

Publications and Presentations — P. Thomas Vernier

Refereed Journal Articles

- Chen, M.-T., L. G. De-Arco, F. N. Ishikawa, P. T. Vernier, C. Zhou, and M. A. Gundersen, Intracellular photoluminescence of carbon nanotube-fluorescein conjugates in human ovarian cancer cells, *Nanotechnology* 20:295101, 2009.
- Craviso, G. L., P. Chatterjee, G. Maalouf, A. Cerjanic, J. Yoon, I. Chatterjee, and P. T. Vernier, Nanosecond electric pulse-induced increase in intracellular calcium in adrenal chromaffin cells triggers calcium-dependent catecholamine release, *IEEE Trans. Dielect. Elec. Ins.*, in press, 2009.
- Jiang, C., M.-T. Chen, C. Schaudinn, A. Gorur, P. T. Vernier, J. W. Costerton, D. Jaramillo, P. Sedghizadeh, and M. A. Gundersen, Nanosecond pulsed plasma dental probe, *Plasma Processes and Polymers*, in press, 2009.
- Jiang, C., M.-T. Chen, C. Schaudinn, A. Gorur, P. T. Vernier, J. W. Costerton, D. Jaramillo, P. Sedghizadeh, and M. A. Gundersen, Pulsed atmospheric-pressure cold plasma for endodontic disinfection, *IEEE Trans. Plasma Sci.* 37:1190-1195, 2009.
- Sanders, J. M., A. Kuthi, Y.-H. Wu, P. T. Vernier, and M. A. Gundersen, A linear, single-stage, nanosecond pulse generator for delivering intense electric fields to biological loads, *IEEE Trans. Dielect. Elec. Ins.* 16:1048-1054, 2009.
- Vernier, P. T., M. J. Ziegler, and R. Dimova, Calcium binding and head group dipole angle in phosphatidylserine-phosphatidylcholine bilayers, *Langmuir* 25:1020-1027, 2009.
- Wang, S., J. Chen, M. T. Chen, P. T. Vernier, M. A. Gundersen, and M. Valderrabano, Cardiac myocyte excitation by ultrashort high-field pulses, *Biophys. J.* 96:1640-1648, 2009.
- Gómez Galindo, F., P. T. Vernier, P. Dejmek, A. Vicente, and M. A. Gundersen, Pulsed electric field reduces the permeability of potato cell wall, *Bioelectromagnetics* 29:296-301, 2008.
- Vernier, P. T., Y. Sun, M.-T. Chen, M. A. Gundersen, and G. L. Craviso, Nanosecond electric pulse-induced calcium entry into chromaffin cells, *Bioelectrochemistry* 73:1-4, 2008.
- Ziegler, M. J. and P. T. Vernier, Interface water dynamics and porating electric fields for phospholipid bilayers, *J. Phys. Chem. B* 112:13588-13596, 2008.
- Abebe, H., V. Tyree, H. Morris, and P. T. Vernier, SPICE BSIM3 model parameter extraction and optimization: practical considerations, *Int. J. Elect. Eng. Educ.* 44:249-262, 2007.
- Garon, E. B., D. Sawcer, P. T. Vernier, T. Tang, Y. Sun, L. Marcu, M. A. Gundersen, and H. P. Koeffler, In vitro and in vivo evaluation and a case report of intense nanosecond pulsed electric field as a local therapy for human malignancies, *Int. J. Cancer* 121:675-682, 2007.
- Krishnaswamy, P., A. Kuthi, P. T. Vernier, and M. A. Gundersen, Compact subnanosecond pulse generator using avalanche transistors for cell electroperturbation, *IEEE Trans. Dielect. Elec. Ins.* 14:873-877, 2007.
- Liu, Y. S., Y. Sun, P. T. Vernier, C. H. Liang, S. Y. C. Chong, and M. A. Gundersen, pH-sensitive photoluminescence of CdSe/ZnSe/ZnS quantum dots in human ovarian cancer cells, *J. Phys. Chem. C* 111:2872-2878, 2007.
- Marshall, J. C., D. L. Herman, P. T. Vernier, D. L. DeVoe, and M. Gaitan, Young's modulus measurements in standard IC CMOS processes using MEMS test structures, *IEEE Electron Device Letters* 28:960-963, 2007.

- Marshall, J. C., and P. T. Vernier, Electro-physical technique for post-fabrication measurements of CMOS process layer thicknesses, *J. Res. Natl. Inst. Stand. Technol.* 112:223-256, 2007.
- Vernier, P. T., and M. J. Ziegler, Nanosecond field alignment of head group and water dipoles in electroporating phospholipid bilayers, *J. Phys. Chem. B* 111: 12993-12996, 2007.
- Wang, J., W. H. Yong, Y. Sun, P. T. Vernier, H. P. Koeffler, M. A. Gundersen, and L. Marcu, Receptor-targeted quantum dots: fluorescent probes for brain tumor diagnosis, *J. Biomed. Optics* 12:044021, 2007.
- Sun, Y., Y. S. Liu, P. T. Vernier, C. H. Liang, S. Y. Chong, L. Marcu, and M. A. Gundersen, Photostability and pH sensitivity of CdSe/ZnSe/ZnS quantum dots in living cells, *Nanotechnology* 17:4469-4476, 2006.
- Sun, Y., P. T. Vernier, M. Behrend, J. Wang, M. M. Thu, M. A. Gundersen, and L. Marcu, Fluorescence microscopy imaging of electroperturbation in mammalian cells, *J. Biomed. Optics* 11:24010, 2006.
- Vernier, P. T., Y. Sun, and M. A. Gundersen, Nanoelectropulse-driven membrane perturbation and small molecule permeabilization, *BMC Cell Biology* 7:37, 2006.
- Vernier, P. T., M. J. Ziegler, Y. Sun, W. V. Chang, M. A. Gundersen, and D. P. Tieleman, Nanopore formation and phosphatidylserine externalization in a phospholipid bilayer at high transmembrane potential, *J. Am. Chem. Soc.* 128:6288-6289, 2006.
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- Vernier, P. T., Y. Sun, L. Marcu, C. M. Craft, and M. A. Gundersen, Nanosecond pulsed electric fields perturb membrane phospholipids in T lymphoblasts, *FEBS Lett.* 572:103-108, 2004.
- Vernier, P. T., M. Thu, L. Marcu, C. M. Craft, and M. A. Gundersen, Nanosecond electroperturbation — mammalian cell sensitivity and bacterial spore resistance, *IEEE Trans. Plasma Sci.* 32:1620-1625, 2004.
- Behrend, M., A. Kuthi, X. Gu, P. T. Vernier, L. Marcu, C. M. Craft, and M. A. Gundersen, Pulse generators for pulsed electric field exposure of biological cells and tissues, *IEEE Trans. Dielect. Elect. Ins.* 10:820-825, 2003.
- Vernier, P. T., A. Li, L. Marcu, C. M. Craft, and M. A. Gundersen, Ultrashort pulsed electric fields induce membrane phospholipid translocation and caspase activation: differential sensitivities of Jurkat T lymphoblasts and rat glioma C6 cells, *IEEE Trans. Dielect. Elect. Ins.* 10:795-809, 2003.
- Vernier, P. T., Y. Sun, L. Marcu, S. Salemi, C. M. Craft, and M. A. Gundersen, Calcium bursts induced by nanosecond electric pulses, *Biochem. Biophys. Res. Commun.* 310:286-295, 2003.

Other Publications

Garon, E. B., P. T. Vernier, J. Wang, T. Tang, M. M. Thu, X. Gu, Y. Sun, L. Marcu, M. Gundersen, and H. P. Koeffler, Nanoelectropulse therapy for cancer: in vitro and in vivo analysis, 97th American Association for Cancer Research Annual Meeting, Washington, DC, 2006.

Sun, Y., P. T. Vernier, Y.-S. Liu, T. Black, C.-H. Liang, S. Y. Chong, M.-T. Chen, T. Tang, L. Marcu, and M. A. Gundersen, Biophotonic studies of mammalian cells with nanosecond pulsed power using quantum dots, *Proc. 27th International Power Modulator Symposium and 2006 High Voltage Workshop*, 2006.

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Vernier, P. T., Y. Sun, L. Marcu, and M. A. Gundersen, Nanoelectropulse-driven phosphatidylserine externalization and small molecule permeabilization, *Proc. Fourth International Symposium on Nonthermal Medical/Biological Treatments Using Electromagnetic Fields and Ionized Gases (ElectroMed 2005)*, Portland, OR, 2005.

Gundersen, M. A., M. R. Behrend, Y. Sun, P. T. Vernier, and A. Kuthi, Four-channel pulse generator for real-time biological investigations, *Proc. 26th International Power Modulator Symposium and 2004 High Voltage Workshop*, pp. 210-215, 2004.

Gundersen, M. A., A. Kuthi, M. R. Behrend, and P. T. Vernier, Bipolar nanosecond pulse generation using transmission lines for cell electro-manipulation, *Proc. 26th International Power Modulator Symposium and 2004 High Voltage Workshop*, pp. 224-227, 2004.

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Gu, X., P. Wijetunga, A. Kuthi, M. Behrend, P. T. Vernier, and M. A. Gundersen, Nanosecond rise time minipulser for cell electroperturbation, *Proc. 14th International Pulsed Power Conference* 2:943-945, 2003.

Vernier, P. T., A. Li, L. Marcu, X. Zhu, C. M. Craft, and M. A. Gundersen, Nanosecond, megawatt, millijoule pulses invert membrane phospholipids and activate caspases in malignant cells, *Proc. Third International Symposium on Nonthermal Medical/Biological Treatments Using Electromagnetic Fields and Ionized Gases (ElectroMed 2003)*, p. 65, 2003.

Wijetunga, P., X. Gu, P. T. Vernier, A. Kuthi, M. Behrend, and M. A. Gundersen, Electrical modeling of pulsed power systems for biomedical applications, accepted for publication in *Proc. 14th International Pulsed Power Conference*, 2003.

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Svihla, G., and P. T. Vernier, Temperature effects on a psychrophilic strain of *Rhodotorula glutinis*, ANL-7535, Argonne National Laboratory Reports 1968:255-258, 1968.

Invited Presentations

Levine, Z. A., Y.-H. Wu, V. Joubert, M. J. Ziegler, L. Mir, D. P. Tieleman, and P. T. Vernier, Increased susceptibility of oxidized phospholipid bilayers to electroporation, XXth International Symposium on Bioelectrochemistry and Bioenergetics, Sibiu, Romania, May, 2009.

Vernier, P. T., Nanoscale restructuring of lipid bilayers in suprphysiological electric fields, International Bioelectrics Symposium, University of Missouri, Columbia, June 2009.

Vernier, P. T., Biomolecular electrosurgery: dipoles and dielectrics, nanoseconds and nanometers, calcium and cancer, peroxidation and poration, Department of Biomedical Engineering Seminar, University of California, Davis, September, 2008.

Vernier, P. T., Biomolecular manipulations with nanosecond pulsed electric fields — in cells and in silico, International Workshop on Bioelectrics 2007, Kumamoto University, Kumamoto, Japan, February 2007.

Vernier, P. T., Nanoscale electroporation: dipoles and dielectrics, nanoseconds and nanometers, Electroporation-Based Technologies and Treatments, International Scientific Workshop and Postgraduate Course, University of Ljubljana and Institute of Oncology, Ljubljana, Slovenia, November 2007.

Vernier, P. T., Biomolecular manipulations with nanosecond pulsed electric fields, Department of Electrical and Computer Engineering Seminar, Old Dominion University, Norfolk, April 2006.

Vernier, P. T., Biomolecular manipulations with nanosecond pulsed electric fields — in cells and in silico, Applied Math and Center for Computational Biology Seminar, University of California, Merced, November 2006.

Vernier, P. T., Biomolecular manipulations with nanosecond pulsed electric fields — in cells and in silico, Los Angeles Tissue Engineering Initiative, Fourth Annual Meeting, University of California, Los Angeles, December 2006.

Vernier, P. T., Y. Sun, M. J. Ziegler, and M. A. Gundersen, Flipping the phospholipid switch for phagocytosis — targeting cells for immune clearance with a nanosecond, remotely delivered, electrical signal, Bioelectromagnetics Society Winter Workshop, Tempe, AZ, 2006.

Vernier, P. T., Y. Sun, M. J. Ziegler, and M. A. Gundersen, Nanosecond, nondestructive, localized scrambling of membrane phospholipids in living cells, American Society for Cell Biology 45th Annual Meeting, Special Interest Sub-Group Meeting on Nanosecond Electric Pulses: A New Technology for Introducing Transient Nanopores in Organelles, San Francisco, 2005.

Vernier, P. T., Nanometer, gigahertz integrated circuits — semiconductor foundry access for design prototypes and small-volume production, University of Southern California School of Engineering Undergraduate Honors Colloquium, Los Angeles, 2004.

Vernier, P. T., Y. Sun, L. Marcu, C. M. Craft, and M. A. Gundersen, Field-dependent nanosecond electroperturbation of Jurkat T lymphoblasts, Scientific Conference, Society for Physical Regulation in Biology and Medicine, San Antonio, 2004.

Marcu, L., P. T. Vernier, S. Salemi, M. Behrend, C. M. Craft, and M. A. Gundersen, Optical imaging of electroperturbative effects in Jurkat T lymphoblasts induced by ultrashort pulsed electric fields, World Congress on Medical Physics and Biomedical Engineering, Sydney, Australia, 2003.

Sun, Y., P. T. Vernier, M. Behrend, L. Marcu, and M. A. Gundersen, Non-invasive approaches to nano-biology through advanced pulsed power, Workshop on High-Field Effects and Fast Pulse Responses in Bio-Systems, IEEE Conference on Electrical Insulation and Dielectric Phenomena, Albuquerque, 2003.

Vernier, P. T., CMOS-compatible MEMS on multi-project wafers: fabrication and characterization, National Institute of Standards and Technology, Semiconductor Electronics Division, Electronics and Electrical Engineering Laboratory, Gaithersburg, MD, 2003.

Vernier, P. T., A. Li, L. Marcu, X. Zhu, C. M. Craft, and M. A. Gundersen, Nanosecond electroperturbation of malignant cells, World Congress on Medical Physics and Biomedical Engineering, Sydney, Australia, 2003.

Vernier, P.T., Y. Sun, L. Marcu, S. Salemi, C. M. Craft, and M. A. Gundersen, Non-invasive intracellular electroperturbation of human lymphocytes, Workshop on High-Field Effects and Fast Pulse Responses in Bio-Systems, IEEE Conference on Electrical Insulation and Dielectric Phenomena, Albuquerque, 2003.

Vernier, P. T., and M. A. Gundersen, Ultrashort electric perturbations trigger membrane phospholipid translocation and apoptosis, Air Force Research Laboratory, Wright-Patterson Air Force, Base, Dayton, OH, 2002.

Contributed and Other Presentations

Chatterjee, P., P. T. Vernier, I. Chatterjee, and G. L. Craviso, Single nanosecond electric pulse-induced influx of calcium into adrenal chromaffin cells requires extracellular sodium, Bioelectromagnetics Society 31st Annual Meeting, Davos, 2009.

Levine, Z. A., Y.-H. Wu, M. J. Ziegler, D. P. Tieleman, and P. T. Vernier, Electroporation sensitivity of oxidized phospholipid bilayers, Biophysical Society Annual Meeting, Boston, 2009.

Levine, Z. A., Y.-H. Wu, M. J. Ziegler, D. P. Tieleman, and P. T. Vernier, Increased susceptibility of oxidized phospholipid bilayers to electroporation, Bioelectromagnetics Society 31st Annual Meeting, Davos, 2009.

Sanders, J. M., A. Kuthi, P. T. Vernier, Y.-H. Wu, C. Jiang, and M. A. Gundersen, Scalable, compact, nanosecond pulse generator with a high repetition rate for biomedical applications requiring intense electric fields, IEEE 17th International Pulsed Power Conference, Washington, 2009.

Craviso, G. L., G. Maalouf, S. Choe, M.-T. Chen, D. McPherson, I. Chatterjee, M. A. Gundersen, and P. T. Vernier, Nanosecond electric pulse stimulates catecholamine release from chromaffin cells, Bioelectromagnetics Society 30th Annual Meeting, San Diego, 2008.

Jiang, C., P. T. Vernier, M.-T. Chen, Y.-H. Wu, L. L. Wang, and M. A. Gundersen, Low energy nanosecond pulsed plasma sterilization for endodontic applications, IEEE 28th International Power Modulator Conference, Las Vegas, 2008.

Marshall, J. C., P. T. Vernier, S. B. Hardy, J. C. Geist, R. A. Allen, C. D. McGray, and M. Gaitan, A standard reference material for five key metrics for MEMS devices, Solid-State Sensors, Actuators, and Microsystems Workshop, Hilton Head, 2008.

Ziegler, M. J. and P. T. Vernier, Nanosecond biomolecular surgery — mechanism of pore formation in lipid bilayers, Biophysical Society Annual Meeting, Long Beach, 2008.

Gómez Galindo, F., P. T. Vernier, P. Dejmek, A. Vicente, and M. A. Gundersen, Pulsed electric fields promote potato tuber cell wall cross-linking, Bioelectromagnetics Society 29th Annual Meeting, Kanazawa, 2007.

Vernier, P. T., M. J. Ziegler, Y. Sun, M. A. Gundersen, and D. P. Tieleman, Nanosecond biomolecular surgery with microelectronics, microfluidics, and nanotubes — in vitro and in silico, Nanomaterials for Defense Applications Symposium, San Diego, 2007.

Vernier, P. T., M. J. Ziegler, and D. P. Tieleman, Nanoelectroporation of phospholipid bilayers — energy-minimized, field-driven reorganization of interfacial water dipoles, Bioelectromagnetics Society 29th Annual Meeting, Kanazawa, 2007.

Ziegler, M. J., D. P. Tieleman, and P. T. Vernier, Nanosecond electroporation of phospholipid bilayers follows field-driven reorganization of interfacial water dipoles, Biophysical Society Annual Meeting, Baltimore, 2007.

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Liu, Y.-S., C. H. Liang, P. T. Vernier, Y. Sun, and M. A. Gundersen, Design and synthesis of a multifunctional probe for bio-imaging and therapeutics, Materials Research Society Spring Meeting, San Francisco, 2006.

Sun, Y., P. T. Vernier, X. Gu, M. T. Chen, L. Marcu, and M. A. Gundersen, Apoptotic nuclear perturbation induced by nanosecond pulsed electric fields, Biophysical Society Annual Meeting, Salt Lake City, 2006.

Vernier, P. T., Y. Sun, M. T. Chen, S. Y. C. Chong, and M. A. Gundersen, DNA-binding fluorochrome photoluminescence in nanoelectropulsed living cells, Bioelectromagnetics Society 28th Annual Meeting, Cancun, 2006.

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Vernier, P. T., M. J. Ziegler, Y. Sun, and M. A. Gundersen, Nanosecond electroporation and electrophoretic phosphatidylserine translocation — in vitro and in silico, American Society for Cell Biology 46th Annual Meeting, San Diego, 2006.

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Ziegler, M. J., D. P. Tieleman, and P. T. Vernier, Molecular dynamics simulations of asymmetric phospholipid bilayers with supraphysiological transmembrane potentials, 232nd American Chemical Society National Meeting, San Francisco, 2006.

Ziegler, M. J. and P. T. Vernier, Molecular dynamics simulations of asymmetric phospholipid bilayers with supraphysiological transmembrane potentials, American Institute of Chemical Engineers Annual Meeting, San Francisco, 2006.

Vernier, P. T., Y. Sun, J. Wang, L. Marcu, and M. A. Gundersen, Nanoelectropulse-induced membrane perturbations in living cells visualized with fluorescence microscopy, BiOS 2005 (SPIE), San Jose, 2005.

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Gu, X., A. Kuthi, M. Behrend, P. T. Vernier, Q. Zhou, and M. A. Gundersen, Compact pulse generator for nanosecond electroperturbation of biological cells, IEEE 26th International Power Modulator Conference, San Francisco, 2004.

Vernier, P. T., L. Marcu, Y. Sun, S. Salemi, C. M. Craft, and M. A. Gundersen, Real-time imaging of mammalian cells in nanosecond, megawatt, millijoule pulsed electric fields, BIOS 2004 (SPIE), San Jose, 2004.

Vernier, P. T., Y. Sun, L. Marcu, C. M. Craft, and M. A. Gundersen, Nanoelectropulse perturbations of calcium and phospholipid distribution in human lymphocytes, Bioelectromagnetics Society 26th Annual Meeting, Washington, 2004.

Marcu, L., P. T. Vernier, C. H. Manning, S. Salemi, A. Li, C. M. Craft, M. A. Gundersen, and D. J. Bornhop, Fluorescence microscopy studies of a peripheral benzodiazepine receptor-targeted molecular probe for brain tumor imaging, Diagnostic Optical Spectroscopy, European Conference on Biomedical Optics, Munich, Germany, 2003.

Thu, M., P. T. Vernier, M. Behrend, S. Salemi, C. M. Craft, and M. A. Gundersen, Germination of *Bacillus atrophaeus* spores after exposure to ultra-short, high-field electric pulses, ElectroMed 2003, San Antonio, 2003.

Vernier, P. T. and M. A. Gundersen, Nanosecond, megawatt, millijoule pulses selectively perturb but do not porate mammalian cells, Air Force Office of Scientific Research, Chemistry and Life Sciences Directorate, Bio-Inspired Concepts Review, Annapolis, MD, 2003.