

Prof. Steven S. Saliterman
BME 5151 Introduction to BioMEMS & Medical Microdevices
Projects 2006 to 2023

2023

Brain-on-a-Chip
Microneural Probes
Cancer-on-a-Chip Models: Making Cancer Run Scared One Chip at a Time
Single-Cell RNA Sequencing
Continuous Glucose Monitor
Impact of Diffusion Coefficients on Cryopreservation Agents within a Kidney-on-a-Chip
Toxicity Testing on a Chip
Kidney-on-a-Chip
Therapeutic Pancreatic-Ductal Adenocarcinoma on a Chip

2022

Uterus-on-a-Chip
Multiple Sclerosis Specific Brain-on-a-Chip
Thymus-on-a-Chip
Microfluidic Device Mimicking Bifurcated Bronchioles
NP and Cancer
Gut-on-a-Chip
GTO-on-a-chip
Lung-on-a-Chip
TBI Presentation
POC for early Detection of Osteoarthritis
Atherosclerosis-on-a-Chip

2021

Aneurysm-on-a-Chip
Cardiac Myocyte Organ-on-a-Chip Microsystem
CVD of Large Area Graphene Films on Cu-Ni Alloys
Determining physiological stress using a wearable stress sensor
Eyeball-On-A-Chip
Glucose Monitoring Contact Lens
Ingestible Bacterial-Electronic System to Monitor Gastrointestinal Health
Opto-genetically Modulated Organ-on-a-Chip Device for Modeling Huntington's Disease
Rapid Viral Testing from Analyte in an Electrochemical Lab on a Chip with Pooled Sampling
Use of Lung-on-a-Chip to Model Drugs for Tuberculosis
Using Microfluidics to Demonstrate Angiogenesis and Cell Extravasation Events in Cancer Metastasis

Utilizing Organ-on-a-Chip Technology to Elucidate SARS-CoV-2 Pathogenesis in the Cardiovascular System and Brain

2020

A BioMEMS Implant to Treat Spinal Cord Injuries
A Mobile Neurostimulation Electrode
Assay of Testicular Germ Cell Tumors
COVID-19 High Throughput Serology Chip
Detection of the SARS-COV-2 Using SPR
Heart-on-a-Chip
Microfluidic Device for Cancer Diagnosis & Monitoring of Metastasis
Organ-on-a-Chip Model for COVID-19
Piezoelectric Patch & Pump for Drug Delivery in Tumors
Quantum Dots for Auditory Brainstem Prosthesis
Real Time Drug Monitoring Peritoneal Dialysis

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 Magnetoresistance (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