*, v39(1), 2014, page 37-44 (Feature Article)
8. Malkin, RA, Beer, K Dissemination of Novel Healthcare Technologies to Resource Poor Settings, *Ann Biomed Eng*. 2013 v41(9), 1841-1850, 2013
9. Malkin RA, A Pouch May Be Prevent the Transmission of HIV from Mother to Child, *J of Biomedical Eng Res*, v2(2), 66-70, 2013.
10. Howard C, Malkin RA, A Foilized Polyethylene Pouch for the Prevention of Transmission of HIV from Mother to Child, *Open Biomedical Engineering J*. 2012, v6 pages 92-97.
11. P Howitt, A Darzi, G Yang, H Ashrafian, R Atun, J Barlow, A Blakemore, A Bull, J Car, L Conteh, G Cooke, N Ford, S Gregson, K Kerr, D King, M Kulendran, R Malkin, A Majeed, S Matlin, R Merrifield, H Penfold, S Reid, P Smith, M Stevens, M Templeton, C Vincent, E Wilson, Technologies for global health, *Lancet*, 2012, v380, pages 507-535.
12. Davis, RE Malkin RA, Simultaneous Comparison of Many Triphasic Defibrillation Waveforms, *Open Biomedical Engineering J*. 2012 v6, pages 1-4.
13. Perry L, Malkin RA, "Effectiveness of Medical Equipment Donations to Improve Health Systems" *Med Biol Eng and Comp* 2011, v49(7), Page 719-722
14. Sanders, WE, Malkin, RA Richey M, Masson SC, Ransbury T and Ideker, RE, Implantable intravascular defibrillator: evaluation of defibrillation waveforms with inferior vena cava electrode system, *Pacing Clin Electrophysiol*. 2011 May;34(5):577-83
15. Sanders WE, Richey M, Malkin RA, Masson SC, Ransbury T, Urtz, MW and Ideker RE, Novel intravascular defibrillator: defibrillation thresholds of intravascular cardioverter defibrillator compared to conventional ICD in a canine model, *Heart Rhythm*. 2011 Feb;8(2):288-92.
16. Malkin RA, Keane A. Evidence-Based Approach to the Maintenance of Laboratory and Medical Equipment in Resource Poor Settings, *Med Biol Eng and Comp* v48(7), 721-726, 2010.
  - a. See editorial comment Herbert Voigt, Shankar Krishnan, *MBEC* v48(7), 719-720
17. Malkin RA, Anand, V, Design and Testing of a Novel Phototherapy for the Developing World, *IEEE EMB Magazine*, March v29(2), 37-43, 2010
18. Malkin, RA, Designing Appropriate Healthcare Technology, *Appropriate Technology*, v25(4), 64-66, 2008.
19. Malkin, RA, Barriers to the development of medical devices for the developing world, *Expert Reviews in Medical Devices*. 4(6),759-763, 2007

20. SG Patel, RA Malkin, "Effect Of Electrode Surface Area On Thresholds For AC Stimulation And Ventricular Fibrillation," *IEEE Transactions on Biomedical Engineering*, 54(10) 2007 1829-1836.
21. RA Malkin, "Physiological Measurements in the Developing World," *Physiol. Meas.* 28 (2007) R57–R63.
22. RA Malkin, "Design of Healthcare Technology for the Developing World," *Annu. Rev. Biomed. Eng.* 2007. 9:567–87.
23. R. A. Malkin, D. Guan, J Wikswo, "Experimental Evidence of Improved Transthoracic Defibrillation Consistent with Electroporation" *IEEE Trans on BME.* 53(10), 2006, 1901-1911.
24. Malkin R. A., Jackson S., Nguyen J., Yang Z., Guan D., Experimental Verification of Theoretical Predictions Concerning the Optimum Defibrillation Waveform *IEEE Trans BME* v53(8), 2006, 1492-1498.  
(See [editorial comment](#) concerning above paper, Krasteva, Kerkhof On the Optimal Defibrillation Waveform – How to Reconcile Theory and Experiment, *IEEE Trans BME* v53(8), 2006, 1725-1726.  
AND response concerning editorial comment, Malkin, Jackson, Mgyuen, Yang, Guan, Replay to "On the Optimal Defibrillation Waveform – How to Reconcile Theory and Experiment" *IEEE Trans BME* v53(8), 2006, 1726-1727)
25. RA Malkin, "Engineering Humanity" Invited Editor of Special Edition, *IEEE Medicine and Biology Magazine* v25(3), 2006, 16-19.
26. BK Hoffmeister, AR Shores, S Banerjee, RA Malkin, Effect Of Electrically Insulating Materials On Magnetically Induced Electrical Currents In A Tissue-like Medium *American Journal of Physics* v74(4):260-266, 2006.
27. RA. Malkin, N Kramer., B Schnitz., M Gopalakrishnan, AL Curry, "Advances in Electrical and Mechanical Cardiac Mapping" *Physiological Measurements*, v26, 2005.
28. D Guan, R. A. Malkin, "Analysis of the Defibrillation Efficacy for 5-ms Waveforms" *J Card. Electophys*, vol. 15(4), 2004, 447-454.
29. Malkin, RA, Curry AD, Frequency Dependence of the Cardiac Threshold to Alternating Current Between 10 Hz and 160 Hz, *Med Biol Eng Comp.*, 2003 v41(6), 640-645.
30. Exil VJ, Roberts RL, Sims H, McLaughlin JE, Malkin RA, Gardner CD, Ni G, Rottman JN, Strauss AW, "Very-Long-Chain Acyl-Coenzyme A Dehydrogenase Deficiency in Mice," *Circ Res*, 93(5):448-55, 2003.
31. Schnitz, B A, Guan D, Malkin, R. A., "Design of an integrated sensor for in vivo simultaneous electrocontractile mapping," v51(2), *IEEE T Biomed Eng.*
32. E Sylvester, B Hoffmeister, E Johnson, P Hess, RA Malkin, "Defibrillation causes immediate cardiac dilatation in humans," *J Cardiovasc Electrophys.* 14(8):832-6, 2003.
33. S. Roberts, D. Guan, R. A. Malkin, "The defibrillation efficacy of high frequency AC sinusoidal waveforms in guinea pigs" *PACE* 26(2) 599-604, 2003.
34. M. Gopalakrishnan, R. A. Malkin, "Two Dimensional Analysis of Ventricular Fibrillation in the Guinea Pig," *J Electrocardiology*, v36(2), 147-153, 2003.
35. M. Malik, M. Gopalakrishnan, R. A. Malkin, "Quantifying the Spatiotemporal Effects of 2,3-Butanedione Monoxime (BDM) on Ventricular Fibrillation with a Conventional Mapping System" *J Cardiovasc Eng.* 2(3), 81-90, 2003.
36. de Jongh, V. Ramanathan, B. K. Hoffmeister, R. Malkin, "Left Ventricular geometry immediately following defibrillation: Shock-induced relaxation. *Am J Physiol* , v284, H815-H819, 2003.
37. R. Malkin "A large sample test of defibrillation waveform sensitivity," *J Cardiovasc Electrophys* 13:361-370:2002.  
(See [editorial comment](#) concerning above paper, CD Swerdlow, SF Lin, "Optimizing Defibrillation Waveforms," *J Cardiovasc Electrophys*, 13: 371-373: 2002.)
38. J. Eason, N. M. Gades, and R. A. Malkin, " A Novel Technique to Estimate Cardiac Geometry During Fibrillation," *Physiol Meas* v 23, 2002, 269-278.
39. R. A. Malkin, "An unconditional exact test for small samples of matched binary pairs," *J Modern App Stat. Methods*, v1 (1) 2002, 69-73.

40. E. Vigmond, N. Trayanova, R. Malkin, "Excitation of a cardiac muscle fiber by extracellularly applied sinusoidal current." *J Cardiovasc Electr.* v12(10), 2001, 1145-1153.
41. R. A. Malkin and B. Hoffmeister, "The mechanism by which 60Hz AC currents cause hemodynamic collapse without inducing VF," *J Cardiovasc Electr.* v12(10), 2001, 1154-1161.  
(See [editorial comment](#) concerning above paper, E. Barbari, "The Shocking Truth," *J Cardiovasc Electr.* v12(10), 2001, 1162-1163.)
42. R. A. Malkin, SR Smith, and BK. Hoffmeister, "The Geometry of the Heart Following Defibrillation," *Physiol Meas*, v22(2), 2001, 309-321.
43. R. A. Malkin, R. Guinn and T. Mandrell, "Water soluble propofol anesthesia: An effective and inexpensive alternative," *Lab Anim*, v29(9), 2000, 45-47.
44. J. Eason, R. A. Malkin, "A simulation study evaluating the performance of high density electrode arrays on myocardial tissue," *IEEE T Biomed Eng*, v47(7), 2000, 893-901.
45. H. Li and R. A. Malkin, "An approximate Bayesian up-down method for estimating a percentage point on a dose-response curve," *J App Stat*, v 27(5), 2000, 579-587.
46. R. A. Malkin and B. Hoffmeister, "Hemodynamic Collapse, Geometry and the Rapidly Pacing on the Upper Limit of Vulnerability to fibrillation by T-wave stimulation," *J Electrocardiol*, v33(3), 2000, 279-286.
47. R. A. Malkin and Bradford Pendley, "Construction of a very high density extracellular electrode array," *Am J Physiol.*, v279, H437-442, 2000.
48. R. A. Malkin, "Experimental Cardiac Tachyarrhythmias in Guinea Pigs," *J Electrocardiol*, v32 (supplement), 84-86, 1999.
49. J.N. Eynard and R. A. Malkin, "Open-Thorax Guinea Pig Model for Defibrillation," *Lab Anim Sci.* v49(6); 628-633, 1999.
50. R. A. Malkin, J. M. Herre, L. McGowen, M. Tenzer, J. R. Onufer, N. J. Stamato, M. Wood, and R. C. Bernstein, "A Four-Shock Bayesian Up-Down Estimator of the 80% Effective Defibrillation Dose," *J Cardiovasc Electr*, v10, pp973-980, July 1999.
51. Charles D. Swerdlow, Walter H. Olson, Mark E. O'Connor, Donna M. Gallik, Robert A. Malkin, and Michael Laks, "Cardiovascular Collapse Caused by Electrocardiographically Silent 60-Hz Intracardiac Leakage Current : Implications for Electrical Safety." *Circulation*.1999;99;2559-2564.  
(See [editorial comment](#) concerning above paper: MM Laks, R. Arzbaccher, D. Geselowitz, JJ Bailey, A. Berson, Revisiting the question: Will relaxing safe current limits for electromedical equipment increase hazards to patients?" *Circulation*. 2000;v102:823-825.
52. H. Li and R. A. Malkin, "Defibrillation and the Upper Limit of Vulnerability to Fibrillation in a Transthoracic Guinea Pig Model," *J Electrocardiol*, vol. 32 (2) 1999, pages 159-166.
53. E. Entcheva, J. Eason, I. Efimov, Y. Cheng, R. A. Malkin, and F. Claydon, "Virtual Electrodes in Transvenous Defibrillation: Modulation by Structure and Interface: Evidence from Bidomain Simulations and Optical Mapping," *J Cardiovasc Electr*, 9, 949-961, 1998.
54. R. A. Malkin and E. E. Johnson, "The Effect of Inducing ventricular fibrillation with 50Hz pacing versus T wave stimulation on the ability to defibrillate," *PACE*, 21(5), 1998, p 1093-1097.
55. R. A. Malkin, J. N. Eynard, N. F. Pergola, "Improved Guinea Pig Model of Cardiac Tachyarrhythmias," *Lab Anim Sci*, 48(1), 1998, p. 55-60.
56. R. A. Malkin, "Constructing a Multichannel Electrocardiography System from a Few Standardized, High Level Components," *Eng Med Biol Mag*, v17, January 1998, p. 34-38.
57. R. A. Malkin, J. E. Penzotti, S. P. Juhlin, and R. Plonsey, "Statistical Analysis of signals from an Intracavitary Probe in a Diseased Heart," *Med Biol Eng Comp*, 35, Sept. 1997, p. 462-466.
58. R. A. Malkin, J. J. Souza, and R. E. Ideker, "The Ventricular Defibrillation and Upper Limit of Vulnerability Dose-Response Curves," *J Cardiovasc. Electr*, 8, 1997, p. 895-903.

59. A. T. Compos, R. A. Malkin, and R. E. Ideker, "A Bayesian Up-Down Defibrillation Efficacy Estimator," *PACE*, 20, May 1997, p. 1292-1300.
60. R. A. Malkin, R. E. Ideker, and T. C. Pilkington, "Estimating Defibrillation Parameters Using Upper Limit of Vulnerability and Defibrillation Testing," *IEEE T Biomed Eng*, 43(1), January 1996, p. 69-78.
61. R. A. Malkin, S. F. Idriss, R. G. Walker, R. E. Ideker, "Effect of Rapid Pacing and T-Wave Scanning on the Relationship Between the Defibrillation and Upper Limit of Vulnerability Dose-Response Curves," *Circulation*, 92, 1995, p. 1291-1299.
62. J. J. Souza, R. A. Malkin, and R. E. Ideker, "Comparison of Upper Limit of Vulnerability and Defibrillation Threshold Parameters Probability of Success Curves Using a Nonthoracotomy Lead System," *Circulation*, 91(4), 1995, p. 1247-1252.
63. R. A. Malkin and D. Alexandrou, "Acoustic Classification of Abyssopelagic Animals," *IEEE J of Oceanic Eng*, 18(1), 1993, p. 63-72.
64. R. A. Malkin, T. C. Pilkington, D. S. Burdick, D. K. Swanson, E. E. Johnson, and R. E. Ideker, "Estimating the 95% Effective Defibrillation Dose," *IEEE T Biomed Eng*, 40(3), March 1993, p. 256-265.

Submitted, not yet published

Emmerling, D, Dahinten, A, Makin RA, The diminishing returns of providing more medical equipment: An assessment in Honduras, Rwanda, and Cambodia, The WHO Bulletin

## PATENTS

F. J. Callaghan, W. Vollman and R. A. Malkin, Patent Number **6,272,381**, August 7, 2001 "Rate-responsive pacemaker with closed loop control," assigned to Pacesetter, Inc.

## BOOK CHAPTERS and EDITORSHIPS

1. RA Malkin, BL Teninty, Medical Imaging in the Developing World: Donation, Procurement, Installation and Maintenance in *Diagnostic Imaging for Global Health: Implementation and Optimization of Radiology in the Developing World*, edited by Daniel J. Mollura, Matthew Lungren, Ezana Azene, Anna Starikovskiy, Springer, 2014, pp 33-41.
2. R.A. Malkin, What Medical Equipment Taught Me About Sustainability, in *Practicing Sustainability*, Springer, 2012, p1-7.
  - 2013 Nautilus Book Award Silver Winner.
3. R.A. Malkin, Social Entrepreneurship for Biomedical Engineers in *Career Development in Bioengineering and Biotechnology*, Springer, 2008, pg 239-244.
4. R. A. Malkin, "Engineering Health Care Technology for use in the Developing World," in Encyclopedia of Biomedical Engineering, Wiley, 2006.
5. R. A. Malkin, A L Curry "Defibrillation - Theory and Instrumentation" in Encyclopedia of Biomedical Engineering, Wiley, 2006.
6. R. A. Malkin, B Pendley, Electrodes in Cardiology: Theory and Practice, in *Electrophysiology from Basic Science to Practice*, Eds. Cabo., 2002, pg 259-289.
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## BOOKS

R. A. Malkin "Medical Equipment in the Developing World," EWH Publishing, 2006.

**SELECTED EDITORIALS/ARTICLES ABOUT DR. MALKIN'S WORK**

National/International

- The Plastic Pouch That Stops HIV, *The Atlantic* (City Lab), October 30, 2015
- The ketchup sachet-shaped drug saving babies from HIV, *BBC News* July 19, 2015
- Engineering Hero," *IEEE Spectrum* March 2015
- "GE Foundation, Duke University World Healthcare Tech Lab, and Engineering World Health Establish Biomedical Equipment Training Program in Nigeria to Build Skills and Improve Capacity" *The Wall Street Journal*, 7 May 2014 (Web)
- "Pratt Pouch Video Wins CUGH's Global Health Video Competition in Innovation." Consortium of Universities for Global Health, 1 May 2014 (Web)
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- "Engineers strut their global stuff" *Science Careers*, 11 Sept. 2014 (Web)
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- "The Pratt Pouch," *DukEngineer*, March 2014, pages 16-17
- "Pratt HIV pouch waiting on funds" *The Chronicle*, September 3, 2013
- "Engineering World Health: Q&A with Robert Malkin," *The Chronicle*, November 29, 2012 and Towerview

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## CONFERENCE PRESENTATIONS AND ADDRESSES

1. David Barash, Ed Hutton, Robert Malkin, A Multi sectorial Partnership for Biomedical Equipment Maintenance, Supplement to Lancet Commission on Global Surgery 2030, 2015
2. Dahinten A, Ekuta J., Malkin RA, Increasing Access to HIV Medication in Developing Countries: An Operational, Feasibility Study in Zambia, BMES Conference, 2014.
3. Emmerling D, Malkin RA, Health system strengthening through equipment donation: Evidence of strategies for impact, Am Pub Health Assoc, November 2014, New Orleans.
4. Emmerling D, Whittle C, Malkin RA, Evidence-based decision making for improving access to healthcare technology in low resource settings, WHO Second Meeting on Health technology, Geneva, Switzerland, November 2013.
5. Whittle C, Malkin, RA, “What happens to medical equipment donations results from a three country study,” WHO Second Meeting on Healthtechnology, Geneva, Switzerland, November 2013.
6. Dahinten, A, Whittle C, Malkin, RA, New medical equipment donations are no more likely to be fully functional than used donations: an assessment study in Rwanda, Honduras and Cambodia, BMES Annual Meeting, September 25-28, 2013 in Seattle, Washington.
7. Malkin RA, Perry LE, “Evaluation of the impact of a new biomedical equipment technician curriculum in Rwanda,” The Appropriate Healthcare Technology Conference, London, September 2012
8. Malkin RA, Gu L, Teninty W, “Provision of biomedical equipment reference texts and manuals on e-readers in resource-poor settings,” The Appropriate Healthcare Technology Conference, London, September 2012
9. **Invited Speaker** Malkin “Medical Equipment in Resource Poor Settings,” University of Calgary, October 2011
10. **Invited Speaker** Malkin “Medical Equipment in Resource Poor Settings,” Clemson University, December 2011
11. Malkin RA, “University-based design of medical devices,” Global Health Conference, Montreal, Canada, November 2011.
12. J Cooper, M Finley, RA Malkin, “Biomedical Equipment Technician and Biomedical Technician’s Assistant Curriculum in Rwanda,” BMES 2011, Hartford, CT
13. M Beard, RA Malkin, L Henderson, “EWH-Duke Summer Institute training yields annual improvements in equipment repair,” BMES 2011, Hartford, CT
14. RA Malkin, “Anti-retroviral Drug Delivery Pouch for Children Born at Home to HIV+ Mothers,” BMES 2011, Hartford, CT
15. **Invited Speaker** Malkin “Donatins Hurt” TEDx Chapel Hill, June, 2011
16. **Invited Speaker** Malkin “Univesity-Based Design for the Developing World: What’s Right, What’s Wrong, What’s Next” Welcome Trust Schools of Excellence Conference June 2011

17. **Invited Speaker** Malkin “Neonatal technologies for resource poor settings” NCIIA Conference, June 2011
18. Gimm, A, Goldberg R, Caves K, Malkin, R Use of simple hands-on design challenges for practicing engineering design principles, ASEE, 2010.
19. Lora Perry, Robert Malkin Biomedical Technician Assistant (BTA) and Biomedical Engineering Technician Training in Rwanda, BMES 2010, Austin, TX
20. Caroline Gamache, Robert Malkin, Daily Liquid Antiretroviral Pouch for PMTCT in Resource-Constrained Settings, BMES 2010, Austin, TX.
21. CM Pultorak, DM Testa, RA Malkin, Low Cost X-Ray Meter for the Developing World to Verify X-Ray Tube Function,” Northeast Biomedical Engineering Conference, 2010
22. M. Garst, RA Malkin, “Curriculum for Biomedical Technicians Assistant,” IET Conference, 2010, London, England
23. C Gamache, RA Malkin, “Local Manufacture and Packaging of NVP for PCTMT of HIV,” IET Conference, 2010, London, England
24. **Invited Chair/Speaker:** RA Malkin, “Social Entrepreneurship and Biomedical Engineering, NC Compact Civic Engagement Conference, 2010.
25. **Invited Speaker,** RA Malkin, “Pathways to Innovation” for the Global Health Technology Conference, Rice University, 2009
26. RA Malkin, A Keane, “Body of Knowledge for the repair of medical equipment in resource poor settings,” BMES 2009.
27. C Gamache, RA Malkin, M Spohn, “On-site packaging of NVP for the prevention of transmission of HIV from mother to child,” BMES 2009.
28. **Invited Speaker,** RA Malkin, “Global Health and Engineering,” The University of Michigan, 2009
29. **Invited Speaker,** RA Malkin, “Engineering World Health,” Illinois Institute of Technology, 2009
30. **Invited Speaker,** RA Malkin, “The Last Lecture,” Crowell Hall, Duke University, 2009.
31. **Invited Speaker,** RA Malkin, “Engineering World Health,” Aalborg University, Denmark, December 15, 2008
32. RA Malkin, M Garst, B Kuruvilla, “Phototherapy for the Developing World,” BMES, St. Louis, October 2008.
33. RA Malkin, “BME Summit – Experiential Learning,” BMES, St. Louis, October 2008.
34. RA Malkin, “Engineering World Health: Lessons Learned from Six Years of Undergraduate Service-Learning in the Developing World,” ASEE, Pittsburgh, June 2008
35. RA Malkin, “Projects that Matter,” NCIIA Conference, Dallas, 2008
36. BS Kelley, DB Dittenber, SR Ayers, RV Gonzalez, JR Goldberg, RA Malkin, “Innovative Biomedical Design Competitions and Scenarios Exploring Underserved Populations” NCIIA Conference, Dallas, 2008
37. RA Malkin, “The Duke CUREs Program,” IET Appropriate Healthcare Technology Conference, London, England, 2008.
38. **Invited Speaker** Robert Malkin “Engineering World Health in the Developing World” Cambridge University, Cambridge, England, 2008
39. **Invited Speaker** Robert Malkin “Engineering World Health in the Developing World” Imperial College, London, 2008
40. **Invited Speaker** Robert Malkin “Engineering World Health in the Developing World” GA Tech Impact Series, 2008
41. Robert Malkin, “Measurement and Data Analysis for Engineering Science” a book review, *IEEE Med. and Biol Mag.*, v26(6) 2007
42. Robert Malkin, “The Next Great Idea,” AIMBE Newsletter, September 2007.
43. Robert Malkin, “Engineering World Health,” AIMBE Newsletter, August 1, 2007.
44. LE Olson, MR Glucksberg, RA Malkin, and M Poluta, Biomedical Engineering Ethics and Standards in the Developing World, *Frontiers in Education*, 2007
45. RA Malkin, “Duke University - Engineering World Health Summer Institute,” BMES 2007.
46. RA Malkin, “Duke-EWH CUREs: A Non-Profit Business Plan Competition,” BMES 2007.
47. **Invited Speaker** Robert Malkin “Biomedical Engineering in the Developing World” AIBME Meeting 2007
48. LG Huettel, J Forbes, L Franzoni, RA Malkin, J Nadeau, G Ybarra, “Transcending the Traditional: Using Tablet PCs to Enhance Engineering and Computer Science Instruction , *Frontiers in Education*, 2007

49. **Invited Speaker** Robert Malkin, "Engineering World Health," IntraHealth lunch-time symposium, 2007.
50. AJ. Potts, DM Testa, RA Malkin. "The Design of a Low Cost Scintillating Detector for a Radiation Meter," Northeast Bioengineering Conference, 2007.
51. RA Malkin, Review of Book: Measurement and Data Analysis for Engineering and Science, for IEEE Eng in Med and Bio, Jany/Feb 2007
52. LG Huettel, J Forbes, L Franzoni, RA Malkin, J Nadeau, G Ybarra, Using Tablet Pcs To Enhance Engineering And Computer Science Education, Workshop on the Impact of Pen-Based Technology on Education, 2007.
53. **Invited Speaker** Robert Malkin, "Obstacles to Design for the Developing World," June 24, 2007 Bioengineering Meeting Plenary Speaker, Keystone, CO.
54. Richard Goldberg, Robert Malkin, "Service Learning at Duke and UNC BME," Service Learning Conference, NC Campus Compact, 2007.
55. **Invited Speaker** Robert Malkin, "Duke Engineering World Health," ACC Meeting on Study Abroad, 2006
56. **Invited Speaker** Robert Malkin, "Duke's Study Abroad for Engineers in the Developing World" URI meeting 2006
57. **Invited Speaker** Robert Malkin, "Duke-Engineering World Health Summer Institute," BMES 2006.
58. **Invited Speaker** Robert Malkin, "Design for the Developing World at Duke University," BMES 2006.
59. B.K. Hoffmeister, A.R. Shores, S. Banerjee, R.A. Malkin. "Magnetically Induced Electric Currents in the Human Body: MRI Scans and Medical Implants," 2006 Gordon Research Conference on Physics Research and Education, Mount Holyoke College, South Hadley, MA June 2006.
60. Book Review Robert Malkin, "Measurement and data Analysis for Engineering and Science by Dunn" Annals of Biomedical Engineering, 2006.
61. Jennifer M. Dolan, Diane Muratore Testa, Robert A. Malkin, Design of a Bilirubin Light Intensity Tester for Developing World Hospitals, Northeast Biomedical Engineering Conference, 2006.
62. Malkin, RA, Design for the Developing World, BMES 2005
63. **Invited Speaker** Malkin, RA Engineering World Health, Tulane Univesity, 2005
64. **Invited Speaker** Malkin, RA Engineering World Health, Ohio State University, February 2005.
65. Hassan Deni1, Diane M. Muratore1, Robert A. Malkin, Development of a Pulse Oximeter Analyzer for the Developing World, northeast regional IEEE-EMBS meeting, 2005.
66. **Invited Speaker** Malkin, RA Engineering World Health, Marquette University, December 2004
67. AR Shores, BK Hoffmeister, S Banerjee, RA Malkin: An Analytical and Numerical Approach to Predicting the Effects of Plastic Implants on Magnetically Induced Currents in the Body Congress of Sigma Pi Sigma, October 15-16, 2004, Albuquerque, NM
68. **Invited Speaker** Malkin, RA Engineering World Health, Rotary Club of San Jose Costa Rica, June 2004.
69. **Invited Speaker** Malkin, RA Tulane University, April 2004.
70. **Invited Speaker** Malkin, RA, University of Rhode Island, October 20, 2003.
71. **Invited Speaker** Malkin, RA, Western New England College, October 22, 2003.
  - A. L. de Jongh Curry, S. C. Marak, T. A. Williams, R.A. Malkin, Y. Sun, Inducibility Of Ventricular Arrhythmias In A Rat Model Of Cardiac Fibrosis, Southern Society of Clinical Engineering, 2003.
72. **Invited Speaker** Malkin, RA, Engineering World Health, Rotary Club of Memphis.
73. Malkin, R. A. , Engineering World Health, A Novel Approach to Teaching a Global Perspective, ASEE Conference 2003.
74. P. Raphisak1, A. de Jongh Curry, R. A. Malkin, S. A. C. Schuckers. Heart Rate Variability in Rats with Aldosterone-Induced Chronic Heart Failure, EMBS Conference, 2003.
75. Marak SC, Curry AL, Malkin RA, Inducibility of Ventricular Arrhythmias in a Chronic Heart Failure Rat Model. BMES Conference, 2003.
76. Hoffmeister BK, Malkin, RA Effect of Electrically Insulating Materials on Magnetically Induced Currents in the Body, BMES Conference, 2003.

77. Martin K, Malkin, RA. Ventricular Fibrillation Induction Following Rapid Pacing Lacks Rotating Wavefronts, BMES Conference 2003.
78. Marak SC, Curry AL, Malkin RA, Cardiac Arrhythmias in a Chronic Heart Failure Rat Model. Research Forum, Univ of Memphis, April 2003.
79. Shivani Patel, Robert A. Malkin , Effect of Electrode Surface Area on Effect and VF Threshold using AC Stimulation, Research Forum, Univ of Memphis, April 2003.
80. J. A. Sexton, R. A. Malkin, B. K. Hoffmeister, Mechanical Response Of The Left Ventricle During AC Induced Hemodynamic Collapse, Nat. Conf. on Undergrad Res. 2003.
81. Malkin, RA. The Engineering World Health Summer Institute: A New Educational Opportunity, IEEE/EMBS Conference, 2002.
82. Sheals B; Chau D; Hoffmeister B, Malkin RA, de Jongh A. Left Ventricular Volume Changes After Defibrillation. IEEE/EMBS Conference, 2002.
83. Sheals B; Chau D; Hoffmeister B, Malkin RA, de Jongh A.. Ventricular Wall Thickness and Volume During Hemodynamic Collapse Produced by AC Leakage Current. IEEE/EMBS Conference, 2002.
84. Guan D, Malkin RA, Multiple Refibrillation Vulnerable Periods Within 180 Milliseconds Of A Monophasic Or Biphasic Shock, Computers in Cardiology conference 2002.
85. Patel S, Malkin RA. The Response Of In Tact Guinea Pigs To AC Leakage Currents, Computers in Cardiology conference 2002.
86. Jacqueline McLaughlin, M.S., Robert Malkin, Inducible Ventricular Tachyarrhythmias in Mice Lacking Very-Long-Chain Acyl-CoA Dehydrogenase, TN BME conference 2002.
87. Benjamin Schnitz, Douglas Guan, Robert Malkin, Design of an Integrated Sensor for In-Vivo Simultaneous Electrocontractile Cardiac Mapping, TN BME conference 2002.
88. Bradford S. Sheals, Amy L. de Jongh, David K. Chau, Brent K. Hoffmeister\*, Robert A. Malkin, "left ventricular volume changes after defibrillation," TN BME conference 2002.
89. Manish Malik, Meera Gopalakrishnan, Robert Malkin, Effect Of 2,3- Butanedione Monoxime (Bdm) On Ventricular Fibrillation, TN BME conference 2002.
90. R. A. Malkin, "Electrifying Duke: A tribute to Theo Pilkington from a student's perspective." BMES 2001, Durham , NC.
91. R. A. Malkin, "Can an RC Membrane Model Predict the Efficacy of a Defibrillation Waveform: An Analysis in 140 Defibrillation Waveforms," Computers in Cardiology, 2001, Rotterdam.
92. A.K. Barros, J.E. McLaughlin, R.A. Malkin, "Extracting The Heart Rate Variability From A Plethysmographic Power Spectrum," Computers in Cardiology, 2001, Rotterdam.
93. M Gopalakrishnan, R. A. Malkin, "Two Dimensional Analysis of Ventricular Fibrillation," TN BME conference 2001
94. C. M. Powell, R. A. Malkin, "Proposition for an Improved Cardiac Defibrillation Model," TN BME conference 2001
95. M. Malik, M. Gopalakrishnan and R. A. Malkin, "Effect of 2,3-Butanedione Monoxime (BDM) on Ventricular Fibrillation," TN BME conference 2001
96. V. Ramanathan, R. A. Malkin, B. K. Hoffmeister, A. L. de Jongh "Noninvasive measurement of left ventricular geometry using one dimensional ultrasound". TN BME conference 2001
97. S Roberts, Dr. R. A. Malkin, " The defibrillation efficacy of waveforms consisting of biphasic and 500 Hz AC components" TN BME conference 2001.
98. J. E. McLaughlin, R. A. Malkin, "The effects of ketamine/xylazine mixture on heart rate and heart rate variability in mice" TN BME conference 2001.
99. B. Schnitz, R. A. Malkin, "Design of an innovative sensor for cardiac mapping," TN BME Conference 2001.
100. J. E. McLaughlin, R. A. Malkin, "The effects of ketamine/xylazine mixture on heart rate and heart rate variability in mice." Southern BME conference, 2001.
101. B. Schnitz, R. A. Malkin, "A self-contained mechano-electric cardiac sensor," Southern BME conference 2001.
102. R. A. Malkin, "Testing defibrillation waveform hypotheses in 140 defibrillation waveforms," Southern BME conference 2001.
103. D. Guan, C. Powell, R. A. Malkin, "Defibrillation Impedance: Including an Inductive Element," Computers in Cardiology, 2000.
104. R. A. Malkin, R. Guinn, "Propofol anesthesia in guinea pigs", TN Biomedical Engineering Conference, 2000.

105. M. Malik, D. Guan, R. A. Malkin, "The Effect of the Defibrillation Waveform on Defibrillation Efficacy," TN Biomedical Engineering Conference, 2000.
106. M. Gopalakrishnan, R. A. Malkin, "Epicardial Waveform formation of ventricular fibrillation in guinea pigs," TN Biomedical Engineering Conference, 2000.
107. **Invited Speaker**, R. A. Malkin "Rapid Pacing and AC stimulation of Cardiac Tissue," Tulane University, Dept. of Biomedical Engineering, March, 2000.
108. D. Thompson, R. A. Malkin, "Integrated Sensing system," Nat. Conf. on Undergraduate Res. Montana, 2000
109. **Invited Speaker**: R. A. Malkin, " CSEE DISTINGUISHED SPEAKER, The ICD and Electrical Engineering," Univ. of West Virginia, 1999.
110. R. Weiss, R. A. Malkin, E. Ostrow, S. Ahmad, L. Gering, V. Gottipaty, J. Hummel, D. Schwartzm and, K. Anderson, "Low Defibrillation Energy Dose (LoDED) Trial: Is a Five-Joule Defibrillation Safety Margin Enough?" AHA Conference, Atlanta, GA, 1999.
111. R.A. Malkin and B. K. Hoffmeister, "The mechanism by which pacing rate affects the upper limit of ventricular vulnerability to fibrillation by T-wave stimulation," BMES/EMBS Conference 1999, Atlanta GA.
112. R.A. Malkin and B. K. Hoffmeister, "AC Leakage Currents Cause Complete Hemodynamic Collapse Below the VF Threshold," Computers in Cardiology, 1999.
113. **Invited Speaker**: R. A. Malkin, "Experimental Tachyarrhythmias in Guinea Pigs," ISCE, Japan, 1999
114. S. R. Smith, B. K. Hoffmeister, R. A. Malkin, The Geometry of the Heart Immediately Following Defibrillation, TN-BME Conference, Nashville TN, April 1999, P2.
115. T. L. LoSicco, R. A. Malkin, Measuring Transmembrane Potential Using Fluorescent Resonant Energy Transfer, TNBME, 1999.
116. M. Neuman, M. Buncick, E. Lindner, D. Lowy, B. Pendley, R. A. Malkin, S. Slack, "Biomedical Sensor development at the Memphis joint program in biomedical engineering," UT Conference on emerging technologies and health care, 1998.
117. R. A. Malkin and B. K. Hoffmeister, "Mechanisms for the increase in the upper limit of vulnerability to fibrillation after rapid pacing," BMES Conference, 1998.
118. JC Eason, NM Gades, W. Ashraf, RA Malkin, "Changes in RV Volume during VF," BMES Conference, 1998.
119. MF Kiani, RA Malkin, VT Turitto, and FA DiBianca, "Bringing biomedical engineering industry & academia together through a regional conference," BMES Conference, 1998.
120. MF Kiani, RA Malkin, VT Turitto, and FA DiBianca, "First Tennessee conference on biomedical engineering: a lesson on bringing industry & academia together," BMES Newsletter.
121. MF Kiani, RA Malkin, VT Turitto, and FA DiBianca, "First Tennessee conference on biomedical engineering: a lesson on bringing industry & academia together," EMBS Magazine.
122. C. Swerdlow, W. Olson, M. Oconnor, M. Laks, R. Malkin, "Alternating current below the ventricular fibrillation threshold causes hemodynamic collapse in humans," AHA, 1998
123. C. Rowan, R Malkin, "Initiation of fibrillation by T-wave stimulation: A model study", Computers in Cardiology, Cleveland, OH, September, 1998, 189-192.
124. T. Losicco, R. Malkin, "Design of an optical FRET system for transmembrane potential measurements," Computers in Cardiology, 1998.
125. H. Li and R. A. Malkin, "A Scalable and Shiftable Bayesian Defibrillation Estimator," *TN BME Conf*, 1998.
126. P. Chen and R. A. Malkin, "A Fast Feature Point Correspondence Algorithm Based on Alpha-Beta-Gamma Filter and Directional Coherence Function," *TN BME Conf*, 1998.
127. W. Hua, J. Eason, and R. A. Malkin, "Model Study of High Spatial Density Electrode Arrays on Cardiac Tissue," *TN BME Conf*, 1998.
128. C. D. Swerdlow, W Olson, M. E. O'Conner, R. A. Malkin, D.M. Gallik, R. Doshi, R. M. Kass, and M. Laks, "Safe Value for 60Hz Leakage Current in Humans," (*NASPE* 1998).
129. J. Eason, R. A. Malkin, and B. Gerber, "In Vivo Measurement of Ventricular Geometry During Fibrillation," Proc of IEEE/EMBS 1997, Chicago, IL.
130. R. A. Malkin, J.N. Eynard, and N. F. Pergola, "Extended Cardiac Tachyarrhythmias in Guinea Pigs," Proc of IEEE/EMBS 1997, Chicago, IL.

131. H. Li and R. A. Malkin, "A Scalable and Shiftable Bayesian Defibrillation Efficacy Estimator," Proc. of IEEE/EMBS, 1997.
132. F. Aguel, N. Trayanova, J. Eason, G. Siekas, M. Fishler, and R. A. Malkin, "Impact of Endocardial Lead Position on Transvenous Defibrillation Efficacy: A Simulation Study," Proc. of Comp. in Card. 1997, Lund, Sweden.
133. R. A. Malkin and H. Li, "A Bayesian Estimator of the Minimum Stimulus Strength to Induce Ventricular Fibrillation," Proc. of Comp. in Card, 1997, Lund, Sweden.
134. E. Entcheva, J. Eason, F. Claydon, and R. A. Malkin, "Spatial Effects from Bipolar Current Injection in 3D Myocardium: Implications for Conductivity Measurements," Proc. of Comp. in Card, 1997, Lund, Sweden.
135. R. C. Bernstein, M. Tenzer, L. J. Raymond, N. J. Stamato, M. A. Wood, K. A. Ellenbogen, L. Baker, S. Szentpetery, J. Rich, J. Onufer, W. DeLacey, R. A. Malkin, and J. M. Herre, "Effects of Shocking Lead Systems on Biphasic Defibrillation Thresholds," Proc. of NASPE, 1996.
136. **Invited Speaker**, R. A. Malkin, "Measuring Defibrillation Dose-Response Curve," DFT Symposium, PhysioControl, May, 1996.
137. R. A. Malkin and E. Entcheva, "The Mechanism of the ULV Dose-Response Curve: A Model Study," *Computers in Cardiology*, 1996.
138. H. Li and R. A. Malkin, "Detecting Myocardial Activation Time by Maximum Likelihood Estimation," *Computers in Cardiology*, 1996.
139. R. A. Malkin and J. Eynard, "The Effect of Transvenous Defibrillation on Current through the Lungs," *International Conference on Electrocardiology*, Cleveland, OH, 1996.
140. **Invited Speaker**, R. A. Malkin, "The Defibrillation Dose-Response Curve," Department of Physiology, Univ. of Tennessee-Memphis, February, 1996.
141. R. A. Malkin, "Biomedical Engineering and the Implantable Ventricular Defibrillator," *BMES Newsletter*, 19(4), 1996, p. 39-42.
142. R. A. Malkin, "The Matched Pairs Defibrillation Efficacy Hypothesis Test," Proceedings of the IEEE/EMBS Conference, 1995, Montreal, Canada.
143. **Invited Speaker**, R. A. Malkin, "Signal Processing and Sudden Cardiac Death," New Jersey Institute of Technology, Biomedical Engineering Seminar Series, April, 1995.
144. R. A. Malkin, "Integration of Student Presentations into Advanced Classes," ASEE - Frontiers in Education Conference, 1995.
145. R. C. Bernstein, L. J. Raymond, J. R. Onufer, N. J. Stamato, M. A. Wood, K. A. Ellenbogen, M. M. Tenzer, R. A. Malkin, J. M. Herre, "Factors Influencing Biphasic ED80 Defibrillation Threshold Determinations," Proceedings of NASPE, 1995.
146. **Invited Speaker**, R. A. Malkin, "Statistical Defibrillation Efficacy Estimation," City College of New York. CMIPS Colloquium, November 1994.
147. S. F. Idriss, R. G. Walker, R. A. Malkin, and R. E. Ideker, "Effect of Rapid Pacing and T-wave Scanning on Upper Limit Defibrillation Estimate." *Am Heart J*, 126, 1994.
148. R. A. Malkin, "Location and Characterization of Myocardial Infarctions Using a Multielectrode, Intracavity Probe," Proceedings of the Computers in Cardiology Conference, 1994.
149. R. A. Malkin, A. T. Compos, L. J. Raymond, and R. C. Bernstein, "A Bayesian Up-Down Estimator of the 80% Effective Defibrillation Dose," *Proceedings of the IEEE/EMBS Conference*, 1994.
150. R. C. Bernstein, L. J. Raymond, J. R. Onufer, L. D. Baker, S. Szentpetery, J. Rich, R. A. Malkin, and J. M. Herre, "Clinical Determination of the 80% Effective Defibrillation Voltage: A New Bayesian Up-Down Protocol for Defibrillation Threshold Testing," *Circulation*, 90(4), p I-653, 1994.
151. R. G. Walker, S. F. Idriss, R. A. Malkin, and R. E. Ideker "Rapid Pacing Moves the Upper Limit of Vulnerability Higher on the Defibrillation Probability of Success Curve," *JACC*, Feb, 1994, p 293.
152. R. G. Walker, S. F. Idriss, R. A. Malkin, and R. E. Ideker, "Comparison of Methods for Determining the Upper Limit of Vulnerability," *Circulation*, 88, 1993, p. 593.
153. R. A. Malkin, S. P. Juhlin, J. E. Penzotti, T. C. Pilkington, and R. Plonsey, "Optimum Detection of Myocardial Infarctions with an Intracavity Probe," Proceedings of Computers in Cardiology, IEEE Comp. Soc. Press, CA, 1993, p 5.
154. S. P. Juhlin, R. A. Malkin, J. E. Penzotti, T. C. Pilkington, and R. Plonsey, "A Generalized Electrocardiographic Spheres Shells Model with Emphasis on the Paced Infarcted Heart," Proceedings of Computers in Cardiology, IEEE Comp. Soc. Press, CA, 1993, p 659.

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155. J. J. Souza, R. A. Malkin, W. M. Smith, R. E. Ideker, "Relationship Between Upper Limit of Vulnerability and Defibrillation Threshold in a Nonthoracotomy Pig Model," *PACE*, 16, 1993, p. 888.
  156. **Invited Speaker**, R. A. Malkin, "Defibrillation Efficacy Estimation," CASE - Western Reserve U. EE/BME Colloquium, April 1993.
  157. **Invited Speaker**, R.A. Malkin, "Accuracy of Combined ULV/DF Step-down Testing," Defibrillation Workshop, Duke U, 1993.
  158. **Invited Speaker**, R. A. Malkin and T.C. Pilkington, "Defibrillation Efficacy Estimation Using Bayesian Estimation Theory," Proc. of ICASSP '93, Minneapolis, MN, April 27-30, 1993, p. 179-183 .
  159. R. A. Malkin, J. J. Souza, and R. E. Ideker, "Accuracy of Defibrillation Efficacy Estimates from Upper Limit of Vulnerability Step-Down Testing," *JACC*, 21, 1993, p 307.
  160. R. A. Malkin and T. C. Pilkington, "Safer Defibrillator Implants Using Upper Limit of Vulnerability Testing," Proc. of AAMI Conference on Cardiovascular Science and Technology, Dec. 12-13, Bethesda, MD, 1992, p 64.
  161. R. A. Malkin and T. C. Pilkington, "A New Defibrillation efficacy Estimator Using Upper Limit of Vulnerability Testing," *Am Heart J*, 124, 1992, p. 832.
  162. J. E. Penzotti, R. A. Malkin, T. C. Pilkington, "A New High Performance Designer of Optimal Defibrillation Experiments," Proc. of Computers in Cardiology, Durham, NC, October, 1992, p. 487-490.
  163. **Invited Speaker**, R. A. Malkin. "Optimum Estimation of the 95% Effective Defibrillation Dose," Defibrillation Workshop, Duke University, 1992.
  164. R. A. Malkin and T. C. Pilkington, "Retrospective Sample Size in Minimum Squared Error Estimates of the 95% Effective Defibrillation Dose," Proc. of Cardiovascular Science and Technology Conference, Bethesda, Maryland, Dec. 2-4 1991, p. 104.
  165. R. A. Malkin, T. C. Pilkington, E. E. Johnson, and R. E. Ideker, "Optimum Bayesian Estimation of the 95% Effective Defibrillation Dose," *Circulation*, 84 (4) (Suppl II), October, 1991, p. II-611.
  166. R. A. Malkin, T. C. Pilkington, E. E. Johnson, and R. E. Ideker, "Optimum Estimation of the 95% Effective Defibrillation Dose," Proc. of IEEE/EMBS Conference, Orlando, Florida, Nov 1-3, 1991, p. 758-759.
  167. R. A. Malkin, T. C. Pilkington, and D. S. Burdick, "Optimal Bayesian Sequential Estimation of Defibrillation Parameters," *Proc. of Cardiovascular Science and Technology: Basic and Applied, II*, Eds J. Norman, R. Whalen, and R. Barbie, Oxymoron Elec. Press, 1990, p. 421-423.
  168. R. A. Malkin, T. C. Pilkington, and D. S. Burdick, "Optimizing Existing Defibrillation Thresholding Techniques," Proc. of IEEE/EMBS Conference, 1990, Philadelphia, PA, Nov. 1-4, 1990, p. 640-641.

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**EXTERNALLY FUNDED GRANTS, AWARDS and GIFTS**

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**Research at The City College of New York**

Sponsor: Ventritex Corporation and the Eastern Virginia Medical School  
Title: Changes in Monophasic and Biphasic Defibrillation  
Thresholds over time in Patients with Epicardial Patch and  
Non-thoracotomy Lead Defibrillation Systems  
Dates: 1994-1995  
PI: Robert Malkin  
Budget Total: \$4,000

Sponsor: Medco Research Incorporated  
Title: The Effect of the Time in VF and Pharmacological  
Intervention on the Probability of Successfully Defibrillating  
Dates: 1995, Extended to 1996  
PI: Robert Malkin and Andrew Wit  
Budget Total: \$46,000

**Research at The University of Memphis**

Sponsor: The National Institutes of Health  
Title: The Rapidly Paced Upper Limit of Vulnerability  
Dates: 1996-1998  
PI: Robert Malkin  
Budget Total: \$96,000  
(Note: Received a 0.7% priority score)

Sponsor: The American Heart Association (Tenn.), Grant-in-Aid  
Title: Tachycardia and the Defibrillation Threshold  
Dates: 1996-1998  
PI: Robert Malkin  
Budget Total: \$69,580

Sponsor: The Assisi Foundation of Memphis  
Title: The Transition to Ventricular Fibrillation in the Human Heart - Student Support  
Dates: 1996-1999  
PI: Vincent Turitto, Initiating-PI: Malkin  
Budget Total: \$75,000

The Baptist Memorial Foundation  
Title: Defibrillation and Ultrasound Measurements of Geometry  
Dates: 1999  
PI: Robert A. Malkin  
Budget Total: \$5,000

Sponsor: Medtronic, Inc.  
Title: Fibrillation and Ventricular Geometry  
Dates: 1998-1999 (extended to 2000)  
PI: Jamey Eason, Co-PI: Robert A. Malkin  
Budget Total: \$30,000

Sponsor: The American Heart Association (National)  
Established Investigator  
Title: Modeling Defibrillation in Rodents, Including Waveform Optimization  
Dates: 1998-2001  
PI: Robert A. Malkin  
Budget Total: \$300,000

**EXTERNALLY FUNDED GRANTS, AWARDS and GIFTS (cont'd)**

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**Research at The University of Memphis (cont'd)**

Sponsor: The National Institutes of Health (R01)  
Title: Mechanism for non-VF pressure collapse  
Dates: 2000-2003  
PI: Robert A. Malkin  
Budget Total: \$350,000

Sponsor: The Whitaker Foundation  
Title: Rapid pacing and the upper limit of vulnerability to ventricular fibrillation.  
Dates: 2001-2004  
PI: Robert A. Malkin.  
Budget Total: \$280,000

Sponsor: The National Institutes of Health (R01 - supplement)  
Title: Reentry Supplement under Mechanism for non-VF pressure collapse  
Dates: 2001-2003  
PI: Robert A. Malkin, Co-PI Amy de Jongh  
Budget Total: \$275,000

**Research at Duke University**

Sponsor: The Whitaker Foundation  
Title: Mechanism for AC Stimulation and VF  
Dates: 2005-2006  
PI: Robert A. Malkin  
Budget Total: \$61,000

Sponsor: Direct Relief International  
Title: BlueRay Safety and Installation Success in Africa  
Dates: 2007-2008  
PI: Robert A. Malkin  
Budget Total: \$1440

Sponsor: The Hope Mission International  
Title: BlueRay Safety and Installation Success in Africa  
Dates: 2007-2009  
PI: Robert A. Malkin  
Budget Total: \$28,860

Sponsor: The National Institutes of Health  
Title: Pratt Pouch to Prevent the Transmission of HIV from mother to child  
Dates: 2010-2011 (extended to 2012)  
PI: John Bartlett  
Budget Total (fraction Malkin PI): \$800,000 (direct, indirect and supplements)

Sponsor: USAID  
Title: Pratt Pouch to Prevent the Transmission of HIV from mother to child  
Dates: 2011-2013, extended 2015  
PI: Robert Malkin  
Budget Total: \$250,000, extended \$250,000

Sponsor: GE Foundation  
Title: BMET Training Measurement and Evaluation  
Dates: 2012-2015  
PI: Robert Malkin  
Budget Total: \$526,696, supplement for \$335,400

Sponsor: USAID  
Title: The Social Entrepreneurship Accelerator at Duke  
Dates: 2012-2017  
PI: Gregg Dees, Matt Nash  
Budget Total: \$10,000,000 (small percentage to Engineering)

**Education at The City College of New York**

Sponsor: The Whitaker Foundation  
Title: CCNY-A National Urban Model for Biomedical Engineering Training  
Dates: 1994-1997  
PI: Sheldon Weinbaum  
Budget Total: \$750,000

Sponsor: The National Science Foundation  
Title: CCNY-Cell and Tissue Engineering Curriculum Development  
Dates: 1995-1998  
PI: Steve Cowin, Robert Malkin, Sheldon Weinbaum  
Budget Total: \$400,000

**EXTERNALLY FUNDED GRANTS, AWARDS and GIFTS (cont'd)**

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**Education at The University of Memphis**

Sponsor: The National Science Foundation (REU)  
Title: Research Experiences for Undergraduates at UofM in Biomedicine  
Dates: 1997-2000  
PI: Richard Warder, Co-PI: Malkin, et al.  
Budget Total: \$300,000

Sponsor: The National Science Foundation (REU)  
Title: Research Experiences for Undergraduates at UofM in Biomedicine Renewal  
Dates: 2000-2003  
PI: Richard Warder, Co-PI: Malkin, et al.  
Budget Total: \$380,000

Sponsor: The National Science Foundation (REU)  
Title: Research Experiences for Undergraduates at UofM in Biomedicine Renewal  
Dates: 2002-2003  
PI: Malkin Co-PI: Richard Warder, et al.  
Budget Total: \$130,000

Sponsor: Engineering World Heath Corporation  
Title – In support of University of Memphis - EWH Summer Institute  
Dates 2002-2003  
PI – Malkin  
Budget Total: \$7,800+

Sponsor: Engineering World Heath Corporation  
Title – In support of University of Memphis - EWH Summer Institute  
Dates 2003-2004  
PI – Malkin  
Budget Total: \$15,600+

**Education at Duke University**

Sponsor: Engineering World Heath Corporation  
Title – Duke - EWH Summer Institute  
Dates 2005-2007  
PI – Malkin  
Budget Total: \$ 389,850

Sponsor: Engineering World Heath Corporation  
Title – Duke - EWH Summer Institute  
Dates 2004-2005  
PI – Malkin  
Budget Total: \$110,000

Sponsor: National Collegiate Inventors and Innovators Alliance  
Title – Design for the Developing World  
Dates: 2005-2006  
PI – Malkin  
Budget Total: \$39,000

Sponsor: Ted Dintersmith (Individual donor)  
Title – Design for the Developing World  
Dates: 2005-2006 with a promise of annual renewal  
PI – Malkin  
Budget Total: \$100,000

Sponsor: The Lord Foundation

Title – Design for the Developing World – Match to Ted Dintersmith  
Dates: 2005-2006  
PI – Malkin  
Budget Total: \$50,000

Sponsor: The Lord Foundation  
Title – Design for the Developing World – Course Development  
Dates: 2005-2006  
PI – Malkin  
Budget Total: \$20,000

Sponsor: The Lord Foundation  
Title – Engineering World Health Summer Institute  
Dates: 2006-2007  
PI – Malkin  
Budget Total: \$15,000

Sponsor: Tom Ebling (Individual donor)  
Title – CUREs: Design for the Developing World  
Dates: 2005-2006  
PI - Malkin  
Budget Total: \$10,000

Sponsor: Jim Anthony (Individual donor)  
Title – CUREs: Design for the Developing World  
Dates: 2005-2006  
PI : Malkin  
Budget Total: \$50,000

Sponsor: National Collegiate Inventors and Innovators Alliance  
Title – CUREs Award Ceremony, E-team award  
Dates: 2005-2008  
PI – Malkin  
Budget Totals: \$4,500, \$15,668

Sponsor: Engineering World Health Corporation  
Title – Duke - EWH Summer Institute  
Dates 2007-2008  
PI – Malkin  
Budget Total: \$ 178,000

Sponsor: Engineering World Health Corporation  
Title – Duke - EWH Summer Institute  
Dates 2008-2013  
PI – Malkin  
Budget Total: \$ 2,100,000

## SERVICE

*National/International*

Standing Member, Stars in Global Health, Grand Challenges Canada, 2013 -  
 American College of Clinical Engineering, Membership committee, 2010-2013  
 Member, WHO Medical Equipment Donation Guidelines Review Committee, 2009-  
 Expert, WHO Expert Advisory Meeting on Health Technology and Infrastructure, 2009-  
 Reviewer of Grants, NCIIA 2004-  
 Reviewer of Grants, Wellcome Trust, 2008, 2010, 2011  
 Chair of Translational Research for Global Health, BMES 2008  
 Chair of Experiential Learning at BME Educational Summit, Chicago, 2008  
 Representative for the International Federation of Medical and Biological Engineering to WHO, 2007  
 Medical Equipment Training Program Review Panel, 2003 Honduras, 2006 Ghana, 2007 Indonesia  
 Member, Health Technology and Training Task Group (HTTTG) of the IUPESM 2006-  
 Advisory Board, Biomedical Engineering Series, Cambridge University Press, 2005-  
 AAMI, Voting Member, Standards for Electrical Safety Committee, 2000-2010  
 IEEE Advancement and Admissions Committee, Senior Membership Advancement, 2006  
 BMES Conference Session Chair (Bioengineering and Global Health), 2006  
 BMES Conference, Session Chair (Design Education), 2005,2006  
 AHA Study Section in bioengineering 2005-2006  
 International Engineering Education, Session Chair (Developing World), 2004  
 IEEE/EMBS Conference, Session Chair (Biomed and Education), 2002  
 IEEE/EMBS Conference, Session Chair (Arrhythmias and Reentry), 2002  
 Computers in Cardiology 2002 in Memphis, overall Conference Chairman 2002  
 Computers in Cardiology Conference, Session Chair (Plenary), 2002  
 Computers in Cardiology Conference, Session Chair (Activation), 2001  
 Annual Reviews of Biomedical Engineering, Guest Editorial Board Member, 2001  
 Computers in Cardiology, Abstract Review Committee, 2001, 2002  
 IEEE Engineering in Medicine and Biology Society Education Committee: 1995-2004  
 Computers in Cardiology Conference, Session Chair (Fibrillation), 1999  
 Computers in Cardiology Conference, Session Chair (Cellular Models), 1997  
 International Conference on Fetal and Neonatal Sensors, Session Chair, 1997

*Regional*

Chair of Session at North Carolina Campus Compact, 2010  
 Board of Directors, Beth Meyer Synagogue 2006-  
 Board of Directors, Beth Shalom Synagogue 2003-2004  
 Tennessee Biomedical Engineering Conference, Session Chair (Instrumentation) , 2000  
 IEEE/EMBS Chairman , Memphis Section 1996-1999  
 IEEE/EMBS New York 1998 Conference Pre-committee 1995  
 Tennessee Biomedical Engineering Conference Committee- 1997-99  
 Tennessee Biomedical Engineering Conference, Session Chair (EM and Body) , 1998  
 Tennessee Biomedical Engineering Conference, Session Chair (Interview Workshop) , 1998

*University*

Global Education Committee: 2013-  
 Robertson Scholars Program: Candidate Admissions Interviewer – 2012  
 Duke Global Health Institute Curriculum Committee – 2011 -  
 Winter Forum 2011 Planning Committee, 2009-2010  
 Duke School of Nursing Global and Community Health Advisory Committee 2009-2011  
 Global Health Certificate Advisory Board, 2009-  
 Graduate Curriculum Committee for Global Health Institute, 2007-2011  
 Executive Committee of the Duke Global Health Institute 2007-2015  
 Duke-Global Health Plus – surplus equipment committee 2007- 2011  
 Member, Duke Global Health Institute 2007-  
 Global Health – Education subcommittee – 2005  
 Global Health – Delivery Arm – 2005  
 Global Health – Education/Internship sub-subcommittee Chair - 2005  
 Faculty Retention and Recruitment, BOV advisory committee, 2002  
 Eminent Faculty Member, nominating committee: UM 2000, 2001, 2002  
 Reviewer for FRG internal grants: UM 1998-1999

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Patents and Intellectual Property committee: UM 1999-2004  
Faculty Senate: UM 1999-2000  
IACUC: UM 1999-2004

*Engineering College/School*

Duke National Academy of Engineering Grand Challenge Scholars - 2009-  
Strategic Planning Committee – Outreach and Visibility Subcommittee 2005  
Engineering College Newsletter Committee 2004  
Engineering College's Award's Committee 2001-2004  
Chairman, Search Committee for Chairman, Biomedical Engineering, 2000-2001  
Engineering College's Tenure and Promotion Committee: UM 2000-2001  
Engineering College's Computer Committee: UM 1995-2001  
Engineering College's Technical Services Committee: UM 1996-1997  
Executive Committee of the Center for Biomedical Engineering: CCNY 1995

*Department*

Member of Curriculum Committee: 2014-  
Associate Director of Undergraduate Studies, 2013-2014  
Member of Search Committee (Global Health in BME), 2010-  
Chair of Tenure and Promotions Committee, 2003  
Joint Program Curriculum committee 2001-2004  
Joint Program 3/2 committee 2000-2002  
Joint Program Math committee 2000-2002  
Joint Program Seminar Committee 2000-2002  
Joint Program recruiting committee 2000-2002  
Biomedical Engineering Departments Tenure and Promotion Committee: UM 1999-2001  
Joint Program BME Exam Committee: UM 1998-2001  
Biomedical Engineering Departments Faculty Search Committee: UM 1995-97,98,00,02  
Biomedical Engineering Departments Seminar Committee: UM/UT 1996-2001  
Electrical Engineering department's graduate admissions Committee: CCNY 1994-1995  
Electrical Engineering department's curriculum Committee: CCNY 1993-1995  
Center for Biomedical engineering Undergraduate curriculum: CCNY 1993-1995  
Center for Biomedical engineering Graduate curriculum Committee: CCNY 1994-1995.  
Electrical Engineering Laboratory Oversight Committee: CCNY 1994-1995  
Ph.D. qualifying exam review committee: CCNY 1994

**PROFESSIONAL MEMBERSHIPS**

Member, Am College of Clinical Engineers, 2008-  
Senior Member IEEE - Engineering in Medicine and Biology Society (IEEE/EMBS) 1998-  
Member: IEEE - Engineering in Medicine and Biology Society (IEEE/EMBS) 1987-1998  
Biomedical Engineering Society (BMES) 1994-  
American Society of Engineering Educators 1994-  
Tennessee Medical and Biological Instrumentation Association (TMBIA) 1996-2004  
International Society of Electrophysiology 1996-2004  
Cardiac Muscle Society 1999-2004

## City College Course Evaluation Summary

Semester	Course No.	Response	Q#10.*
S94	ELEC 241	11	3.73
F94	ELEC 424	4	5.00
F94	ELEC 241	28	4.21

\*Q10: Compared to other instructors I have had at CCNY, this instructor has been (1) one of the worst (2) worse than average, (3) average, (4) better than average, (5) one of the best

## University of Memphis Course Evaluation Summary

Semester	Course No.	Course Name	Percent Taught	Resp./ Enrolled	New Prep	Q#26*.	Q#26 Dept.	Q#26 College
F95	BIOM 7/8209	Biom. Instrum.	100%	9/11	Y	2.111	1.746	1.203
S96	BIOM 7/8110	Biostats	30%	10/12	Y	1.800	1.466	1.695
F96	BIOM 7/8209	Biom. Instrum	100%	20/30	N	2.167	2.000	1.803
S97	BIOM 7/8915	Adv. Card. EP	80%	4/4	Y	2.000	1.588	1.775
S98	BIOM 7/8909	Bioelectricity	100%	2/3	Y	1.500	1.746	1.822
F98	BIOM 7/8215	Adv. Card EP	80%	3/4	N	1.250	1.740	1.737
S99	BIOM 7/8909	Bioelectricity	100%	5/5	N	1.200	1.873	1.818
S00	BIOM 7/8203	Bioelectricity	100%	2/2	N	1.000	2.389	1.829
F00	BIOM 7/8215	Adv Card EP	80%	3/2	N	1.333	2.306	1.794
S01	BIOM 7/8203	Bioelectricity	90%	5/6	N	1.400	1.641	1.781
F01	BIOM 7/8220	Adv Instrum	100%	5/5	Y	1.200	2.054	1.801
S03	BIOM 7/8203	Bioelectricity	50%	7/10	N	1.000	2.208	1.653
F03	BIOM7/8209	Biom Instrum	100%	15	N	2.12		1.79

\*Q26: In general, the instructor was an effective teacher (1) strongly agree, (2) agree, (3) neutral, (4) disagree, (5) strongly disagree.

## Duke University Course Evaluation Summary

Semester	Course No.	Course Name	Percent Taught	Resp./ Enrolled	New Prep	Required Course	Course Quality.*	Instructor Quality *
F04	BME 154	Biom. Instrum.	100%	22/26	Y	Y	3.64	3.77
S05	BME154	Biom. Instrum	100%	19/19	N	Y	3.53	3.68
S05	BME265.07	Design Develop Wrld	100%	7/7	Y	N	4.14	4.00
F05	BME153	Intro to Medical Circuits	100%	15/22	Y	Y	3.73	3.40
F05	BME154	Biom. Instrum	100%	10/10	N	Y	4.00	4.20
S06	BME154	Biom. Instrum	100%	36/36	N	Y	3.58	3.17
S06	BME265.01/02	Design Develop Wrld	100%	14/14	N	N	4.36	3.89
F06	BME154	Biom. Instrum	100%	14/27	N	Y	3.64	3.46
F06	BME261/262	Design Develop Wrld	100%	9/10	N	N	4.9	4.9
S07	BME154	Biom. Instrum	100%	31/44	N	Y	3.48	3.26
S07	BME261/262	Design Develop Wrld	100%	20/26	N	N	4.6	4.6
F07	BME153	Intro to Med Circuits	100%	30/38	N	Y	3.57	3.23
F07	BME261/262	Design Develop Wrld	100%	15/16	N	N	4.62	3.79
S08	BME154	Biom Instrum	100%	/45	N	Y	4.09	4.42
S08	BME261/262	Design Develop Wrld	100%	/18	N	N	4.15	4.58
F08	BME154	Biom Instrum	100%	/48	N	Y	3.96	4.08
F08	BME261/262	Design Develop Wrld	100%	/18	N	N	4.13	4.20
S09	BME154	Biom Instrum	100%	27/48	N	Y	4.18	4.32
S09	BME261/262	Design Develop Wrld	100%	17/18	N	N	4.65	4.59
F09	BME154	Biom Instrum	100%	17/33	N	Y	4.69	4.81
F09	BME261/262	Design Develop Wrld	100%	13/15	N	N	4.69	4.92
S10	BME262	Design Develop Wrld	100%	10/18	N	N	4.60	4.80
S10	BME154	Biom Instrum	100%	34/46	N	Y	4.44	4.53
F10	BME262	Design Develop Wrld	100%	13/15	N	N	4.85	4.77
F10	BME154	Biom Instrum	100%	16/30	N	Y	4.21	4.60
S11	BME154	Biom Instrum	100%	27/30	N	Y	4.37	4.52
S11	BME262	Design Develop Wrld	100%	11/17	N	N	4.45	4.45
F11	BME262	Design Develop Wrld	100%	8/15	N	N	4.75	4.75
F11	BME165	Med Inst in Devlp Wrld	100%	11/18	Y	N	4.00	4.70
S12	BME265	Intelligent Sensors	100%	13/18	Y	N	3.92	4.23
S12	BME262	Design Develop Wrld	100%	13/18	N	N	4.69	4.85
F12	BME262	Design Develop Wrld	100%	11/15	N	N	4.73	4.82
F12	BME154	Biom Instrum	100%	26/35	N	Y	4.31	4.58
S13	BME154	Biom Instrum	100%	47/65	N	Y	4.30	4.53
S13	BME462	Design Develop Wrld	100%	17/17	N	N	4.47	4.71
F13	BME462	Design Develop Wrld	100%	16/18	N	N	4.57	4.71
F13	BME290	Med Inst in Devlp Wrld	100%	13/14	N	N	4.62	4.85
S14	BME354	Intro to Biom Instrum	100%	49/58	N	Y	3.76	3.92
S14	BME462	Design Develop Wrld	100%	15/18	N	N	4.20	4.67
F14	BME195FS	Intro Med Inst FOCUS	100%	16/16	Y	N	4.75	4.63
F14	BME462	Design Develop Wrld	100%	17/18	N	N	4.59	4.69
S15	BME354	Intro to Biom instrum	100%	27/43	N	Y	3.63	3.63
S15	BME462	Design Develop Wrld	100%	14/17	N	N	4.43	4.50
F15	BME462	Design Develop Wrld	100%	15/18	N	N	4.13	4.60
F15	BME195FS	Intro Med Inst	100%	16/17	N	N	4.06	4.19

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		FOCUS						
S16	BME354	Intro to Biom Instrum	100%	29/51	N	Y	3.62	3.76
S16	BME462	Design Develop Wrld	100%	5/16	N	N	4.40	4.40

\*Departmental Average Course Quality and Instructor Quality are 3.80 (New forms: Increased to 4.118 and 4.286 in Fall 2013)

**Appendix A****Additional Information on Teaching**

## New Summer Institute

Created Engineering World Health Summer Institute to train engineers for volunteer work in developing countries. first program of its kind in the world.

## New Program

Initiated accelerated degree program with Rhodes College and University of Memphis.

## New Course

Introduced the first advanced instrumentation course at the University of Memphis and the University of Tennessee-Memphis.

## New Course

Introduced the first course in advanced cardiac electrophysiology at the University of Memphis and the University of Tennessee-Memphis.

## Update Course

Responsible for updating Instrumentation course with virtual instrumentation material, student project, and computerized data acquisition.

## New Journal Club

Implemented first electrophysiology journal club upon arrival at UM. Successfully integrated UM and UT-Memphis faculty and students into club.

## New WWW Pages

Implemented world wide web site for the exchange of information between students in electrophysiology track at the University of Memphis.

## New Course

Introduced the first course in biomedical signal processing at CCNY for both ME and EE undergraduates.

## New Curriculum

Responsible for the biomedical engineering curriculum for the Electrical Engineering department - CCNY.

## New Consortium

Participated in the foundation of the Center for Biomedical Engineering at CCNY, funded by a Whitaker Special Opportunity award. Principle Electrical Engineering contact for curriculum, co-op positions and laboratory opportunities.

## New Teaching Evaluation System

Implemented a new department wide voluntary evaluation system. The evaluation forms were designed to allow the professor to improve his teaching skills and course materials. Student reaction has been positive.