

# Stanford

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## Gregory Kovacs

Professor of Electrical Engineering, Emeritus

### Bio

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#### BIO

Professor Kovacs' research areas include the development of non-invasive instruments for cardiovascular medicine; sensors for prediction of epileptic seizures; cell-based systems for drug discovery and testing of stem-cell cardiac therapies; titration of medical care via embedded systems; and remote delivery of laboratory electronics education. He teaches hands-on undergraduate courses in analog circuit design and medical instrument design. He is led the initial development of the Bioengineering graduate core curriculum sequence. He has extensive industry experience, including the co-founding of Cepheid, which has shipped more than 25 million DNA diagnostic assays. He has a long history of government service for DARPA, NASA and other agencies. In 2003 he was the Investigation Scientist for the debris team investigating the loss of the space shuttle Columbia and was Director of the Microsystems Technology Office at DARPA from 2008 through 2010.

#### ACADEMIC APPOINTMENTS

- Professor Emeritus, Electrical Engineering
- Member, Wu Tsai Neurosciences Institute

#### HONORS AND AWARDS

- Young Investigator (NYI) Award, National Science Foundation (1993)
- Undergraduate Summer Research Award, Natural Sciences and Engineering Research Council of Canada (1982, 1983)
- Hector MacLeod Scholarship in Electrical Engineering, University of British Columbia (1984)
- Peter J. Gingrass, M.D., Memorial Award, Plastic Surgery Research Council (1990)
- Robert N. Noyce Family Faculty Scholar Chair, Stanford (1992-1994)
- Terman Fellow, Stanford (1994-1997)
- University Fellow, Stanford (1996-1998)
- Fellow National, Explorer's Club (2001)
- Fellow, American Institute for Medical and Biological Engineering (2003)
- Group Achievement Award for Columbia Accident Investigation, NASA (2003)
- Thomas V. Jones Faculty Development Scholar, Thomas V. Jones (2003 - 2005)
- Fellow, IEEE (2008)
- Group Achievement Award for Columbia Investigation Medical Forensics, NASA (2008)
- Secretary of Defense Medal for Exceptional Public Service, Department of Defense (2010)

#### PROFESSIONAL EDUCATION

- M.D., Stanford, Medicine (1992)

- Ph.D., Stanford , Electrical Engineering (1990)
- M.S., U.C. Berkeley , Bioengineering (1985)
- B.A.Sc., University of British Columbia , Electrical Engineering (1984)

## LINKS

- <http://www.stanford.edu/group/kovacslab/cgi-bin/>: <http://www.stanford.edu/group/kovacslab/cgi-bin/>

## Research & Scholarship

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### CURRENT RESEARCH AND SCHOLARLY INTERESTS

Kovacs is a long-standing member of the Defense Sciences Research Council (DARPA), and has served as Associate Chair and Chairman. He also has extensive industry experience including co-founding several companies, including Cepheid in Sunnyvale, CA.

His present research areas include biomedical instruments and sensors, miniaturized spaceflight hardware, and biotechnology. He is the Director of Medical Device Technologies for the Astrobionics Program at the NASA Ames Research Center, and Principal Investigator of the Stanford-NASA National Center for Space Biological Technologies. He helps direct a variety of projects spanning wearable physiologic monitors, biosensor instruments for detection of chemical and biological warfare agents and space biology applications, and free-flyer experiment payloads.

In 2003, he served as the Investigation Scientist for the debris team of the Columbia Accident Investigation Board, having worked for the first four months after the accident at the Kennedy Space Center, Florida. In this role, he carried out physical, photographic, x-ray, chemical and other analyses on selected items from the nearly 90,000 pounds of recovered debris and worked toward understanding the nature of the accident. He currently serves as Engineering/Medical Liason on the Spacecraft Crew Survival Integration Investigation Team (SCSIIT) of the Johnson Space Center.

He is a Fellow of the American Institute for Medical and Biological Engineering. Kovacs is a private pilot, scuba diver, and a Fellow National of the Explorers Club. He was a member of a NASA and National Geographic Society sponsored team that climbed Licancabur volcano (19,734 ft.) on the Chile/Bolivia border in November of 2003, serving as medical, physiologic research, and photography lead. In November of 2004, he served the same role on a return expedition to Licancabur, and carried out medical research and underwater videography in the summit lake.

## Teaching

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### COURSES

2016-17

- Analog Circuits Laboratory: EE 122A (Aut)

### STANFORD ADVISEES

#### Doctoral Dissertation Advisor (AC)

Corey McCall, Nathan Volman

#### Doctoral (Program)

Sarah Divel, Corey McCall, Nathan Volman

## Publications

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### PUBLICATIONS

- **Characterisation of electrophysiological conduction in cardiomyocyte co-cultures using co-occurrence analysis** *COMPUTER METHODS IN BIOMECHANICS AND BIOMEDICAL ENGINEERING*  
Chen, M. Q., Wong, J., Kuhl, E., Giovangrandi, L., Kovacs, G. T.  
2013; 16 (2): 185-197
- **Microfluidic impedance cytometer for platelet analysis** *LAB ON A CHIP*  
Evander, M., Ricco, A. J., Morser, J., Kovacs, G. T., Leung, L. L., Giovangrandi, L.  
2013; 13 (4): 722-729
- **Extracting respiratory information from seismocardiogram signals acquired on the chest using a miniature accelerometer** *PHYSIOLOGICAL MEASUREMENT*  
Pandía, K., Inan, O. T., Kovacs, G. T., Giovangrandi, L.  
2012; 33 (10): 1643-1660
- **Noninvasive Measurement of Physiological Signals on a Modified Home Bathroom Scale** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*  
Inan, O. T., Park, D., Giovangrandi, L., Kovacs, G. T.  
2012; 59 (8): 2137-2143
- **Noninvasive measurement of physiological signals on a modified home bathroom scale.** *IEEE transactions on bio-medical engineering*  
Inan, O. T., Dookun Park, Giovangrandi, L., Kovacs, G. T.  
2012; 59 (8): 2137-2143
- **High-Frequency Electrical Stimulation of Cardiac Cells and Application to Artifact Reduction** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*  
Dura, B., Chen, M. Q., Inan, O. T., Kovacs, G. T., Giovangrandi, L.  
2012; 59 (5): 1381-1390
- **Spatiotemporally Controlled Cardiac Conduction Block Using High-Frequency Electrical Stimulation** *PLOS ONE*  
Dura, B., Kovacs, G. T., Giovangrandi, L.  
2012; 7 (4)
- **Preliminary Results from BCG and ECG Measurements in the Heart Failure Clinic** *34th Annual International Conference of the IEEE Engineering-in-Medicine-and-Biology-Society (EMBS)*  
Giovangrandi, L., Inan, O. T., Banerjee, D., Kovacs, G. T.  
IEEE.2012: 3780–3783
- **Microfluidic platelet analysis platform based on impedance spectroscopy**  
Evander, M., Ricco, A. J., Morser, J., Kovacs, G. T. A., Leung, L. L., K., Giovangrandi, L.  
2012
- **Determination of low bacterial concentrations in hyperarid Atacama soils: comparison of biochemical and microscopy methods with real-time quantitative PCR** *CANADIAN JOURNAL OF MICROBIOLOGY*  
Fletcher, L. E., Conley, C. A., Valdivia-Silva, J. E., Perez-Montano, S., Condori-Apaza, R., Kovacs, G. T., Glavin, D. P., Mckay, C. P.  
2011; 57 (11): 953-963
- **Rapid Assessment of Cardiac Contractility on a Home Bathroom Scale** *IEEE TRANSACTIONS ON INFORMATION TECHNOLOGY IN BIOMEDICINE*  
Etemadi, M., Inan, O. T., Giovangrandi, L., Kovacs, G. T.  
2011; 15 (6): 864-869
- **A portable system for monitoring the behavioral activity of Drosophila** *JOURNAL OF NEUROSCIENCE METHODS*  
Inan, O. T., Marcu, O., Sanchez, M. E., Bhattacharya, S., Kovacs, G. T.  
2011; 202 (1): 45-52
- **Automatic detection of motion artifacts in the ballistocardiogram measured on a modified bathroom scale** *MEDICAL & BIOLOGICAL ENGINEERING & COMPUTING*  
Wiard, R. M., Inan, O. T., Argyres, B., Etemadi, M., Kovacs, G. T., Giovangrandi, L.  
2011; 49 (2): 213-220

- **Multi-Signal Electromechanical Cardiovascular Monitoring on a Modified Home Bathroom Scale** *33rd Annual International Conference of the IEEE Engineering-in-Medicine-and-Biology-Society (EMBS)*  
Inan, O. T., Park, D., Kovacs, G. T., Giovangrandi, L.  
IEEE.2011: 2472–2475
- **Ballistocardiography – A method worth revisiting**  
Giovangrandi, L., Inan, O., T., Wiard, R., M., Etemadi, M., Kovacs, G., T. A.  
2011
- **Ballistocardiography - A Method Worth Revisiting** *33rd Annual International Conference of the IEEE Engineering-in-Medicine-and-Biology-Society (EMBS)*  
Giovangrandi, L., Inan, O. T., Wiard, R. M., Etemadi, M., Kovacs, G. T.  
IEEE.2011: 4279–4282
- **Evaluating the Lower-Body Electromyogram Signal Acquired From the Feet As a Noise Reference for Standing Ballistocardiogram Measurements** *IEEE TRANSACTIONS ON INFORMATION TECHNOLOGY IN BIOMEDICINE*  
Inan, O. T., Kovacs, G. T., Giovangrandi, L.  
2010; 14 (5): 1188-1196
- **A Device for Separated and Reversible Co-Culture of Cardiomyocytes** *BIOTECHNOLOGY PROGRESS*  
Chen, M. Q., Whittington, R. H., Day, P. W., Kobilka, B. K., Giovangrandi, L., Kovacs, G. T.  
2010; 26 (4): 1164-1171
- **A low-noise ac-bridge amplifier for ballistocardiogram measurement on an electronic weighing scale** *PHYSIOLOGICAL MEASUREMENT*  
Inan, O. T., Kovacs, G. T.  
2010; 31 (7): N51-N59
- **Thermally Actuated Omnidirectional Walking Microrobot** *JOURNAL OF MICROELECTROMECHANICAL SYSTEMS*  
Erdem, E. Y., Chen, Y., Mohebbi, M., Suh, J. W., Kovacs, G. T., Darling, R. B., Boehringer, K. F.  
2010; 19 (3): 433-442
- **An 11  $\mu$ W, Two-Electrode Transimpedance Biosignal Amplifier With Active Current Feedback Stabilization** *IEEE TRANSACTIONS ON BIOMEDICAL CIRCUITS AND SYSTEMS*  
Inan, O. T., Kovacs, G. T.  
2010; 4 (2): 93-100
- **Adaptive Cancellation of Floor Vibrations in Standing Ballistocardiogram Measurements Using a Seismic Sensor as a Noise Reference** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*  
Inan, O. T., Etemadi, M., Widrow, B., Kovacs, G. T.  
2010; 57 (3): 722-727
- **Physical Modeling of Low-Frequency Sound Propagation through Human Thoracic Tissue** *32nd Annual International Conference of the IEEE Engineering-in-Medicine-and-Biology-Society (EMBC 10)*  
Pandia, K., Vijayraghavan, K., Kovacs, G. T., Giovangrandi, L.  
IEEE.2010: 2455–2458
- **Signal Improvement by Dielectric Focusing in Microfluidic Impedance Cytometers**  
Evander, M., Dura, B., Ricco, A., J., Kovacs, G., T. A., Giovangrandi, L.  
2010
- **Chest-Accelerometry for Hemodynamic Trending During Valsalva-Recovery**  
Pandia, K., Ravindran, S., Kovacs, G., T. A., Giovangrandi, L., Cole, R.  
2010
- **Motion artifact cancelation to obtain heart sounds from a single chest-worn accelerometer**  
Pandia, K., Vijayraghavan, K., Kovacs, G., T. A., Giovangrandi, L.  
2010
- **Current-Controlled Electrical Point-Source Stimulation of Embryonic Stem Cells** *CELLULAR AND MOLECULAR BIOENGINEERING*  
Chen, M. Q., Xie, X., Wilson, K. D., Sun, N., Wu, J. C., Giovangrandi, L., Kovacs, G. T.  
2009; 2 (4): 625-635

- **Signal-to-Noise Ratio in Doppler Radar System for Heart and Respiratory Rate Measurements** *IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES*  
Droitcour, A. D., Boric-Lubecke, O., Kovacs, G. T.  
2009; 57 (10): 2498-2507
- **Evolving Point-of-Care Diagnostics Using Up-Converting Phosphor Bioanalytical Systems** *ANALYTICAL CHEMISTRY*  
Ouellette, A. L., Li, J. J., Cooper, D. E., Ricco, A. J., Kovacs, G. T.  
2009; 81 (9): 3216-3221
- **Non-invasive cardiac output trending during exercise recovery on a bathroom-scale-based ballistocardiograph** *PHYSIOLOGICAL MEASUREMENT*  
Inan, O. T., Etemadi, M., Paloma, A., Giovangrandi, L., Kovacs, G. T.  
2009; 30 (3): 261-274
- **A Miniaturized Video System for Monitoring the Locomotor Activity of Walking *Drosophila Melanogaster* in Space and Terrestrial Settings** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*  
Inan, O. T., Etemadi, M., Sanchez, M. E., Marcu, O., Bhattacharya, S., Kovacs, G. T.  
2009; 56 (2): 522-524
- **Robust ballistocardiogram acquisition for home monitoring** *PHYSIOLOGICAL MEASUREMENT*  
Inan, O. T., Etemadi, M., Wiard, R. M., Giovangrandi, L., Kovacs, G. T.  
2009; 30 (2): 169-185
- **Conduction Analysis in Mixed Cardiomyocytes-Fibroblasts Cultures using Microelectrode Arrays** *Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*  
Roy, S., Chen, M. Q., Kovacs, G. T., Giovangrandi, L.  
IEEE.2009: 4250-4253
- **Modeling Conduction in Host-Graft Interactions Between Stem Cell Grafts and Cardiomyocytes** *Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*  
Chen, M. Q., Yu, J., Whittington, R. H., Wu, J. C., Kovacs, G. T., Giovangrandi, L.  
IEEE.2009: 6014-6017
- **Estimation of Central Aortic Forces in the Ballistocardiogram under Rest and Exercise Conditions** *Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*  
Wiard, R. M., Kim, H. J., Figueroa, C. A., Kovacs, G. T., Taylor, C. A., Giovangrandi, L.  
IEEE.2009: 2831-2834
- **Non-Invasive Assessment of Cardiac Contractility on a Weighing Scale** *Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*  
Etemadi, M., Man, O. T., Wiard, R. M., Kovacs, G. T., Giovangrandi, L.  
IEEE.2009: 6773-6776
- **Novel Methods for Estimating the Ballistocardiogram Signal Using a Simultaneously Acquired Electrocardiogram** *Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*  
Inan, O. T., Etemadi, M., Wiard, R. M., Kovacs, G. T., Giovangrandi, L.  
IEEE.2009: 5344-5347
- **Optical scanner for immunoassays with up-converting phosphorescent labels** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*  
Li, J. J., Ouellette, A. L., Giovangrandi, L., Cooper, D. E., Ricco, A. J., Kovacs, G. T.  
2008; 55 (5): 1560-1571
- **Non-invasive Measurement of Valsalva-induced Hemodynamic Changes on a Bathroom Scale Ballistocardiograph** *30th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*  
Inan, O. T., Etemadi, M., Wiard, R. M., Kovacs, G. T., Giovangrandi, L.  
IEEE.2008: 674-677
- **Point-Source Electrical Stimulation of Embryonic Stem Cells for Cardiac Repair**  
Chen, M., Q., Xie, X., Kovacs, G., T. A., Wu, J., C., Giovangrandi, L.  
2008

- **High electromechanical performance of electroelastomers based on interpenetrating polymer networks** *Conference on Electroactive Polymer Actuators and Devices (EAPAD 2008)*  
Ha, S. M., Park, I. S., Wissler, M., Pelrine, R., Stanford, S., Kim, K. J., Kovacs, G., Pei, Q.  
SPIE-INT SOC OPTICAL ENGINEERING.2008
- **Evaluating the foot electromyogram signal as a noise reference for a bathroom scale ballistocardiogram recorder** *21st IEEE International Symposium on Computer-Based Medical Systems*  
Inan, O. T., Etemadi, M., Wiard, R. M., Giovangrandi, L., Kovacs, G. T.  
IEEE COMPUTER SOC.2008: 70–74
- **Cardiac Differentiation of Embryonic Stem Cells with Point-Source Electrical Stimulation** *30th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*  
Chen, M. Q., Xie, X., Whittington, R. H., Kovacs, G. T., Wu, J. C., Giovangrandi, L.  
IEEE.2008: 1729–1732
- **A discrete-time control algorithm applied to closed-loop pacing of HL-1 cardiomyocytes** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*  
Whittington, R. H., Kovacs, G. T.  
2008; 55 (1): 21-30
- **Robust neural-network-based classification of premature ventricular contractions using wavelet transform and timing interval features** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*  
Inan, O. T., Giovangrandi, L., Kovacs, G. T.  
2006; 53 (12): 2507-2515
- **Low-cost microelectrode array with integrated heater for extracellular recording of cardiomyocyte cultures using commercial flexible printed circuit technology** *SENSORS AND ACTUATORS B-CHEMICAL*  
Giovangrandi, L., Gilchrist, K. H., Whittington, R. H., Kovacs, G. T.  
2006; 113 (1): 545-554
- **Temporal resolution of stimulation threshold: a tool for electrophysiologic analysis.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Conference*  
Whittington, R. H., Chen, M. Q., Giovangrandi, L., Kovacs, G. T.  
2006; 1: 3891-3894
- **Micro and Nanoscale Education at Stanford University**  
Barlian, A., A., Howe, R., T, Kovacs, G., T. A., Pruitt, B., L.  
2006
- **Modeling and Control of a 3-Degree of Freedom Walking Microrobot**  
Chen, Y., M., Suh, J., W., Kovacs, G., T. A., Darling, R., B., Böhringer, K., F.  
2006
- **Temporal resolution of stimulation threshold: A tool for electrophysiologic analysis** *28th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*  
Whittington, R. H., Chen, M. Q., Giovangrandi, L., Kovacs, G. T.  
IEEE.2006: 813–816
- **A multiparameter wearable physiologic monitoring system for space and terrestrial applications** *International Workshop on New Generation of Smart Wearable Health Systems and Applications*  
Mundt, C. W., Montgomery, K. N., Udoh, U. E., Barker, V. N., Thonier, G. C., Tellier, A. M., Ricks, R. D., Darling, R. B., Cagle, Y. D., Cabrol, N. A., Ruoss, S. J., Swain, J. L., Hines, et al  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2005: 382–91
- **A closed-loop electrical stimulation system for cardiac cell cultures** *IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING*  
Whittington, R. H., Giovangrandi, L., Kovacs, G. T.  
2005; 52 (7): 1261-1270
- **A microfluidic shadow imaging system for the study of the nematode *Caenorhabditis elegans* in space** *SENSORS AND ACTUATORS B-CHEMICAL*  
Lange, D., Storment, C. W., Conley, C. A., Kovacs, G. T.  
2005; 107 (2): 904-914

- **Sensitivity of cell-based biosensors to environmental variables** *BIOSENSORS & BIOELECTRONICS*  
Gilchrist, K. H., Giovangrandi, L., Whittington, R. H., Kovacs, G. T.  
2005; 20 (7): 1397-1406
- **Chest motion sensing with modified silicon base station chips** *IEEE Topical Conference on Wireless Communication Technology/2nd Wireless Grantees Workshop*  
Droitcour, A., Boric-Lubecke, O., Lubecke, V. M., Lin, J. S., Kovacs, G. T.  
IEICE-INST ELECTRONICS INFORMATION COMMUNICATIONS ENG.2004: 1524–31
- **Range correlation and I/Q performance benefits in single-chip silicon Doppler radars for noncontact cardiopulmonary monitoring** *IEEE MTT-S International Microwave Symposium*  
Droitcour, A. D., Boric-Lubecke, O., Lubecke, V. M., Lin, J. S., Kovacs, G. T.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2004: 838–48
- **LifeGuard- A Personal Physiological Monitor for Extreme Environments** *Proceedings of the 26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (ISBN 0-7803-8439-3-04, Ed: RJ Jaeger)*  
Montgomery, K., Mundt, C., Thonier, G., Tellier, A., Udoh, U., Barker, V., Ricks, R., Davies, P., Cagle, Y., Swain, J., Hines, J., Kovacs, G.  
2004: pp. 2192-2195.
- **Lifeguard--a personal physiological monitor for extreme environments.** *Conference proceedings : ... Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Conference*  
Montgomery, K., Mundt, C., Thonier, G., Tellier, A., Udoh, U., Barker, V., RICKS, R., Giovangrandi, L., DAVIES, P., Cagle, Y., Swain, J., Hines, J., Kovacs, et al  
2004; 3: 2192-2195
- **Lifeguard - A personal physiological monitor for extreme environments** *26th Annual International Conference of the IEEE-Engineering-in-Medicine-and-Biology-Society*  
Montgomery, K., Mundt, C., Thonier, G., Tellier, A., Udoh, U., Barker, V., RICKS, R., Giovangrandi, L., DAVIES, P., Cagle, Y., Swain, J., Hines, J., Kovacs, et al  
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- **Range Correlation and I/Q Performance Benefits in Single-Chip Silicon Doppler Radars for Noncontact Cardiopulmonary Monitoring** *IEEE Transactions on Microwave Theory and Techniques*  
Droitcour, A. D., Boric-Lubecke, O., Lubecke, V. M., Lin, J., Kovacs, G. T. A.  
2004; 52 (3): 838 ? 848
- **Chest motion sensing with modified silicon base station chips** *IEICE Transactions on Electronics, Special Issue on Wave Technologies for Wireless and Optical Communications*  
Droitcour, A.D., Boric-Lubecke, O., Lubecke, V. M., Lin, J., Kovacs, G. T. A.  
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- **Electronic sensors with living cellular components** *PROCEEDINGS OF THE IEEE*  
Kovacs, G. T.  
2003; 91 (6): 915-929
- **Electronic Sensors with Living Cellular Components** *Proceedings of the IEEE*  
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- **Wireless IC Doppler Radars for Sensing of Heart and Respiration Activity**  
Boric-Lubecke, O., Droitcour, A., D., Lubecke, V., M., Lin, J., Kovacs, G., T. A.  
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- **Modiried silicon base station chips as biomedical sensors** *IEEE Topical Conference on Wireless Communication Technology/2nd Wireless Grantees Workshop*  
Droitcour, A. D., Boric-Lubecke, O., Lubecke, V., Lin, J. S., Kovacs, G. T.  
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- **A multi-parameter, feedback-based electrical stimulation system for cardiomyocyte cultures** *12th International Conference on Solid-State Sensors, Actuators and Microsystems (TRANSDUCERS 03)*  
Whittington, R. H., Gilchrist, K. H., Giovangrandi, L., Kovacs, G. T.  
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- **Range correlation effect on ISM band I/Q CMOS radar for non-contact vital signs sensing** *IEEE MTT-S International Microwave Symposium*

- Droitcour, A. D., Boric-Lubecke, O., Lubecke, V. M., Lin, J., Kovacs, G. T.  
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- **Stimulus representation in rat primary visual cortex: multi-electrode recordings with micro-machined silicon probes and estimation theory** *10th Computational Neuroscience Meeting (CSN 01)*  
Freiwald, W. A., Stemmann, H., Wannig, A., Kreiter, A. K., Hofmann, U. G., Hills, M. D., Kovacs, G. T., Kewley, D. T., Bower, J. M., Etzold, A., Wilke, S. D., Eurich, C. W.  
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  - **Microfabricated solid-state dissolved oxygen sensor** *Transducers 2001 Conference/Eurosensor XVth Conference*  
McLaughlin, G. W., Braden, K., Franc, B., Kovacs, G. T.  
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  - **An in-line osmometer for application to a cell-based biosensor system** *Transducers 2001 Conference/Eurosensor XVth Conference*  
Mourlas, N. J., Gilchrist, K. H., Giovangrandi, L., Maluf, N. I., Kovacs, G. T.  
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  - **Retinal ganglion cells do not extend axons by default: Promotion by neurotrophic signaling and electrical activity** *NEURON*  
Goldberg, J. L., Espinosa, J. S., Xu, Y. F., Davidson, N., Kovacs, G. T., Barres, B. A.  
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  - **Array-based comparative genomic hybridization for the differential diagnosis of renal cell cancer** *CANCER RESEARCH*  
Wilhelm, M., Veltman, J. A., Olshen, A. B., Jain, A. N., Moore, D. H., Presti, J. C., Kovacs, G., Waldman, F. M.  
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  - **Retinal Ganglion Cells Do Not Extend Axons by Default: Promotion by Neurotrophic Signaling and Electrical Activity** *Neuron*  
Goldberg, J. L., Espinosa, J. S., Xu, Y., Davidson, N., Kovacs, G. T. A., Barres, B. A.  
2002; 33: 689-702
  - **Active SOI-Based Neural Probes**  
Hills, M., D., Kewley, D., T., Bower, J., M., Kovacs, G., T. A.  
2002
  - **Measurement of Changes in Tissue Metabolism Using a Clark-Type Oxygen Sensor**  
Franc, B., Peixoto, N., Giovangrandi, L., McLaughlin, G., Kovacs, G., T. A.  
2002
  - **Stimulus Representation in Rat Primary Visual Cortex: Multi-Electrode Recordings with Micromachined Silicon Probes and Estimation Theory** *Neurocomputing*  
Freiwald, W. A., Stemmann, H., Wannig, A., Kreiter, A. K., Hofmann, U. G., Hills, M. D., Kovacs, G. T. A., Kewley, D. T., Bower, J. M.  
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  - **An In-Line Osmometer for Application to a Cell-Based Biosensor System** *Sensors and Actuators B: Chemical*  
Mourlas, N. J., Gilchrist, K. H., Giovangrandi, L., Maluf, N. I., Kovacs, G. T. A.  
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  - **A docking system for microsattellites based on MEMS actuator arrays** *SMART MATERIALS & STRUCTURES*  
Terry, M., Reiter, J., Bohringer, K. F., Suh, J. W., Kovacs, G. T.  
2001; 10 (6): 1176-1184
  - **A genetically engineered cell-based biosensor for functional classification of agents** *BIOSENSORS & BIOELECTRONICS*  
Aravanis, A. M., DeBusschere, B. D., Chruscinski, A. J., Gilchrist, K. H., Kobilka, B. K., Kovacs, G. T.  
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