BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors. Follow this format for each person. **DO NOT EXCEED FIVE PAGES**.

NAME: Petelenz, Tomasz, J

eRA COMMONS USER NAME (credential, e.g., agency login): TOMASZjPI

POSITION TITLE: Research Associate Professor

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
University of Utah, Salt Lake City, UT	PhD	09/1989	Bioengineering
Silesian University of Technology, Gliwice, Poland	MS	09/1976	Applied Physics/ Microelectronics

A. Personal Statement

Medical device development and clinical implementation require multidisciplinary medical device design, regulatory and commercialization expertise, as well as the ability to work together with engineers, clinicians, and patients in hospital and laboratory environments. My education and professional experience include solid state physics and micro-electromechanical systems and technologies (MEMS), which will play an important role in providing oversight of project selection and continuing review of projects progress. During my career, I have managed biomedical R&D projects at all stages of medical and drug delivery systems development from concept, funding procurement, to clinical testing, regulatory compliance, and production. I have co-founded a drug delivery company, lomed, Inc., focused on the development and commercialization of transdermal iontophoretic drug delivery systems. My experience in medical and drug delivery device R&D encompasses implantable cardiac pacemakers, iontophoretic transdermal drug delivery systems, kidney dialysis machines, infusion and injection devices, biosensors, optical sensors, cardiovascular devices, wearable sensors, wireless data communication devices, and prosthetics. I have conducted and managed engineering development and performed animal testing for intra-esophageal and intravascular applications, organized and directed a drug delivery systems R&D laboratory, and developed an ISO9001 based quality system for a medical start-up company. I have designed and conducted animal and human studies, and I am a member of the University of Utah IRB. I have initiated, and teach a Regulatory Affairs undergraduate/graduate courses, and I teach Design Control, 21CFR820-based undergraduate and graduate courses at the University of Utah Department of Biomedical Engineering. I have been a Co-PI and directed and conducted a 5-year NIH-supported biol~immersion clinical need identification training. The 10-week summer course provided clinical shadowing experience for Bioengineering and Multidisciplinary Design (Architecture) students and trained them to identify clinical problems and needs and develop concept solutions. I am a CoPI on the NSF-supported ICORPS Site program that has trained over a hundred physician-engineer teams in need identification, customer discovery and medical projects entrepreneurship. I believe that my bioengineering education and experience in multidisciplinary design, research, clinical collaborations, and the regulatory process will allow me to make significant engineering, quality, and regulatory contribution to the Center, as well as provide product development, testing, and regulatory leadership.

In this project, I will co-lead the Dissemination Core, oversee the engineering development and Human Subjects Protection regulatory compliance.

B. Positions and Honors

Positions and Employment

UNIVERSITY OF UTAH, Department of Bioengineering, Salt Lake City, UT Research Associate Professor Adjunct Associate Professor	2011-present 1992-2011
RAYTHEON SARCOS, Salt Lake City, UT Senior Manager, Program Management	2007 – 2011
SARCOS RESEARCH CORPORATION, Salt Lake City, UT Vice President, Medical Projects Technical Director, Medical Projects	1994 – 2007
IOMED, INC., Drug Delivery Systems, Salt Lake City, UT Director of Research and CTO Co-Founder and Director of Product Development	1987 – 1994 1989 – 1994 1987 – 1989

Other Experience and Professional Memberships

Member, University of Utah Institutional Review Board (IRB) IEEE EMBC Associate Editor (multiple years) Member of the Veterans Administration Rehabilitation R&D Scientific Review Board, Washington, DC Controlled Release Society, Member (past) IEEE Neural Systems and Rehabilitation Engineering – ad hoc reviewer Journal of Controlled Release – Reviewer

<u>Awards</u>

- Technology Innovation Award 2004, University of Utah
- Multiple grant awards from the NIH, NSF, CDC, MSHA / NIOSH, DoD; over \$6M in research funding
- Fullbright-Hayes Scholarship

C. Contribution to Science

1. Microcamera for imaging and sensing applications. Developed a method of surface composition analysis using scattered light imaging with a sub-millimeter N-MOS microcamera for tumor detection. Target application included non-invasive detection of Barrett's esophagus and other GIT neoplasms. The work was funded by the NCI and results in prototype devices and program reports submitted to the NCI.

2. Drug delivery systems. Developed and clinically tested new electrode technology for administration of local and systemic medications by iontophoresis. The work results in new clinical and commercial application of iontophoretic drug delivery.

- Maloney MJ, Bezzant JL, Stephen RL, Petelenz TJ. Iontophoretic administration of lidocaine anesthesia in office practice an appraisal. J Dermatol Surg Oncol 1992. ; 18:937-940.
- Petelenz TJ, Buttke JA, Bonds CB, Lloyd LB, Beck JE, Stephen RL, Jacobsen SC, Rodriguez P. Iontophoresis of dexamethasone: laboratory studies. J Controlled Release 1992;20:55-66.
- Ashburn MA, Stephen RL, Ackerman E, Petelenz TJ, Hare B, Pace NL, Hoffman AA. Iontophoretic delivery of morphine for postoperative analgesia. J Pain Symptom Management 1992; 7:27-33.Krueger GG, Wojciechowski ZJ, Burton SA, Gilhar A, Huether SE, Leonard LG, Rohr UD, Petelenz TJ, Highuchi WI, Pershing LK. The development of a rat/human skin flap served by a defined and accessible vasculature on a congenitally athymic (nude) rat. J Fund Appl Toxicol, 1985; 5:112-21.

3. Non-invasive detection of cardiac output and wireless monitoring of vital signs. This research focused on monitoring of vital signs and cardiopulmonary parameters in soldiers on the battlefield. Cardiac output is critical in the detection of the onset of hemorrhaging shock during battlefield casualty rescue and transport. The work result in the development of a working system that has been tested in controlled animal studies.

 Petelenz, TJ, Peterson, SC, Hughes, Jameson, R, Jacobsen, SC, Pearce, FJ, VanAlbert, S, Garcia, A Bodo, M, "RF-based non-invasive cardiac output tracking" Advanced Technology for Combat Casualty Care, Medical Research and Materiel Command, St.Petersburg, FL, 2007

- Petelenz, TJ, Sikorski, K, Jacobsen, SC, "Power Limitations in Embedded Systems Impact of Signal Acquisition and Data Processing Strategies", HCMDSS Conference Proceedings, 2005
- Petelenz, TJ, Sikorski, C, "Potential alternative signal sampling and reconstruction strategies for low power embedded sensors." Proceedings of the 2007 Joint Workshop on High Confidence Medical Devices, Software and Systems, and Medical Plug-and-Play Interoperability, Cambridge, MA, IEEE Society Press, 2007, pp.194 – 197.

4. Continuous orthopeadic load monitoring. We have developed the first practical system for long term, continuous monitoring of underfoot load and physical activity during the rehabilitation of lower extremity fractures. The system was developed, fabricated and tested in 30 patients recovering from tibia and ankle fracture surgery.

- Petelenz, TJ, Peterson, SC, Jacobsen, North, K, Kubiak, EN, Hitchcock, RW, Petelenz, TJ, "Load Monitoring System for Partial Weight Bearing Therapy for Rehabilitation of Lower Extremity Fractures", IEEE EMBC 2013 Conference, Osaka, July 2013.
- Lajevardi-Kosh, A, Tresco, BI, Ackerman, M, Petelenz, T, Hitchcock, R, Acquisition and Analysis of Underfoot Data from Lower Extremity Fracture Patients, Proceedings of the BMES Conference, 2015
- Vandersteen, E, Petelenz, T, Hitchcock, R, The Design and Development of a Portable Pressure sensing Insole for out-of-Clinic Load Capture, Proceedings of the BMES Conference, 2015
- Stuart AR, Lajevardi-Khosh A, Chen NK, Presson AP, Petelenz TJ, Hitchcock RW, Kubiak EN. Loading and Ambulatory Behavior of Lower Extremity Fracture Patients. Military Health Services Research Symposia, Orlando, FL, Aug 2016
- North, K, Kubiak, EN, Rothberg, DL, Lajevardi-Kosh, A, Petelenz, TJ, Hitchcock, RW, Stuart, AR, "Longitudinal monitoring of patient limb loading throughout ankle fracture rehabilitation using an insole monitoring system: a case series.", Current Orthopaedic Practice, Vol. 28, No. 2, March/April 2017

Publications, presentations and patents: 40 publications and presentations, 30 patents, 2 patents pending

D. Additional Information: Research Support and/or Scholastic Performance

Title: Ambulatory Tibial Load Analysis System Supporting Agency: DoD CDMRP

Project Goals: The aim of this grant is to use the load monitoring technology developed in the Hitchcock laboratory to study how limb loading directs fracture outcomes. The limb loading data collected from the sensor will be used to develop data base rehabilitation protocols. In my role I have contributed to engineering design, quality system, designing research protocols, supervising students and managing the project.

Title: Motherhood and Pelvic Health Supporting Agency: NIH

Project Goals: The objective of this project is to investigate the clinical role of abdominal pressure in diagnosis and treatment of pelvic floor disorders. The project involves the development of specialized recording systems for a clinical study with over 800 women, sensor fabrication and supply, and participation in data analysis. My role in the project is engineering development and support.

OVERLAP

There is no overlap between projects funded and pending.