Prof. Steven S. Saliterman  
BMEn 5151 Introduction to BioMEMS & Medical Microdevices  
Projects 2006 to 2019

2019

3-ω Sensor for Property Measurement of Biomaterials  
A Novel, Portable Device to Count CD4+ T Cells using Flow Cytometry and a Cellphone  
Diagnosis of Sepsis By Measurement of Spontaneous Neutrophil Motility  
Fetal Chromosomal Abnormalities Detection Chip  
Highly Stretchable Tactile Sensor Pressure Detection during Colonoscopy  
Miniaturized Cantilever Device for High-Throughput Analysis of Muscle Cell Contractile Forces  
Monitoring Chronic Kidney Disease Through the Use of BioMEMs  
Non-Invasive, Continuous, Wearable Blood Glucose Monitor  
Optical Immunoassay for Snake bite Diagnosis  
Piezoelectric Cupular Micro Transducer Implant  
Shrink-based Device for Protein Purification  
Single-Neuron Gene Delivery via a PDMS-Based Multielectrode Array  
ThyChyp

2018

Anti-thrombotic Inferior Vena Cava Filter  
Improving the Design of Middle-Ear Implants  
Lab-on-a Disc to Evaluate CTCs in Humans  
Lung-on-a-chip  
Measuring Lactate to Evaluate Ex-vivo Donor Heart Functionality  
Non-Invasive Treatment of Anaphylaxis  
Optrodes for Neural Stimulation  
Paper-Based ELSIA for the Developing World  
Piezoelectric & CMUT Devices as Retinal Implants  
Placenta-on-a-Chip  
Sensor for Measuring Intra-abdominal Pressures  
Smart Contact Lens for Glaucoma Diagnosis & Treatment

2017

Anemia Diagnosis Device  
Biomimetic Cutaneous Mechanoreceptor Field for Tactile Sensation in Artificial Skin  
The Delivery and Control of Microbial Fuel Cells in Powering Implantable Devices  
Detection of Plasma Endorphin Concentrations Using Microfluidic Device  
Implantable Multi-Sensor Device for Monitoring and Managing Cardiovascular Health
Integrated Medical Device for Atherectomy
Lab on a Chip for Saliva Diagnosis of Cystic Fibrosis
Epipen on a Chip
Microfluidic Device for Insulin-Dependent Diabetic Patients
Micro Pulse Oximeter for use in the Brain
Touch Sensor for Prosthetic Hand

2016

A Digital Microfluidic Lab-on-a-Chip for at Home Glucose Monitoring
Bacterial Detection Using Optical Biochips
Biomolecular Recognition Biosensors
Clot-on-a-Chip Point of Care Emergency Coagulopathy Device
Diagnosing Melanoma with ‘Lab-On-a-Chip’
Dipstick 2.0 - Enzymatic Nitrate Quantification
Early Cancer Detection
MEMS Pressure Sensors
Microfluidic Blood Oxygenator
Microfluidic Cell Sorting
Microfluidics for the Study of Cancer Metastasis
Multimodal Water Pathogen Detection
3D Microfluidic Model for the Movement of Cancer Cells through Blood Vessels

2015

Application of MEMS Technology for the Treatment of Diabetes Mellitus
Circulating Tumor Cell Capture
Surface Plasmon Resonance
Transdermal Patch for Delivery of Epinephrine
Subcutaneous Infusion of Insulin for Patients with Diabetes Retinal Prosthesis
Device to Study Migration of Cellular Aggregates in Confined Microenvironments
Multi-electric Giant Magneto-resistance (GMR) Sensor for Clinical Disease Diagnosis
Cytomegalovirus Point-of-Care Biodetection
A Possible Design for an Artificial Kidney-On-A-Chip Device
Automated Differentiation and High-Throughput Screening of Beta Cells
Flexible Cortical Electrode with Silk-Based Drug Carrier in the Treatment of Movement Disorders
Cortisol Point-of-Care Detection Chip
Microfluidic Channel with a Polymer Valve
Microfabricated Drug Delivery Device for Ocular Diseases

2014

Hydrogels for Drug Delivery
Chronic Kidney Disease: Glomerular Pressure Measurement
Implantable Drug-Releasing Microdevices to Relieve Pain in Rheumatoid Arthritis
Extravasation of Metastatic Carcinoma Cells in Diverse Vasculature
Lab on a Chip: Urinary Tract Infection Detection
Hematuria Detection BioMEMS Device
Flow Cytometry to Identify Acute Lymphoblastic Leukemic Cells
Retinal Prosthesis
An Implantable Microfluidic Chip for Insulin Delivery with Embedded Glucose Monitoring
Sensimed Triggerfish Contact Lens
Vitamin D Detection and Dispensing
Detection and Quantification of Antibodies Using Cantilever Sensors Integrated With Magnetic Particles
Microscopic Tumor Excision Therapy
Using MEMS for Retinal Prostheses
Machining Plaque

2013

An Indomethacin Emitting Polyimide Brain Electrode
Cell Encapsulation
Closed Loop Drug Eluting System for Deep Brain
Closed Loop Insulin Delivery
Detection of Micro-Vascular Status
Early Detection of Hodgkin’s Lymphoma Relapse
Lung on a Chip
Magnetic Nano-Particles for Cancer Therapy
Olfactory sensors on a chip to prevent COPD exacerbations
Rapid detection of Hepatitis B using SIMBAS
Real-Time Cardiac Calcium Sensing
The Multi-Sensing Croc Clamp
Tuberculosis Drug Susceptibility Testing

2012

BioMEMS for Cancer Relapse Detection
BioMEMS for Hydrocephalus Treatment
Coupling Mass Spectrometer Electrophoresis Proteomics
Detection and Isolation of Cancer Cells
Microchannel Resonator for PSA Monitoring
Microelectrodes in Neural Implants
Multiplexed GMR Bio-Sensing
Pacemakers in Lung & Respiratory Disease
Spinal Cord Stimulator
2011

Biomedical Watch
Capsule Endoscopy
Continuous Glucose Monitoring for Diabetes
Coupling SEC with Micro-FFE 2D Separations
Epiretinal Prosthesis
Infrared Light to Detect Blood Glucose Levels
Integra Detection of Cystic Fibrosis
LDH Sensor
Subretinal Implants
Troponin Alert Early Detection of Heart Attacks
Vulnerable Plaque and Diagnostic Evaluation via BioMEMS

2010

Blood Pressure Sensor with Human Energy Harvesting
Cochlear Implant Device to Monitor Neurotransmitter in Vivo
FBAR-CMOS Mass Sensor as Label-Free Biodetection
Implantable Immuno-Isolated Islets
Integrated Device for Diagnosis Genetic Diseases
Microfluidic Level Sinusoid
Organic Materials for Photodiodes in Subretinal Implants
Parylene MEMS Force Sensor
Podocyte Culture Using Porous PDMS Microchannels for Dialysis
Power Scavenging and Potential BioMEMS Applications
Power Sensor for Measuring Electrolyte Levels in the Body
Pulmonary Embolism - Monitoring BioMEMS Systems
Retinal Implants
Stents as Antennas

2009

Cholesterol Level Monitoring
Implantable Dialysis Device for Renal Failure
Implantable Piezoelectric Battery Charger
Magnetic-Bead Based Microfluidic System
Micro Probe Array for Electrical Biosensors
Microdevice to Identify Bacterial Strains
Optical Trapping Applications in BioMEMS
Surgical Precision via the Data Knife

2008
BioMEMS Device for Autonomic Nervous System Failure
DOT ELISA Lab-on-a-Chip
Flow Regulation Induced Expandable Stent
Implantable Blood Pressure Sensor
Implantable Glucose Monitoring
Implantable Micro Sensor for Lactate Monitoring
Implantable Microdevice for Viscosupplementation
In-Vivo Functional Electrical Stimulation System
Joint Repair Using Polymers and Ultrasound
Microdevice for Retinitis Pigmentosa
Microfluidic Cell Analysis using Dielectrophoresis
Neurotransmitter Analysis via Microdialysis
Wireless Blood Glucose Monitoring Device

2007

Biotelemetry, BioMEMS and Wearable
Diabetes Glucose Monitoring and Drug Delivery System
Homeland Security Applications for BioMEMS
Implantable Biosensor Devices for Lactate and Glucose Detection
Implantable Hemodynamic Sensor
Medical Nanodevices
Microarrays and Newborn Screening
Microfluidic Platform for Cell Analysis with Quantum Dots
Micropump with Piezoelectric Plastic
Nanoneedle-Enhanced BioMEMS for In-Vitro Cellular Treatment
Neural Probes
Point of Care Diagnosis of Acute Myocardial Infarction
Shape Memory Alloy Micro Actuators

2006

BioMEMS Cancer Targeting-Final
BioMEMS Devices for the Treatment of Hydrocephalus
Bio-pressure Sensor and Drug Delivery Device
Diabetes Lens
Detection of a Biomarker for Alzheimer's Disease
IR Implant
Implantable Retinal Sensor Array
MEMS Device for Blood Pressure Measurement
Micro Devices in Hearing Assistance
Nano-Batteries and BioMEMS Applications
Reverse Phase Microarrays
Smart Pill Glucose Regulation
Subretinal Implant with Glutamate Release
Terahertz Micro-Bolometer