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Professor Jason Heikenfeld, College of Engineering & Applied Sciences
On Skin Technology

Education

Ph.D, Electrical Engineering, University of Cincinnati,,2001
B.S.E.E. with Minors in Photonics and in Physics, Electrical Engineering, University of Cincinnati, 1998

Research and Practice Interests

Wearable and flexible electronics, rapid prototyping, electronic materials, electrowetting, biosensors, microfluidics, and optics.

Professional Summary

Prof. Heikenfeld is director of the Novel Device Lab www.ece.uc.edu/devices, in EECS with joint appointments in Materials Science and Biomedical Engineering.

NDL's mission is to create disruptive technological innovations through highly multidisciplinary research in electrofluidics and biosensors, spanning fundamental science to more applied work through industrial partnerships. Our research foci are not participatory, but rather to play a globally leading role in any endeavor we pursue. Furthermore, NDL has the practical knowledge, facilities, and a strong track-record for rapidly transforming novel concepts into commercially viable prototypes. NDL is also a founding member of the NSF Center for Advanced Design and Manufacturing of Integrated Microfluidics (CADMIM), lead founder for the Ohio Center for Microfluidic Innovation (OCMI).

Learn more about Prof. Heikenfeld in a 2015 UC Faces Video.

Publications

2017

Hauke, A., Kumar, L.S., Kim, M.Y., Pegan, J., Khine, M., Li, H.,Plaxco, K.W., Heikenfeld, J. (2017). Superwetting and aptamer functionalized shrink-induced high surface area electrochemical sensors. Biosensors and Bioelectronics, 94(March), 438-442. doi: 10.1016/j.bios.2017.03.024 [pdf]

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Heikenfeld, J., "Non-invasive Analyte Access and Sensing through Eccrine Sweat: Challenges and Outlook circa 2016". Electroanalysis. doi: 10.1002/elan.201600018 (2016). [pdf]

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J. H. Noh, J. Noh, E. Kreit, J. Heikenfeld and P. D. Rack, Toward Active-matrix Lab-on-a-chip: Programmable Electrofluidic Control Enabled by Arrayed Oxide Thin Film Transistors, Lab on a Chip, vol.12, pp. 353-360, 2012. [pdf]

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J. Heikenfeld, P. Drzaic, J.-S. Yeo, and Tim Koch, Review Paper: A critical review of the present and future prospects for electronic paper, Journal of the SID, vol.19, issue 2, 2011. [pdf]

2010

M. Dhindsa, S. Kuiper, and J. Heikenfeld, Reliable and low-voltage electrowetting on thin Parylene films, Thin Solid Films, Dec.2010. [pdf]

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S. Yang, K. Zhou, E. Kreit, J. Heikenfeld, High reflectivity electrofluidic pixels with zero-power grayscale operation, Applied Physics Letters, Vol.97, Issue,14, Oct.2010. [pdf]

Manjeet Dhindsa, Jason Heikenfeld, Seyeoul Kwon, Jungwon Park, Philip D. Rack and Ian Papautsky, Virtual electrowetting channels: electronic liquid transport with continuous channel functionality, Lab on a Chip, Vol.10, 832-836, 2010. [pdf]

Andrew Steckl, College of Engineering & Applied Sciences
On Skin Technologies, Wound Healing

Education

- B.S.E. Electrical Engineering, 1964-1968
- Princeton University M.S. Electrical Engineering, 1968-1970
- University of Rochester Ph.D. Materials Science/Electrical Engineering, 1970-1973

Professional Experience

- 1988-Present University of Cincinnati 1985
- Summer Stanford University, Visiting Professor 1981-1986
- RPI, Founding Director, Center for Integrated Electronics 1977 Summer IBM T.J. Watson Research Center, Faculty Fellow 1976-87
- Rensselaer Polytechnic Institute (RPI), Professor of Electrical Engineering 1973-76
- Rockwell Electronics Research Center, Member of the Technical Staff 1972-7
- Honeywell Radiation Center, Senior Research Engineer

Awards and Professional Recognition

2013 Senior Faculty Engineering Research Award, University of Cincinnati.
2013 Distinguished Research Professor, University of Cincinnati.
2013 Life Fellow of the Institute of Electrical and Electronic Engineering (IEEE).
2010 Fellow of American Association for the Advancement of Science (AAAS).
2009 University of Cincinnati Graduate Fellow.
2007 Distinguished Engineering Research Award, University of Cincinnati.
2006 Rieveschl Award for Distinguished Scientific Research, University of Cincinnati.
1999 Scientific Member of the Bohmische Physikalische Gesselschaft.
1999 College of Engineering Research Award, University of Cincinnati.
1998 Fellow of the Institute of Electrical and Electronic Engineering (IEEE).

Selected Publications (from over 400 to date)

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P. Ray, D. Han, and A. J. Steckl, "Urine-powered (galvanic) electric cell and sensor on paper substrate", Flex. Print Electron., 1, pp. 044002, **2016**.

V. Venkatraman, and A. J. Steckl, "Integrated OLED as excitation light source in fluorescent lateral flow immunoassays", Biosens/ Bioelectron/, 74, pp/ 150-155, **2015**.

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H. Li, D. Han, G. M. Pauletti and A. J. Steckl, "POINT-OF-CARE BLOOD COAGULATION MONITORING USING LATERAL FLOW DEVICE", Proc/ µT!S, pp/ 1573-1577, **2014**.

E. F. Gomez, V. Venkatraman, J. G. Grote, and A. J. Steckl, "DNA Bases Thymine and Adenine in Bio-Organic Light Emitting Diodes", Sci/ Rep/, 4.7105, **2014**.

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A. T. Zocco, H. You, J. A. Hagen, and A. J. Steckl, "Pentacene organic thin-film transistors on flexible paper and glass substrates", Nanotechnology, 25, pp/094005, **2014**.

S. Purandare, E. F. Gomez, and A. J. Steckl, "High brightness phosphorescent organic light emitting diodes on transparent and flexible cellulose films", Nanotechnology, 25, pp/094012, **2014**.

E. F. Gomez, V. Venkatraman, J. G. Grote, and A. J. Steckl, "Exploring the Potential of Nucleic Acid Bases in Organic Light Emitting Diodes", !dv/ Mater/, **2014**.

H. Li, D. Han, G. M. Pauletti, and A. J. Steckl, "Blood coagulation screening using a paper-based microfluidic lateral flow device", Lab Chip, 14, pp, 4035-4041, **2014**.

M. Zhong, J. Roberts, W. Kong, A. S. Brown, and A. J. Steckl, "p-type GaN grown by phase shift epitaxy", Appl. Phys. Lett., 104, pp.012108, **2014**.

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N. Bedford, G. D. Winget, S/ Punnamaraju, and !/ J/ Steckl,"Immobilization of Stable Thylakoid Vesicles in Conductive Nanofibers by Electrospinning", !CS Biomacromolecules, 12 (3), 778, Mar/ 2011/

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Invited Paper/ (DOI.10/1117/12/871021) D/ Y/ Kim and !/ J/ Steckl, "Electrowetting on Paper for Electronic Paper Display", !CS !pplied Materials and Interfaces, 2, 3318, Nov/ 2010/ (featured on cover of Journal).

N/ Bedford and !/ J/ Steckl, "Photocatalytic Self-Cleaning Textile Fibers by Coaxial Electrospinning", !CS Applied Materials and Interfaces, 2 (8), 2448, Aug. 2010.

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D. Wu and A. J. Steckl, “High Speed Nanofluidic Protein !ccumulator”, Lab-on-a-Chip 9 (13), 1890, June 2009.

!/ J/ Steckl, H/ Spaeth, K/ Singh, J/ Grote, and R/ Naik, “Chirality of sulforhodamine dye molecules incorporated in DN! thin films”, !ppl/ Phys/ Lett/ 93 193903, Nov. 2008.

!/ J/ Steckl, “DN! – ! New Material for Photonics”, Nature Photonics, 1, 3, Jan/ 2007/

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J/ !/ Hagen, W/ Li and !/ J/ Steckl, J/ G/ Grote, “Enhanced emission efficiency in organic light emitting diodes using deoxyribonucleic acid complex as electron blocking layer”, !pplied Physics Letters/ 88 171109, Apr. 2006. Paper featured on cover of journal.

Je-Hyeong Bahk, College of Engineering & Applied Sciences
On Skin Technology

Biography

Je-Hyeong Bahk holds a PhD he earned in 2010 in Electrical and Computer Engineering from the University of California, Santa Barbara, where his thesis was titled “Electron transport in Er!s.InGa(!l)!s metal/semiconductor nanocomposites for thermoelectric power generation/” His Master of Science and Bachelor of Science are both in Electrical Engineering from Seoul National University, where he graduated with honors.

Upon completion of his PhD, Bahk worked as a postdoctoral research associate at the University of California, Santa Cruz from 2010 to 2012 and at Purdue University from 2012-2015. His research in thermoelectrics has led him to write three book chapters, more than fifty journal & conference papers, and create several online simulation tools related to thermoelectric devices and materials. Bahk is also a member of several professional organizations including IEEE, MRS, APS, and in 2013 served as the session chair at the Frontiers in Education Conference.

Recent advances in the development of flexible thermoelectric materials and devices for wearable human body-heat energy harvesting applications. We identify various emerging applications such as specialized medical sensors where wearable thermoelectric generators can have advantages over other energy sources. To meet the performance requirements for these applications, we provide detailed design guides regarding the material properties, device dimensions, and gap fillers by performing realistic device simulations with important parasitic losses taken into account. For this, we review recently emerging flexible thermoelectric materials suited for wearable applications, such as polymer-based materials and screen-printed paste-type inorganic materials. A few examples among these materials are selected for thermoelectric device simulations in order to find optimal design parameters for wearable applications. Finally, we discuss the feasibility of scalable and cost-effective manufacturing of thermoelectric energy harvesting devices with desired dimension.

Research Interests

Human body-heat energy harvesting, wearable/flexible electronics, medical sensors; Additive manufacturing of functional materials, organic semiconductors, nanoscale devices; Nano-scale electron/thermal transport physics and materials for thermoelectric energy conversion; Nano- and micro-scale device fabrication and characterization. Teaching interests include: Solid-state physics, quantum mechanics, electron/thermal transport in semiconductors (graduate level); Heat transfer, thermodynamics, classical mechanics and physics (undergraduate level).

Online Simulation Tools

J.-H/ Bahk, M/ Youngs, Z/ Schaffter, K/ Yazawa, and !/ Shakouri, "Thin-Film and Multi-Element Thermoelectric Devices Simulator," published on nanoHUB/org (https.//nanohub/org/tools/thermo) Jun. 2013

J.-H/ Bahk, R/ B/ Prost, K/ Margatan, and !/Shakouri, "Linearized Boltzmann Transport Calculator for Thermoelectric Materials," published on nanoHUB/org (https.//nanohub/org/tools/btesolver) Oct/ 2013

K. Yazawa, K. Margatan, J.-H/ Bahk, and !/Shakouri, "Thermoelectric Power Generator System Optimization and Cost !nalysis," published on nanoHUB/org (https.//nanohub/org/tools/tedev) Oct/ 2013

J.-H/ Bahk, K/ Margatan, K/ Yazawa, and !/ Shakouri, "!dvanced thermoelectric device simulation for waste heat recovery and wearable energy harvesting," to be published on nanoHUB/org (https://nanohub.org/tools/teadv) Aug. 2015

Selected Book Chapters

J.-H/ Bahk, T/ Favaloro, and !/ Shakouri, "Thin film thermoelectric characterization techniques," Chap/ 3, Annual Reviews of Heat Transfer vol.16, Ed. G. Chen (Begell House Inc., New York, 2013).

J.-H/ Bahk and !/ Shakouri, "Electron transport engineering by nanostructures for efficient thermoelectrics," Chap/ 2 in Nanoscale Thermoelectrics, Ed/ X/ Wang and Z. Wang, a book series of Lecture Notes on Nanoscale Science and Technology vol. 16 (Springer, Nov. 2013).

C. Kang, H. Wang, J.-H/ Bahk, H/ Kim, and W/ Kim, "Thermoelectric materials and devices," Chap/ 6 in *Hierarchical Nanostructures for Energy Devices*, *RSC Nanoscience and Nanotechnology Series No. 35,* Ed. S. H. Ko and C. P. Grigoropoulos (RSC Publishing, 2015).

Selected Recent Journal Articles

J.-H/ Bahk, H/ Fang, K/ Yazawa, and !/ Shakouri, "Flexible thermoelectric materials and device optimization for wearable energy harvesting," submitted to J/ Mater/ Chem/ C (2015)

L. Shi, C. Dames, J. R. Lukes, P. S. Reddy, J. Duda, D. G. Cahill, J. Lee, A. Marconnet, K. E. Goodson, J.-H. Bahk, Ali Shakouri, R. S. Prasher, J. Felts, W. P. King, B. Han, and J. C/ Bischof, "Evaluating broader impacts of nanoscale thermal transport research," Nanosc/ and Microsc/ Therm/, 19, 127-165 (2015).

T. Favaloro, J.-H. Bahk, and A. Shakouri, "Characterization of the temperature dependence of the thermoreflectance coefficient for conductive thin films," Rev. Sci. Instrum. 86, 024903 (2015).

H. Yang, J.-H/ Bahk, T/ Day, !/ M/ S/ Mohammed, G/ J/ Snyder, !/ Shakouri, and Y/ Wu, "Enhanced thermoelectric properties in bulk nanowire heterostructure-based nanocomposites through minority carrier blocking," Nano Lett/ 15, 1349 (2015)/

V. Sahu, Y. K. Joshi, A. G. Fedorov, J.-H/ Bahk, X/ Wang, and !/ Shakouri, "Experimental characterization of hybrid solid-state and fluidic cooling for thermal management of localized hotspots," IEEE Trans. Compon. Packag. Manuf. Technol. 5, 57 (2015).

H. Yang, J.-H. Bahk, T. Day, A. M. S. Mohammed, B. Min, G. J. Snyder, A. Shakouri, and Y. Wu, "Composition modulation of !g2Te nanowires for tunable electrical and thermal properties," Nano Lett/ 14, 5398 (2014).

J.-H/ Bahk, and !/ Shakouri, “Enhancing the thermoelectric figure of merit through the reduction of bipolar thermal conductivity with heterostructure barriers,” !ppl/ Phys/ Lett/105, 052106 (2014)/

T. Favaloro, A. Ziabari, J.-H. Bahk, P. Burke, H/ Lu, J/ Bowers, !/ Gossard, Z/ Bian and !/ Shakouri, “High temperature thermoreflectance imaging and transient Harman characterization of thermoelectric energy conversion devices,” J/ !ppl/ Phys/ 116, 034501 (2014)/

H. Wang, J.-H. Bahk, C. Kang, J. Hwang, K. Kim, J. Kim, P. Burke, J. E. Bowers, A. Shakouri, and W. Kim, “Right sizes of nano- and microstructures for high performance and rigid bulk thermoelectrics,” Proc/ Natl. Acad. Sci. 111, 10949 (2014).

S. W. Finefrock, G. Zhang, J.-H. Bahk, H. Fang, H/ Yang, !/ Shakouri, and Y/ Wu, “Structure and thermoelectric properties of spark plasma sintered ultrathin PbTe nanowires,” Nano Lett/ 14, 3466 (2014).

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J. Kim, J.-H/ Bahk, J/ Hwang, H/ Kim, H/ Park, and W/ Kim, “Thermoelectricity in semiconductor nanowires,” Phys/ Status Solidi RRL 7, 767 (2013)/

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J.-H/ Bahk, Z/ Bian, and !/ Shakouri, “Electron energy filtering by a non-planar barrier to enhance the thermoelectric power factor in bulk materials,” Phys. Rev. B 87, 075204 (2013).

Invited Presentations

J.-H/ Bahk, “Nanoscale thermoelectric energy conversion. materials and devices,” Seminar, LG Chem Research Inst., Daejun, Korea, Dec. 18, 2013.

J.-H/ Bahk, “Hot carrier energy filtering for efficient thermoelectrics,” Nano-Thermoelectric Material Team Workshop at Korea Univ., Seoul, Korea, Nanomaterial Technology Development Program, Natl. Res. Found. Korea, Jul. 19, 2013.

J.-H/ Bahk, “Engineering electron transport by nanostructures for efficient thermoelectric energy conversion,” The 2nd !nnual Thermoelectric Workshop, Korea Electrotechnology Research Institute, Kyungju, Korea, Dec. 13, 2012.

J.-H. Bahk, Y. Ezzahri, K. Yazawa, B. Vermeersch, G/ Pernot, and !/ Shakouri, “Nanoscale electrothermal energy conversion devices,” THERMINIC 2012, Budapest, Hungary, Sep/ 27, 2012/

J.-H/ Bahk, “Nanoscale thermoelectric energy conversion. materials and devices,” Seminar, Samsung Advanced Institute of Technology Suwon, Korea, Jul. 27, 2012.

J.-H/ Bahk, “Nanoscale thermoelectric energy conversion. materials and devices,” Seminar, Mechanical Engineering Dept., Yonsei Univ., Seoul, Korea, Jul. 24, 2012.

J.-H/ Bahk, Z/ Bian, and !/ Shakouri, “Nanoscale thermionic and thermoelectric materials and devices,” IEEE Nanotechnol. Mater. Devices Conf., Monterey, CA, USA, Oct. 14, 2010.

Steven Boyce, College of Medicine
On Skin Technology, Wound Healing

Biography

Steven Boyce, PhD, serves currently as Professor in the Department of Surgery at the University of Cincinnati College of Medicine, and as Senior Investigator in the Research Department of the Shriners Hospitals for Children – Cincinnati. He trained in the Department of Molecular, Cellular and Developmental Biology at the University of Colorado, and spent his post-doctoral years in the Department of Surgery at the University of California San Diego. With interests and expertise in engineering of model systems for anatomy and physiology of human skin, Dr. Boyce has designed and tested engineered skin substitutes consisting of cultured human skin cells and degradable biopolymer scaffolds for closure of severe burns, reconstructive surgery, and studies *in vitro* of skin biology and pathology.

Research Interests

- Regenerative medicine
- Engineered skin substitutes; autologous or allogeneic
- Human cell isolation, propagation and cryopreservation
- Implantable and biodegradable biopolymers
- Translational research
- Technology transfer to commercialization

Education and Training

BA: 1974, Biological Sciences, University of Colorado at Boulder

PhD: 1984, Molecular, Cellular & Developmental Biology; University of Colorado at Boulder

Post-doctoral: 1985-1988, Tissue engineering and translational research; Surgery, University of California San Diego

Publications (selected from 135 original articles; 215 abstracts; 19 patents; 18 book chapters, and 150 invited presentations)

Articles:

Hansbrough JF, ST Boyce, ML Cooper and TJ Foreman. **Burn wound closure with cultured human keratinocytes and fibroblasts attached to a collagen-GAG substrate.** J Amer Med Assn 262:2125-2130.

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Book chapters:

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Boyce ST and DM Supp. **Biologic skin substitutes.** Chapter 11 in, "Tissue Engineering and Regenerative Medicine of Skin"- eds/, MZ !lbanna and JH Holmes IV- Elsevier Press; NY, NY, p. 211-238. http://dx.doi.org/10.1016/B978-0-12-801654-1.00011-5

Patents:

Boyce ST. US Patent 6,905,105, **"!pparatus for preparing a biocompatible matrix".** Assignees: University of Cincinnati and Shriners Hospitals for Children.

Boyce ST. US Patent 7,452,720B2, **"!pparatus for preparing a biocompatible matrix".** Assignees: University of Cincinnati and Shriners Hospitals for Children.

Boyce ST. European Patent #1483373, **"! surgical device for skin therapy or testing".** Assignees: University of Cincinnati and Shriners Hospitals for Children.

Boyce ST. US Patent 7,741,116, **"! surgical device for skin therapy or testing".** Assignees: University of Cincinnati and Shriners Hospitals for Children.

Boyce ST. Japanese Patent #4,555,576, **"! surgical device for skin therapy or testing".** Assignees: University of Cincinnati and Shriners Hospitals for Children.

Boyce ST. Canadian Patent #2,478,100, **"!pparatus for preparing a biocompatible matrix".** Assignees: University of Cincinnati and Shriners Hospitals for Children.

Boyce ST. European Patent #1,483,365, **"!pparatus for preparing a biocompatible matrix".** Assignees: University of Cincinnati and Shriners Hospitals for Children.

Boyce ST. US Patent 8,450,108, **"! surgical device for skin therapy or testing".** Assignees: University of Cincinnati and Shriners Hospitals for Children.

Boyce ST. Japanese Patent #5,535,446, **"! surgical device for skin therapy or testing".** Assignees: University of Cincinnati and Shriners Hospitals for Children.

Boyce ST. US Patent 8,765,468, **"! surgical device for skin therapy or testing".** Assignees: University of Cincinnati and Shriners Hospitals for Children.

Boyce ST. US Patent 9,089,417, **"! surgical device for skin therapy or testing".** Assignees: University of Cincinnati and Shriners Hospitals for Children.

Boyce ST. 2016. European Patent #2,075,330 B1 **"! method of producing a cultured skin device"**. Assignees: University of Cincinnati and Shriners Hospitals for Children.

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Jerry Kasting, College of Pharmacy
Skin Health & Therapeutics

Biography

Dr/ Kasting is Professor of Pharmaceutics and Cosmetic Science at the University of Cincinnati's James L/ Winkle College of Pharmacy. He teaches in the College's graduate and professional programs and serves as chair of the Divison of Pharmaceutical Sciences. His research is in the area of percutaneous absorption. Prior to beginning an academic career in 1999, he served as a senior scientist with the Skin Beauty Care Technology Division of Procter & Gamble's Miami Valley Laboratories, working on the development of improved skin care products. He received his B.A. in Chemistry from Vanderbilt University in 1975 and his Ph.D. in Physical Chemistry from MIT in 1980. He has published over seventy papers in the above areas and holds eight patents associated with his work. He is a two-time recipient of the Shaw Mudge Award from the Society of Cosmetic Chemists and was the 2005 chair of the Gordon Research Conference on Barrier Function of Mammalian Skin. He serves on the Editorial Board of the *Journal of Pharmaceutical Sciences* and *Pharmaceutical Research and Development* andas a referee for several other major pharmaceutical journals. His current research is focused on the development of improved computational models for topical delivery and dermal risk assessment based on a mechanistic understanding of the percutaneous absorption process. Projects include development of microstructural models for transport through the stratum corneum and hair follicle, prediction of solvent and pesticide absorption and evaporation rates from skin, estimation of the epidermal bioavailability of contact allergens and iontophoretic drug delivery to the nail. In 2013 Dr. Kasting received the Excellence in Doctoral Mentoring Award from the University of Cincinnati for his work with graduate students.

Research and Clinical Interests

Development of computational models for absorption of materials into and through the skin with the objective of developing better tools for prediction of topical drug delivery, transdermal drug delivery, and dermal exposure to noxious agents.

Publications

Dancik, Y., Miller, M. A., Jaworska, J., & Kasting, G. B. (2013). Design and performance of a spreadsheet-based model for estimating bioavailability of chemicals from dermal exposure. *Advanced Drug Delivery Reviews*, 65 (2), 221-36.

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Taulbee, J. D., & Kasting, G. B. (1988). A nonparametric method for evaluating results from laboratory antinociceptive tests. *Journal of Pharmacological Methods*, 20 (3), 197-206.

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Gunt, H., & Kasting, G. B. Hydration effect on human nail permeability. *Journal of Cosmetic Science*, 57 (2), 183-4.

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Human Protocols

Co-Investigator
Testing of a Novel Iontophoretic Sweat Stimulation Patch
Staff: Heikenfeld, Jason (Coordinator); Sonner, Zachary (Sub-investigator); Kasting, Gerald (Coordinator); Wilder, Eliza (Sub-investigator)
Approval Date: 11/16/2015

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Education

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Ph.D.: University of Utah., 1998

Research and Clinical Interests

Drug Delivery, Transport, Diffusion, Skin, Transdermal Delivery, Eye, Ocular Delivery, Dental and Periodontal Delivery, Nail, Translingual Delivery, Intestinal Absorption, Oral Delivery System, Ear, Inner Ear Delivery, Permeation Enhancers, Iontophoresis, Electrode Electrochemistry, Imaging, Non-invasive Pharmacokinetics, Drug Dissolution, Physical Pharmacy.

Professional Experience

2000-2003, Research Assistant Professor, University of Utah, College of Pharmacy.

2003-2005, Research Associate Professor, University of Utah, College of Pharmacy.

2004-2004, Instructor, Idaho State University, College of Pharmacy.

2006-2010, Associate Professor, University of Cincinnati, Department of Ophthalmology, Ophthalmology Research.

2006-Present, Associate Professor, University of Cincinnati, College of Pharmacy.

Publications

Liu, H., Feng, L., Tolia, G., Liddell, M. R., Hao, J., & Li, S. K. (2013). Evaluation of intratympanic formulations for inner ear delivery: methodology and sustained release formulation testing. *Drug Development and Industrial Pharmacy*.

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Biography

Dr. Pauletti is an Associate Professor of Biopharmaceutics & Pharmacokinetics at the James L. Winkle College of Pharmacy. His research interests focus on molecular pharmaceutics with an emphasis on membrane transport. Current activities include rational design, fabrication, and evaluation of innovative, non-viral nanocarriers as vectors for targeted drug delivery applications to improve therapeutic efficacy of small molecules, biotechnology drugs, and antitumor agents. Dr. Pauletti has published more than 100 scientific abstracts and papers. He is an inventor on 15 U.S. patents and patent applications protecting various drug delivery technologies and contributed to one GenBank entry. Dr. Pauletti served on more than 40 MS/PhD committees and is engaged in the education of professional PharmD and MS/PhD students enrolled in Pharmaceutical Sciences and Engineering graduate programs. As an advisor to pharmaceutical companies, Dr. Pauletti has facilitated preclinical and early clinical development of different molecular entities relevant to women's health and cancer therapy.

Education

MPharm - Pharmacy (1987): Swiss Federal Institute of Technology

PhD - Biopharmaceutics/Pharmacokinetics (1994): Swiss Federal Institute of Technology

Research and Clinical Interests

Research interests focus on molecular pharmaceutics with an emphasis on membrane transport. Current activities include rational design, fabrication, and evaluation of innovative, non-viral nanocarriers as vectors for targeted drug delivery applications to improve therapeutic efficacy of small molecules, biotechnology drugs, and antitumor agents. Specifically, we apply phage display technology to identify unique peptide ligands that facilitate selective intracellular delivery and/or transepithelial transport of colloidal nanocarriers such as nanoparticles, liposomes, and niosomes. In addition, we are engaged in collaborative research projects with UC faculty in Material Science and Internal Medicine aimed at developing multifunctional nanocomposite structures suitable for drug delivery and non-invasive imaging applications.

Publications

Dunn, A.W., Zhang, Y., Mast, D.B., Pauletti, G.M., Xu, H., Zhang, J., Ewing, R.C., and Shi, D. (2016). In-vitro Depth-dependent Hyperthermia of Human Mammary Gland Adenocarcinoma. *Mater. Sci. Eng. C*, *69*, 12-16.

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Honors and Awards

Faculty Service Recognition Award. (UC Winkle College of Pharmacy), 2015

Faculty Research Recognition Award. (UC Winkle College of Pharmacy), 2015

Scientific Secretary (elected 2015-2019), International Pharmaceutical Federation (FIP), 2015

Vice President, FIP Board of Pharmaceutical Sciences (elected, 2014 – 2015), 2014

Faculty Service Recognition Award. (UC Winkle College of Pharmacy), 2014

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Education

PhD, University of Toronto, Toronto, Canada, 1998 (Physical Chemistry)

Professional Experience

2010 to Present, Associate Professor, University of Cincinnati, Cincinnati, OH.

2004 to 2010, Assistant Professor and Associate Professor, New Mexico Institute of Mining and Technology, Socorro, NM.

Research Interests

Photodynamic therapy against bacteria and cancers; plasmonics; photon upconversion; sensing; nanomaterials; wound healing

Publications

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Skin Health, Therapeutics, On Skin Technologies

Biography

William R. Heineman received a BS in Chemistry from Texas Tech University in 1964 and a PhD in Chemistry in 1968 from the University of North Carolina at Chapel Hill under the direction of Professor Royce Murray. He was a Research Chemist at Hercules Research Center for two years before becoming a Postdoctoral Research Associate with Professor Ted Kuwana in 1970 at Case Western Reserve University and then at The Ohio State University. He joined the faculty at the University of Cincinnati in 1972 where he is now Distinguished Research Professor and Head of the Department of Chemistry.

Professor Heineman's research interests include spectroelectrochemistry, chemical sensors, analytical chemistry of radiopharmaceuticals, polymer modified electrodes, electrochemical immunoassay, and microfluidic systems for chemical analysis. He has published over 400 research papers and patents and has presented over 500 lectures at conferences, universities, and government/industrial laboratories. He is coauthor of the laboratory manual Chemical Experiments for Instrumental Methods, the instrumental analysis textbook Chemical Instrumentation: A Systematic Approach; and coeditor of the textbook Laboratory Techniques in Electroanalytical Chemistry.

Professor Heineman has received numerous awards including Sigma Xi Research Recognition Award, Cincinnati Chemist of the Year,Japanese Government Research Award for Foreign Scientists, George Rieveschl, Jr. Award for Distinguished Scientific Research, Humboldt Prize from Germany, Charles N. Reilley Award in Electroanalytical Chemistry from the Society for Electroanalytical Chemistry, Chemical Sensors Award from the International Meeting on Chemical Sensors, Award for Excellence in Teaching from the Division of Analytical Chemistry of the American Chemical Society, Torbern Bergman Medal 1999 from the Analytical Section of the Swedish Chemical Society, Fields of Analytical Chemistry award by the Eastern Analytical Association, and the Outstanding Achievement in Sensors Award from the Electrochemical Society. He was elected a Fellow of the American Association for the Advancement of Science in 2001 and chosen for the inaugural class of Fellows of the American Chemical Society in 2009.

Heineman has served on numerous advisory boards for journals including Analytical Chemistry, Biosensors and Bioelectronics, Analytica Chimica Acta, and Electroanalysis. He was a co-founder and the first President of the Society for Electroanalytical Chemistry and was a member of the Board of Directors. Heineman has been active in the American Chemical Society. In the Cincinnati Section he served as Cintacs Editor, Secretary, Chair, Trustee, and Councilor. In the Division of Analytical Chemistry he served as Treasurer, Councilor, and Chair.

Research Interests

Spectroelectrochemistry; Chemical sensors & biosensors; Polymer modified electrodes; Electrochemical immunoassay; Microfluidic systems for chemical analysis

Recent Publications

Amperometric Homogeneous Competitive Immunoassay in a Perfluorocarbon Emulsion Oxygen Therapeutic (PEOT), R. E. Barlag, H. B. Halsall, W. R. Heineman, *Anal. Bioanal. Chem.*, 405, 3541-3547, 2013.

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Tom Beck, Chemistry, College of Arts & Sciences
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Biography

Tom Beck is a Professor of Chemistry at the University of Cincinnati. He is a physical chemist with research interests in theoretical and computational chemistry. After receiving his undergraduate degree in 1982 from the University of Minnesota, he studied at the University of Chicago, receiving his Ph.D. in 1987. His thesis concerned molecular dynamics simulations of phase transitions in atomic clusters. He then worked for two years as a postdoctoral fellow at the Los Alamos National Laboratory in New Mexico, where he helped to develop new Monte Carlo methods in quantum dynamics. In 1989, he joined the faculty of the University of Cincinnati. His research in Cincinnati has included further work on atomic clusters and quantum dynamics, computer simulations of liquid chromatographic interfaces, simulations of phase equiliabria in liquids, development of new numerical methods for quantum chemistry, fundamental studies of ions in solutions, and modeling studies of biological ion channels.

Education

PhD, University of Chicago, 1987 (Chemical Physics)
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Research Interests

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