

# Professor David Erickson

SC Thomas Sze Director and Sibley College Professor  
Sibley School of Mechanical and Aerospace Engineering  
Cornell University  
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## Biography:

David Erickson is the SC Thomas Sze Director and Sibley College Professor in the Sibley School of Mechanical and Aerospace Engineering at Cornell University. He is also a joint Professor within the Division of Nutritional Sciences. His research focuses on: mobile and global health technology, medical diagnostics, microfluidics, photonics, and nanotechnology. Prior to joining the faculty, he was a postdoctoral scholar at the California Institute of Technology and he received his Ph.D. degree from the University of Toronto. Research in the Erickson lab is or has been primarily funded through grants from the NIH, NSF, ARPA-E, ONR, DOE, DARPA, USAID, Nutrition International, and Global Alliance for Improved Nutrition (GAIN). Prof. Erickson has helped to found numerous start-up companies commercializing: high-throughput pharmaceutical instrumentation, biomedical diagnostics, and energy technologies including Halo Labs (<http://halolabs.com>), VitaScan (<http://vitascan.me>) and Dimensional Energy (<https://www.dimensionalenergy.net/>). Dr. Erickson has received the DARPA-MTO Young Faculty Award, the NSF CAREER Award, the Department of Energy Early Career Award, among others. In 2011 he was awarded the Presidential Early Career Award for Scientist and Engineers (PECASE) by President Obama. Erickson has been named a fellow of the Optical Society of America, the American Society of Mechanical Engineers, and the Canadian Academy of Engineering.

## Education:

**Post-Doc**, Electrical Engineering, California Institute of Technology, Pasadena, CA (2005)  
**Ph.D.**, Mechanical Engineering, University of Toronto, Toronto, ON (2004)  
**M.A.Sc.**, Mechanical Engineering, University of Toronto, Toronto, ON (2001)  
**B.Sc.** – Mechanical Engineering, University of Alberta, Edmonton, AB (1999)

## Employment

**SC Thomas Sze Director of the Sibley School of Mechanical and Aerospace Engineering**, Cornell University (2019 – Present)  
**Associate Dean for Research and Graduate Studies**, College of Engineering, Cornell University (2017-2019)  
**Sibley College Professor**, Mechanical and Aerospace Engineering, Cornell University (2015-Present)  
**Joint-Professor**, Division of Nutritional Sciences, Cornell University (2016-Present)  
*Other affiliations at Cornell*  
Graduate Field Memberships: Mechanical Engineering, Aerospace Engineering, Biomedical Engineering, Electrical Engineering, Applied Physics.  
Center Memberships: Atkinson Center for a Sustainable Future, Institute for Nutritional Sciences, Global Health, and Technology (INSiGHT) – <http://insight.cornell.edu>, Cornell Center on the Microenvironment and Metastasis  
**Co-Founder and Board Member**, Dimensional Energy, Ithaca, NY (2017 - Present)  
**Co-Founder & Chairman**, VitaScan (formerly VitaMe Technologies Inc.), Ithaca, NY (2016 - Present)  
**Co-Founder**, HaloLabs Inc. (formerly Optofluidics Inc.), San Francisco, CA (2011 - Present) **Chairman**, 2011-2018)  
**Professor**, Mechanical and Aerospace Engineering, Cornell University (2015)  
**Associate Professor**, Mechanical and Aerospace Engineering, Cornell University (2011-2015)  
**Assistant Professor**, Mechanical and Aerospace Engineering, Cornell University (2005-2011)  
**Visiting Professor**, École Polytechnique Fédéral Lausanne (EPFL), Lausanne, CH, (2011)  
**Post-Doctoral Associate**, California Institute of Technology, Pasadena, CA (2004-2005)  
**Graduate Research Assistant and Instructor**, University of Toronto, Toronto, ON, (2000-2004)  
**Research Assistant**, Defense Research Establishment Valcartier (DREV), Quebec City, QC, (1999)

## Recent Major Awards and Honors

**Fellow, Canadian Academy of Engineering** (2021)  
**Defense Sciences Study Group** (2016-2017)  
**Sibley College Professor** (2015)  
**University of Toronto Distinguished Alumni Lecture** (2015)  
**National Academy of Engineering US-China Symposium, Keynote Speaker** (2015)  
**Fellow of the American Society of Mechanical Engineers, ASME** (2014)  
**Prism Award Finalist**, for Optofluidics's Molecular NanoTweezer, SPIE (2014)  
**Pittcon Silver New Product Award**, for Optofluidics's Molecular NanoTweezer (2013)  
**Corporate Innovator Award**, for Optofluidic's Inc., IEEE (2013)  
**Fellow of the Optical Society of America, OSA** (2012)  
**Philadelphia Life Sciences Start-up of the Year**, Greater Philadelphia Alliance for Capital and Technologies (2012)  
**Presidential Early Career Award for Scientists and Engineers, PECASE** (2011)  
**Department of Energy Early Career Award** (2010)  
**National Science Foundation CAREER Award** (2009)  
**National Academy of Engineering Frontiers in Engineering Symposium** (2009)  
**4th U.S. – Japan NSF Young Researchers Exchange Program** (2007)  
**DARPA-MTO Young Faculty Award** (2007)  
**Robert '55 and Vanne '57 Cowie Excellence in Teaching Award** (2007)  
**Associate Editor**. Journal of Microfluidics and Nanofluidics (2008 – 2013)  
**Associate Editor**. Smart Materials and Structures (2008 – 2013)

## Select External Positions

### **Academic Conferences – Organizer**

- ***uTAS***: 2021 (Palm Springs, CA) – External Engagement Committee
- ***Photonics West***: 2019, 2018, 2017, 2016, 2015, 2014, 2013 (San Francisco, CA) – Conference Organizer “Optics and Biophotonics in Low-Resource Settings”
- ***European Optical Society – World of Photonics Congress***: 2013 (Munich, Germany) “Optofluidics conference co-organizer” 2011 (Munich, Germany) “Optofluidics” conference organizer.
- ***Frontiers in Optics***: 2010 (Rochester, NY) Symposium Organizer “Optofluidics in the Near Field”.
- ***Conference on Lasers and Electro-Optics, CLEO***: 2011 (Baltimore, MD), 2010 (San Jose, CA) Technical Committee “Biophotonics and Optofluidics”; 2009 (Baltimore, MD) **Symposium Chair and Organizer** “Optofluidics” & Technical Committee Member “Medical and Biological Applications”; 2007 (Baltimore, MD) Session Chair “Photonic Crystals”.
- ***IEEE/LEOS Summer Topicals***: 2008 (Acapulco, Mexico) & 2006 (Quebec City, Quebec) Organizer & Chair “Optofluidics: Emerging Technologies and Applications”
- ***International Mechanical Engineering Congress and Exposition (IMECE, ASME Annual Meeting)***: 2009 (Orlando, FL) & 2008 (Boston, MA) Co-Organizer of annual symposium on microfluidics & Session Chair; 2007 (Seattle, WA) Session chair; 2005 (Orlando, FL) Session Chair.

### **Proposal Review Panel Member**

- **National Science Foundation**: May 2021 – Biophotonics - Sept 2020 – CAREER Biophotonics Aug 2018 – CAREER Biophotonics; April 2016 – Partnerships for Innovation. January 2012 – Biosensors; December 2008 – Civil, Mechanical and Manufacturing Innovation; May 2008 - Chemical, Biological and Engineering Transport; May 2008 - Chemical, Biological and Engineering Transport (*Note: 2 Panels done in May 2008*); January 2008 - Chemical, Biological and Engineering Transport; 2007 – Active Nanostructures and Nanosystems Program; December 2006 & June 2006 – Nanomanufacturing Program.

- **National Institutes of Health:** June 2021 - J DSI-Africa Research Hub (U54) - Sept 2020 – NIBIB Sars-CoV-2; February 2017 – NIBIB ISD - October 2015 – NIBIB IMST; July 2015 – NIH SBIR, November 2014 – NIAID June 2014 – SBIR, November 2013 – IMST; November 2012 – IMST; June 2012 – ISD; February 2012 – Biotechnology; March 2010 – National Cancer Institute: Early Diagnostics for Cancer Detection. November 2008 & September 2007 - National Institute of Environmental Health Sciences (NIH-NIEHS): Superfund Basic Research Program; October 2008 and October 2009 National Institute of Allergy and Infectious Diseases (NIH-NIAID): Cooperative Research Partnerships for Biodefense.
- Also reviewer for: **Department of Energy** (2010-2017), **European Union/Commission** (2008-2016), **Singapore Science Foundation** (2008-2011), **Hong Kong Science Foundation** (2008-2011).

### **Departmental, College and University Level Service (Partial List):**

**SC Thomas Sze Director of the Sibley School of Mechanical and Aerospace Engineering** (2019 – Present)  
**Praxis Advisor Committee** (2019-2021)  
**eCornell Advisory Committee** (2019-Present)  
**Dean of Engineering Search Committee** (2019-2020)  
**Dean of the Graduate School Search Committee** (2019-2020)  
**Associate Dean of Engineering for Research and Graduate Studies** (2017-2019)  
**Internationalization Council** (2018-2019)  
**Committee to establish an entrepreneurial minor in engineering** (2016)  
**Chair, MAE Directors Review Committee** (2016)  
**Chair, Microsystems Search Committee** (2015-2016).  
**Chair, Undergraduate Programs Committee** (2012-2015)  
**Applied Physics Search Committee** (2014)  
**Entrepreneurship and Industry Committee - College of Engineering** (2011)  
**Reinvisioning the Engineering Library Committee - College of Engineering** (2010)  
**Fluid Dynamics Search Committee** (2010-2011)  
**Admissions Committee** (2010-2011)  
**Chair, Graduate Programs Committee** (2009-2011)  
**Colloquium Committee** (2008-2009)  
**Faculty Secretary** (2007-2008)  
**Dynamics Systems and Controls, Search Committee** (2006-2008)  
**Academic Committee** (2006-2007)

### **Research Funding**

Below is a subset of the federal grants awarded to the Erickson lab, Co-PIs are at Cornell unless otherwise indicated.

**National Institutes of Health** 8/5/2021 – 8/4/2023  
Program: National Institute of Biomedical Imaging and Bioengineering  
Title: Paper-COVID - Platform for High-throughput SARS-CoV-2 Screening and Contact Tracing  
Role: PI (Mason, Chris – Weill Cornell Co-PI)  
Amount: ~\$450k (Total).

**National Institutes of Health** 2/10/2021 – 1/31/2023  
Program: National Cancer Institute  
Title: Point of Care Diagnostic test for Molecular Subtyping of Breast Cancer (PoCBreCa Study)  
Role: Co-PI (PI = Adebamowo, Clement – U Maryland, Baltimore)  
Amount: ~\$450k (Total).

**National Science Foundation** 08/14/2020 – 08/14/2022  
Program: Partnerships for Innovation  
Title: PFI-TT: Mobile device-based detection of toxins in food crops to monitor food safety and improve public health  
Role: Co-PI (Mehta, Saurabh – PI)  
Amount: \$250k (Total)

**Pershing Square Foundation**  
TINY COVID: Rapid, Mobile, and Point-of-care Diagnostics for SARS-CoV-2 from Saliva  
Role: Co-PI (PI Mason, Chris)  
Amount: \$250k (Total)

**National Institutes of Health** 09/01/2020 – 09/01/2021  
Program: National Cancer Institute  
Title: Adapting KS-Detect technology to high-throughput COVID-19 screening  
Role: PI (Mason, Chris – Weill Cornell Co-PI)  
Amount: \$160k (Total)

**National Institutes of Health** 07/01/2019 – 07/01/2024  
Program: National Institute on Aging (R01)  
Title: A Biomarker Panel Based Smart Mini-Array System for the Homecare of Autoimmune Kidney Diseases  
Role: Co-PI (Wu, Tianfu – University of Houston, PI)  
Amount: \$593k (Erickson lab amount)

**US Agency for International Development** 09/30/2018 – 9/29/2022  
Title: Food Safety Assessment Via Aflatoxin Sensors at the Point-of-Care  
Role: Investigator

**Clinical and Translational Science Center** 07/01/2018 – 6/30/2020  
Title: Novel Phenotypic Assay for Determining Antibiotic Susceptibility of Neisseria Gonorrhoeae  
Role: PI (Mehta, S., Co-PI)  
Amount: \$42k

**Clinical and Translational Science Center** 07/01/2018 – 6/30/2020  
Title: H.E.R.M.E.S: Rapid Low-Cost Blood-Plasma Separation at the Point-of-Need  
Role: PI  
Amount: \$92k

**Dimensional Energy, Inc.** 08/30/2018 – 8/30/2020  
Title: HI-Light - Solar Thermal Chemical Reactor Technology for Converting CO<sub>2</sub> to Hydrocarbons  
Role: PI (Tobias Hanrath, Co-PI)  
Amount: \$225k

**National Science Foundation** 07/01/2018 – 06/30/2019  
Program: iCORPS  
Role: PI  
Amount: \$50k

**Global Alliance for Improved Nutrition** 07/01/2017 – 07/01/2019  
Title: “Rapid detection of aflatoxin”  
Major goal: To develop rapid diagnostic tools for diagnosing aflatoxin exposure.

Role: Co-PI (Mehta, S., DNS Cornell, PI)  
Amount: ~\$200k

**Atkinson Center for a Sustainable Future**

06/01/2017-08/01/2019

Program: Academic Venture Fund

Title: “RIDAR – Rapid Identification of Infectious Diseases and Antibiotic Resistance”

Major goal: To develop a rapid diagnostic system for measuring the resistance of unknown bacterial organisms to a variety of antibiotics

Role: Co-PI (Mehta, S., DNS Cornell, PI)

Amount: ~\$150k

**United States Department of Agriculture**

06/01/2017-06/01/2020

Title: “ReproPhone: A User-friendly, Rapid, Low-cost Tool to Improve Cattle Reproductive Management”

Major goal: To develop a mobile technology for monitoring cattle fertility.

Role: Co-PI (Giordano, J., Animal Science Cornell, PI)

Amount: ~\$450k

**National Institutes of Health**

08/15/2017-05/31/2020

Title: “Development of a Point of Care Multiplexed Diagnostic Platform to Target Anemia and Micronutrient Deficiencies”

Role: Co-PI (PI, J. Finkelstein, DNS)

Amount: \$227k

**National Institutes of Health**

07/01/2016-07/01/2022

Program: National Cancer Institute (UH2/UH3)

Title: “KS-Detect – Rapid diagnosis of Kaposi’s Sarcoma using solar-thermal microfluidics”

Major goal: To develop a solar enabled rapid diagnostic system for Kaposi’s Sarcoma and demonstrate efficacy in and around Kampala, Uganda.

Role: PI

Co-PIs: E. Cesarman (Weill Cornell), J. Martin & T. Mauer (UCSF), A. Semeere (IDI, Uganda)

Amount: \$4.0M

**National Institutes of Health**

07/01/2016-07/01/2020

Program: National Institute of Biomedical Imaging and Bioengineering (R01)

Title: “FeverPhone: Point of Care Diagnosis of Acute Febrile Illness using a Mobile Device”

Major goal: To develop mobile technologies for diagnosing the most common agents of infectious diseases including Dengue, Chikungunya, and Malaria.

Role: PI

Co-PI: S. Mehta

Amount: \$2.4M

**Atkinson Center for a Sustainable Future**

06/01/2016-08/01/2016

Program: Rapid Response Fund

Title: “ZikaDrone”

Major goal: Seed funds to develop a UAV based method for monitoring Zika and similar mosquito borne viruses.

Role: PI

Co-PI: J. Finkelstein

Amount: ~\$20k

**Atkinson Center for a Sustainable Future**

06/01/2016-06/01/2017

Program: Academic Venture Fund

Title: “Green Methanol”

Major goal: To develop a method for sequestering carbon and converting it into sunlight using solar energy.

Role: PI

Co-PI: T. Hanrath

Amount: ~\$100k

**Micronutrient Initiative**

12/01/2015-09/01/2017

Title: “Cornell NutriPhone: Expanding its capability to measure vitamin A status”

Major goal: To enable vitamin A status measurement on the Cornell NutriPhone

Role: Co-PI (Mehta, PI)

Amount: \$160k (total)

**National Science Foundation**

08/01/2014-08/01/2019

Program: INSPIRE

Title: “INSPIRE Track 2: Public Health, Nanotechnology, and Mobility (PHeNoM)”

Major goal: The goals of the program are to: first demonstrate that this roadblock to the deployment of lab-on-chip technology can be fundamentally altered by taking advantage of the now ubiquitous installed base of smartphone technology, and second show that that the fusion of physical sensing and molecular assays on mobile platforms will enable healthcare diagnostics that are far more telling than what is possible with either technology alone.

Role: PI

Co-PIs: Tanzeem Choudhury, Information Science - Cornell, Deborah Estrin, Computer Science and Public Health - Cornell TECH, Saurabh Mehta, Human Ecology and Nutritional Sciences - Cornell, Katie Shilton, Information Studies - Maryland, Aydogan Ozcan, Electrical Engineering and Bioengineering - UCLA

Amount: \$3,000k

**National Science Foundation**

08/01/2014-08/01/2017

Program: Partnerships for Innovation

Title: “PFI:BIC NutriPhone: A Nanoparticle-based Optical Contrast Assay to Monitor Vitamin and Micro-nutrient Levels Using Smartphones.”

Major goal: To develop and commercialize the “Nutriphone” – a smartphone based nutritional monitoring technology.

Role: PI

Co-PIs: Saurabh Mehta, Human Ecology and Nutritional Sciences - Cornell, Geri Gay, Information Studies.

Amount: \$700k

**National Institutes of Health**

01/01/2013-01/01/2015

Program: Nanoscience and Nanotechnology in Biology and Medicine (R21)

Title: “KS-Detect: A sample-in answer-out solution to the diagnosis of Kaposi’s Sarcoma in limited resource settings”

Major goal: To develop techniques to use sunlight to process biosamples in limited resource settings.

Role: PI

Co-PI: E. Cesarman

Amount: \$475k

**Advanced Research Projects Agency – Energy**

02/01/2013-02/01/2014

Program: Open-FOA

Title: “High density photobiorefineries with optimized light/CO2 delivery and product extraction”

Major Goal: To develop a prototype optofluidic photobioreactor for biofuel production

Role: PI

Co-PI: L. Angenent

Amount: \$910k

**National Institutes of Health**

01/01/2013-01/01/2015

Program: Nanoscience and Nanotechnology in Biology and Medicine (R21)

Title: “A New Approach to Autonomous Point-of-care Tropical Disease Diagnostics Using Solar thermal microfluidics”

Major goal: To develop techniques to use sunlight to process biosamples in limited resource settings..

Role: PI

Co-PI: A. Baeunmer, M. Frey

Amount: \$475k

**National Institutes of Health**

01/01/2013-01/01/2018

Program: Nanoscience and Nanotechnology in Biology and Medicine (R01)

Title: “Single Molecule Optically Resonant NanoTweezers for the study of Intracellular Metal Ion Transport”

Major goal: To use optically resonant nanotweezers to understand how intracellular metabolism works at the single molecule level.

Role: PI

Co-PI: P. Chen

Amount: \$1,975k

**National Science Foundation**

09/01/2010-08/31/2013

Program: Interdisciplinary Research Program

Title: “IDR: Self-Reliant, Autonomous Microsystems for Biophysical Monitoring of Small Animals (Lab-on-a-Bird)”

Major goal: To develop autonomous microsystems including microfluidic systems for monitoring small birds.

Role: PI

Co-PIs: E. Garcia, D. Winkler

Amount: \$904k

**Department of Energy**

03/01/2010-03/01/2015

Program: Young Investigator Program

Title: “Directed Assembly of Hybrid Nanostructures using Optically Resonant Nanotweezers”

Major goal: To develop a technique for directly assembling arbitrary nanostructures using optically resonant nanotweezers.

Role: PI

Amount: \$750k

**National Institutes of Health**

04/01/2010-04/01/2012

Program: Nanoscience and Nanotechnology in Biology and Medicine (R21)

Title: “Optically Resonant Nanotweezers”

Major goal: To use optically resonant nanotweezers to investigate the single molecule interactions particularly those involved with metal ion transport.

Role: PI

Co-PI: P. Chen

Amount: \$475k

**Office of Naval Research**

01/01/2010-13/31/2012

Program: Biosciences program

Title: “Autonomous microfluidic devices for battlefield health assessment and treatment”

Major goal: To develop a “self-reliant” system that can autonomously monitor the body for changes in vasopressin levels in response to traumatic events and regulate them.

Role: PI

Amount: \$510k

**National Institutes of Health**

07/01/2009-6/31/2014

Program: Physical Sciences Oncology Centers

Title: “Center on the Microenvironment and Metastasis”

Major goal: To develop nanotechnologies to elucidate the root causes of cancer metastasis.

Role: Co-PI

Amount: \$375k (Erickson lab amount)

**National Science Foundation**

05/01/2009-4/31/2014

Program: CAREER Program

Title: “CAREER: Optofluidics: Fusing Fluidics and Photonics”

Major goal: To investigate the fundamental electromagnetic and hydrodynamics behind fusing microfluidics with photonics.

Role: PI

Amount: \$400k

**Cornell Center for a Sustainable Future**

06/01/2010-06/01/2012

Program: Academic Venture Fund

Title: “Thousand fold improvement in solar photobioreactors using advanced photonics”

Major goal: To develop bioreactors using optical fibers as the illumination source. The preliminary data for this proposal was obtained under this seed grant.

Role: PI

Co-PI L. Angenent

Amount: \$100k

**Cornell Center for Life Science Enterprise**

06/01/2010-06/01/2012

Program: NYSTAR

Title: “Flexible Photonics for Biomedical Diagnostics and Bioenergy Production”

Major goal: To develop flexible photonics for biosensors and bioenergy applications

Role: PI

Amount: \$50k

**Illuminaria, LLC**

1/1/2011-12/31/2011

Program: NSF SBIR program

Major goal: To create SERS surfaces for biodetection

Role: PI on Subcontract for Phase I

Amount: \$50k

**Nanobiotechnology Center**

01/01/2010-06/01/2011

Program: Biomolecular Devices and Analysis

Title: "Soft Photonics"

Major goal: In this program we aim to develop a new paradigm for nucleic acid biosensing based on the subwavelength integration of nanophotonics and nanofluidics.

Role: PI

Co-PI: D. Luo

Amount: \$50k (Erickson lab amount)

**Nanobiotechnology Center**

01/01/2009-06/01/2011



Program: Nanoscale Cell Mechanics  
Title: "Nanoscale Optofluidic Probing of Cell Migration Mechanics"  
Major goal: Can we use optical forces to probe cell mechanics?  
Role: Co-PI (PI: Reinhart-King)  
Amount: \$40k (Erickson lab amount)

**Nanobiotechnology Center**

01/01/2009-01/01/2011

Program: Biomolecular Devices and Analysis  
Title: "SERS Enhanced Ligase Detection Reaction Chip for the Molecular Diagnosis of Cancer "  
Major goal: A new form of SERS based LDR reaction.  
Role: PI (Co-PI: Batt)  
Amount: \$40k (Erickson lab amount)

**Defense Advanced Research Projects Agency**

05/01/2008-4/31/2010

Program: Programmable Matter (DSO)  
Title: "ENZYM: Dynamically Programmable Fluidic Self-Assembly of Arbitrary Functional Objects"  
Major goal: To develop a new form of programmable matter.  
Role: Co-PI (PI: H. Lipson)  
Amount: \$1,000k (Erickson lab amount)

**Illuminaria, LLC**

10/15/2008-12/31/2011

Program: AFOSR STTR program  
Title: "Microfluidically Reconfigurable Photonics"  
Major goal: To create physically reconfigurable photonics using microfluidics  
Role: PI on Subcontract for Phase I and Phase II  
Amount: \$290k (Erickson lab amount)

**National Science Foundation**

09/01/2007-08/31/2011

Program: Active Nanostructures and Nanosystems Program  
Title: "NIRT: Active Nanophotofluidic Systems for Single Molecule/Particle Analysis."  
Major Goal: To develop active optofluidic for single molecule/particle confinement and analysis using advanced photonic structures.  
Role: PI  
Co-PIs: M. Lipson - Cornell, T. Krauss - Rochester, K. Bren - Rochester  
Amount: \$1,000k

**National Institutes of Health**

07/01/2007-06/31/2010

Program: Nanoscience and Nanotechnology in Biology and Medicine (R21)  
Title: "Nanoscale Optofluidic Screening for Pathogen Detection"  
Major goal: To developing high density photonic sensors for pathogen detection.  
Role: PI  
Co-PI: Baeumner  
Amount: \$646k

**Nanobiotechnology Center**

01/01/2007-12/31/2009

Program: Biomolecular Devices and Analysis  
Title: "Nanoscale Optofluidic Devices for Biomolecular Analysis"  
Major goal: In this program we aim to develop a new paradigm for nucleic acid biosensing based on the subwavelength integration of nanophotonics and nanofluidics.  
Role: PI  
Amount: \$240k

**Defense Advanced Research Projects Agency**

07/01/2007-06/30/2008

Program: Microsystems Technology Office, Young Faculty AwardTitle: "Integrated Nanosystems for Autonomous Health Monitoring of Warfighters"Major goal: To develop microfluidic devices for autonomous health monitoring.Role: PIAmount: \$150k**Defense Advanced Research Projects Agency**

12/15/2006-03/01/2011

Program: Microsystems Technology Office, Hybrid Insect MEMS programTitle: "Insect Cyborg Sentinels"Major goal: To develop insect cyborg sentinels which intimately fuse MEMS, NEMS, nanofluidics and microfluidics with flying insects.Role: Co-PI (PI, D. Stern)Amount: \$750k (Erickson lab amount)**National Science Foundation**

08/01/2006-08/01/2007

Program: Civil, Mechanical and Manufacturing InnovationTitle: "Hierarchical Microfabrication: Actively Programmable Multi-level Fluidic Self-Assembly"Major goal: The goal in this grant is to exploit dynamic microfluidic effects both to accelerate and to control self-assembly of micro-scale tiles (microtiles). The results of this research will open the door to future low-cost, scalable fabrication of three-dimensional micro-scale devices, required in numerous applications.Role: Co-PI (PI, H. Lipson)Amount: \$70k (Erickson lab amount)**National Science Foundation**

09/01/2005-09/01/2008

Program: Sensors and Sensor Networks ProgramTitle: "Integration of spectroscopic sensors and electroactive nanowell arrays with microfluidic chips based on thermocapillary actuation."Major goal (Erickson Lab): To develop electroactive nanofluidic sensors for attracting, confining, concentrating and sensing biological pathogens.Role: CoPI (PI, S. Troian, Caltech)Amount: \$350k (Erickson lab amount)**Patents and Intellectual Property**

Below a list of the IP developed by the Erickson lab, with Cornell Docket Numbers included. Included papers are included to illustrate use of IP but are not comprehensive of the claims nor does inclusion imply original inventorship on behalf of the authors. Further details on this IP can be obtained from Professor Erickson or the Cornell Center for Technology Enterprise and Commercialization (<http://www.cctec.cornell.edu>).

**1. NutriCard: multiplex point-of-care test for blood nutritional biomarkers**

- Cornell Docket: 7260
- PCT Application Filed
- Licensed by VitaMe Technologies, Inc. (DBA VitaScan)

**2. Competitive Lateral Flow Assay**

- Related Paper #1: Vemulapati, S., Rey, E., O'Dell, D.O., Mehta, S., Erickson, D., "A Quantitative Point-of-Need Assay for the Assessment of Vitamin D3 Deficiency" Under Review (2017)
- Related Paper #2: Lee, S., O'Dell, D., Hohenstein, J., Colt, S., Mehta, S., Erickson, D., "NutriPhone: a mobile platform for low-cost point-of-care quantification of vitamin B12 concentrations" Scientific Reports 6, 28237 (2016)

- Cornell Docket: 7259
- PCT/US2016/062828
- Licensed by VitaMe Technologies, Inc. (DBA VitaScan)

### 3. Apparatus and method for point-of-collection measurement of a biomolecular reaction

- Related Paper #1: Erickson, D., O'Dell, D., Jiang, L., Gumus, A., Lee, S., Mancuso, M., Mehta, S., "Smartphone technology can be transformative to the deployment of lab-on-chip diagnostics" *Lab-on-a-Chip* 14, 3159-3164 (2014).
- Related Paper #2: Mancuso, M., Cesarman, E., Erickson, D. "Detection of Kaposi's Sarcoma Associated Herpes Virus Nucleic Acids Using a Smartphone Accessory" *Lab-on-a-Chip* 14 3809-3816 (2014).
- Cornell Docket: 6044
- Patent Issued: US 9,686,395
- Patent Filed: China 201380058363
- Patent Filed: Europe 20130837536
- Licensed by VitaMe Technologies, Inc.

### 4. Smartphone-Based Apparatus and Method for Obtaining Repeatable, Quantitative Colorimetric Measurement

- Related Paper #1: Erickson, D., O'Dell, D., Jiang, L., Gumus, A., Lee, S., Mancuso, M., Mehta, S., "Smartphone technology can be transformative to the deployment of lab-on-chip diagnostics" *Lab-on-a-Chip* 14, 3159-3164 (2014).
- Related Paper #2: Oncescu, V., Mancuso, M., Erickson, D. "Cholesterol testing on a smartphone" *Lab-on-a-Chip*, 14, 759-763 (2014).
- Related Paper #3: Oncescu, V., O'Dell, D., Erickson, D., "Smartphone based health accessory for colorimetric detection of biomarkers in sweat and saliva" *Lab on a Chip*, 13, 3232-3238 (2013).
- Cornell Docket: 6152
- Patent Issued: US 9,445,749 and US 9,787,815
- Patent Filed: China 201480017254
- Patent Filed: Europe EP20140740730
- Licensed by VitaMe Technologies, Inc.

### 5. Photobioreactor Apparatus, Method and Application

- Related Paper #1: Ahsan, S.S., Pereyra, B., Jung, E.E., Erickson, D. "Engineered surface scatterers in edge-lit slab waveguides to improve light delivery in algae cultivation" *Optics Express* 22, A1526 (2014).
- Related Paper #2: Jung, E.E., Jain, A., Voulis, N., Doud, D.D.R., Angenent, L.T., Erickson, D. "Stacked optical waveguide photobioreactor for high density algal cultures" *Bioresource Technology* 171, 495-499 (2014).
- Related Paper #3: Jain A., Voulis N., Jung E. E., Doud D. F. R., Miller W., Angenent L. T. and Erickson D. "Optimal intensity and biomass density for biofuel production in a thin light-path photobioreactor". *Environmental Science & Technology*, 49(10), 6327-6334 (2015)
- Doud D. F. R., Jain A., Ahsan S. S., Erickson D. and Angenent L. T. "In-situ UV disinfection of a waveguide-based photobioreactor" *Environmental Science & Technology* 48, 11521-11526 (2014).
- Cornell Docket 6147
- Patent Issued: US 9,523,070

### 6. Methods, systems, and applications for solar-thermal microfluidic PCR

- Related Paper #1: Jiang, L., Mancuso, M., Lu, Z., Akar, G., Cesarman, E., Erickson, D. “Solar thermal polymerase chain reaction for smartphone-assisted molecular diagnostics” *Scientific Reports*, 4, 4137 (2014)
- Cornell Docket 6032
- US Patent Issued: US 9,821,314

#### **7. Microfluidic Device, System, and Method for Tracking Single Cells and Single Cell Lineages**

- Related Paper #1: Mak, M., Erickson, D., “Mechanical Decision Trees for Investigating and Modulating Single-Cell Cancer Invasion Dynamics” *Lab-on-a-Chip* 14, 964-971 (2014).
- Related Paper #2: Mak, M., Erickson, D., “A simple automated serial micropipette with applications to cancer cell repeated deformation studies” *Integrated Biology*, 5, 1374-1384 (2013).
- Related Paper #3: Mak, M., Reinhart-King, C.A., Erickson, D., “Elucidating Mechanical Transition Effects of Invading Cancer Cells with a Subnucleus-Scaled Microfluidic Serial Dimensional Modulation Device” *Lab-on-a-Chip* 13 (3), 340-348 (2013).
- Cornell Docket 5947
- Patent Filed: US 14/406,310

#### **8. Apparatus, methods, and applications for point of care multiplexed diagnostics**

- Related Paper #1: Mancuso, M., Jiang, L., Cesarman, E., Erickson, D., “Multiplexed Colorimetric Detection of Kaposi’s Sarcoma Associated Herpes Virus and Bacillary Angiomatosis DNA using Gold and Silver Nanoparticles” *Nanoscale* 5, 1678-1686 (2013).
- Cornell Docket 5794
- US Patent Application Filed: US 14/377,962

#### **9. High Resolution Reversible Color Images on Photonic Crystal Substrates**

- Related Paper #1: Kang, P., Erickson, D. “High Resolution Reversible Color Images on Photonic Crystal Substrates” *Langmuir* 27 (16), 9676-9680 (2011)
- Cornell Docket 5469
- Provisional Patent Filed

#### **10. Surface Enhanced Raman Scattering (SERS) Apparatus, Methods, and Application**

- Cornell Docket 5319
- US Patent Issued: US 9,001,322

#### **11. Optical trapping apparatus, methods and applications using photonic crystal resonators**

- Related Paper #1: Chen Y.-F., Serey, X., Sarkar, R., Chen, P., Erickson, D., “Controlled photonic manipulation of proteins and other nanomaterials” *Nano Letters* 12 (3), 1633-1637 (2012).
- Related Paper #2: Kang, P., Serey, X., Chen, Y.-F., Erickson, D., “Angular Orientation of Nanorods using Nanophotonic Tweezers” *Nano Letters* 12, 6400-6407 (2012).
- Cornell Docket 5224
- Patent Issued: US 9,057,825
- Patent Filed: China 201180059282
- Patent Filed: Europe 2011831678
- Patent Filed: Japan 2013-532973
- Patent Filed: Korea 10-2013-7011717
- Licensed by Optofluidics, Inc.

#### **12. Optofluidic photobioreactor apparatus, method, and applications**

- Related Paper #1: Erickson, D., Sinton, D., Psaltis, D., “Optofluidics for Energy Applications” *Nature Photonics* 5, 583-590 (2011).

- Related Paper #2: Jung, E.E., Kalontarov, M., Doud, D.F.R., Ooms, M.D., Angenent, L.T., Sinton, D., Erickson, D., “Slab waveguide photobioreactors for microalgae based biofuel production” *Lab-on-a-Chip* 12, 3740-3745 (2012).
- Cornell Docket 5200
- Patent Issued: US 9,518,248
- Patent Filed: Europe 20110841822
- Patent Filed: China: 201180065337.

### **13. Optofluidic apparatus, method, and application**

- Jung, E.E., Erickson, D., “Continuous operation of a hybrid solid-liquid state reconfigurable photonic system without resupply of liquids” *Lab-on-a-Chip* 12, 2575-2579 (2012).
- Related Paper #1: Chung, A.J., Erickson, D. "Optofluidic Waveguides for Reconfigurable Photonic Systems” *Optics Express* 19(9) 8602-8609 (2011).
- Cornell Docket 4922
- US Patent Issued: US 8,861,904.

### **14. Nanofilter devices using elastomeric micro to nanochannel interfaces and methods based thereon**

- Related Paper #1: Park, S.-M., Huh, Y.S., Szeto, K., Joe, D.J., Kameoka, J., Coates, G.W., Edel, J.B., Erickson, D., Craighead, H.G. “Rapid prototyping of nanofluidic systems using size-reduced electrospun nanofibers for biomolecular analysis” *Small* 6, 2420-2426 (2010).
- Cornell Docket 4785
- Patent Issued: US 8,691,588

### **15. Enhanced On-Chip SERS Based Biomolecular Detection Using Electrokinetically Active Microwells**

- Related Paper #1: Huh, Y.S., Chung, A.J., Cordovez, B., Erickson, D., “Enhanced on-chip SERS based biomolecular detection using electrokinetically active microwells.” *Lab-on-a-Chip* 9, 433-439 (2009).
- Cornell Docket 4519
- US Patent Issued: US 9,057,099
- Patent Filed: Europe: EP20090821197.

### **16. Optical force based biomolecular analysis in slot waveguides**

- Related Paper #1: Yang, A.H.J., Moore, S.D., Schmidt, B.S, Lipson, M., Erickson, D., “Optical Manipulation of Nanoparticles and Biomolecules in Sub-Wavelength Slot Waveguides” *Nature*, 457, 71-75 (2009).
- Cornell Docket 4438
- US Patent Issued: 9,322,995
- Patent Filed: China 200980145053
- Patent Filed: Europe 20110831678.
- Licensed by Optofluidics, Inc.

### **17. Nanoscale Optofluidic Devices for Biomolecular Detection**

- Related Paper#1: Mandal, S., Goddard, J., Erickson, D., “A Multiplexed Optofluidic Biomolecular Sensor for Low Mass Detection” *Lab-on-a-Chip* 9, 2924-2932 (2009).
- Cornell Docket 4186
- Patent Issued: US 9,410,892.

### **18. System and method for optically driven separations using fluid filled core optical fibers**

- Related Paper #1: Mandal, S., Erickson D., “Optofluidic Transport in Liquid Core Waveguiding Structures” *Applied Physics Letters*, 90, 184103 (2007).

- Cornell Docket 4030
- Patent Issued: US 8,552,363

**19. Combined electrostatic and optical waveguide based microfluidic chip systems for bio-molecule and bio-entity detection and processing.**

- California Institute of Technology
- Patent Issued: US 7,385,460.

**Research Group**

**Ph.D. & M.S. Students Post-Docs**

<b>Richard Hoff</b> Biomedical Engineering (Ph.D)	2021-Present
<b>Juan Boza</b> Biomedical Engineering (PhD.)	2019-Present
<b>Aakash Choubal</b> Mechanical Engineering (Ph.D.)	2018-Present
<b>Rose Buchmann</b> Biomedical Engineering (Ph.D.)	2017-Present
<b>Duncan McCloskey</b> Biomedical Engineering (Ph.D.)	2017-Present
<b>Taylor Oeschger</b> Biomedical Engineering (Ph.D.)	2017-Present
<b>Yuval Kaminer</b> Degree Awarded: Mechanical Engineering (M.S.) Current Position: Mechanical Design Engineering ASML	2017-2019
<b>Varun Koppa</b> (Post-Doc) Current Position: Cleveland Clinic	2016 – 2019
<b>Serge Yhombi</b> (Post-Doc)	2016 - 2018
<b>Yue Ren</b> Mechanical Engineering (Ph.D.)	2016 – Present
<b>Elvis Cao</b> Mechanical Engineering (Ph.D.)	2016 – Present
<b>Sasank Vemulapati</b> Degree Awarded: Mechanical Engineering (Ph.D.) Current Position: CEO Hermes Life Sciences	2015-2019
<b>Ruisheng Wang</b> Degree Awarded: Biomedical Engineering (Ph.D.) Current Position: Boston Consulting Group	2015-2020
<b>Zhengda Lu</b> Degree Awarded: PhD Mechanical Engineering (2019)	2015-2019

Current Position: Halo Labs, San Francisco, CA

**Elizabeth Case** 2015-2017  
Degree Awarded: M.Sc. Mechanical Engineering (2017)  
Current Position: Graduate Student Researcher at Lamont-Doherty Earth Observatory

**Hohenstein, Jess** 2014-2016  
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**Rey, Elizabeth** 2014-2019  
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**Snodgrass, Ryan** 2014-2019  
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Current Position: ASML

**Lee, Seoho** 2011-2016  
Degree Awarded: Ph.D. Mechanical Engineering (2016)  
Current Position: Samsung

**O'Dell, Dakota** 2011-2016  
Degree Awarded: PhD. Applied Physics (2016)  
Current Position: Senior Software Engineer at Wellframe

**Jain, Aadhar** 2009-2016  
Degree Awarded: Ph.D. Mechanical Engineering (2014)  
Current Position: Researcher, IMEC.

**Gumus, Abdurrahman** 2008-2015  
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**Ahsan, Syed Saad** 2010-2014  
Degree Awarded: Ph.D. in Applied Physics (2014)  
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**Kang, Pilgyu** 2009-2014  
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**Mancuso, Matt** 2009-2014  
Degree Awarded: Ph.D. Biomedical Engineering (2014)  
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**Jiang, Li** 2009-2014  
Degree Awarded: Ph.D. Mechanical Engineering (2014)  
Current Position: CEO, VitaScan

**Oncescu, Vlad-Victor** 2009-2014  
Degree Awarded: Ph.D. Mechanical Engineering (2013)  
Current Position: VP Strategy and Product Development, Wells Fargo

**Kalontarnov, Michael** 2007-2013

Degree Awarded: Ph.D. Mechanical Engineering (2013) Current Position: Schlumberger	
<b>Jung, Erica</b> Degree Awarded: Ph.D. Mechanical Engineering (2013) Current Position: Assistant Professor, UIC	2008-2013
<b>Mak, Michael</b> Degree Awarded: Ph.D. Biomedical Engineering (2013) Current Position: Assistant Professor, Yale University	2008-2013
<b>Serey, Xavier</b> Degree Awarded: Ph.D. Applied Physics (2013) Current Position: Intel, Portland Oregon	2008-2013
<b>He, Peng (Post-Doc)</b> Current Position: P&G Chemicals	2010-2011
<b>Chen, Yih-Fan (Post-Doc)</b> Current Position: Associate Professor, National Yang Ming University, Taiwan	2010-2011
<b>Choi, Inhee (Post-Doc)</b> Current Position: Associate Professor, University of Seoul	2009-2011
<b>Krishnan, Mekala</b> Degree Awarded: Ph.D. Mechanical Engineering (2011) Current Position: McKinsey & Company	2006-2011
<b>Chung, Aram</b> Degree Awarded: Ph.D. Mechanical Engineering (2011) Current Position: Associate Professor, Korea University	2006-2011
<b>Moore, Sean</b> Degree Awarded: M.S. Mechanical Engineering (2011)	2007-2011
<b>Cordovez, Bernardo</b> Degree Awarded: Ph.D. Mechanical Engineering (2010) Current Position: Halo Labs, San Francisco, CA	2005-2010
<b>Yang, Allen</b> Degree Awarded: Ph.D. Chemical Engineering (2010) Current Position: ThorLabs, New Jersey	2005-2010
<b>Huh, Yun Suk (Post-Doc)</b> Location: Korean Basic Science Institute	2007-2010
<b>Mandal, Sudeep</b> Degree Awarded: Ph.D. Applied Physics (2009) Current Position: CoVar Applied Technologies	2005-2010
<b>Goddard, Julie (Post-Doc)</b> Current Position: Associate Professor, Cornell University, Ithaca, NY	2007-2009

### Visiting Scholar Alumni

<b>Sinton, David</b> Canada Research Chair in Integrated Microfluidics and Nanofluidics Associate Professor of Mechanical Engineering, University of Toronto Adjunct Professor of Mechanical Engineering, Cornell University	2009-2010
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## Technical Staff

<b>Lu, Zhengda</b> Mechanical Engineering (M.Eng, Cornell) Current Position: PhD Cornell University	2013-2014
<b>Akhmechet, Roman</b> Mechanical Engineering (M.Eng, Cornell)	2006-2007

## UG & MENG Group Alumni (Partial List)

<b>Akhmechet, Roman</b>	M.Eng./Engineer	2006-2007
<b>Story, Devon</b>	M.Eng.	2005-2006
<b>Rubin, Ephram</b>	M.Eng.	2006
<b>Vallejo, Ana</b>	M.Eng.	2006
<b>Borkar, Abhas</b>	M.Eng.	2006
<b>Jayakumar, Harishankar</b>	M.Eng.	2006
<b>Dropkin, Amanda</b>	Undergraduate Researcher	2005-2007
<b>Youn, Paul</b>	Undergraduate Researcher	2005-2006
<b>Ahmad, Sana</b>	Undergraduate Researcher	2005-2006
<b>Tung, Stephen</b>	Undergraduate Researcher	2006
<b>Kabadi, Suraj</b>	CNF-REU	2006
<b>Lannon, Herbert</b>	CNF-REU	2006
<b>Kim, Donn</b>	M.Eng	2006-2007
<b>Ng, Adrian</b>	M.Eng	2006-2007
<b>Sheikh, Omer</b>	M.Eng	2006-2007
<b>Nichols, Weston</b>	Undergraduate Researcher	2006-2007
<b>Chen, Likun</b>	REU	2006-2007
<b>Baisch, Andrew</b>	CNF-REU	2007
<b>Klug, Matt</b>	M.Eng.	2007
<b>Chi, Binbin</b>	Undergraduate	2007
<b>Kress, Michael</b>	Undergraduate	2007
<b>Lerdsuchatawanich, Tadsanapan</b>	M.Eng.	2008
<b>Park, Joonsik</b>	UG/M.Eng.	2008
<b>D'Souza, Angela</b>	M.Eng.	2008-2009
<b>DiFelice, Audrey</b>	UG	2009
<b>Klingler, Kristen</b>	UG	2009
<b>Huang, Toby</b>	UG Researcher	2010
<b>Duan, Hank</b>	UG Researcher	2010
<b>Anger, Richard</b>	CNF-REU	2010
<b>Ogunbo, Samuel</b>	CU-LSAMP REU	2010
<b>Jasuja, Nipun</b>	UG Researcher	2009-2011
<b>Neilsen, Lars</b>	MS from DTU	2010-2011

## Publications

### Articles published, accepted, or under review in refereed journals

1. Oeschege, T., McCloskey, D., Buchmann, R.M., Choubal, A.M., Boza, J.M., Erickson, D., "Early Warning Diagnostics for Emerging Infectious Diseases" Submitted (2021)
2. Cao, X., Kim, J., Mehta, S., Erickson, D., "Two-Color Duplex Platform for Point-of-Care Differential Detection of Malaria and Typhoid Fever" Submitted (2021)

3. Cao, X.E, Tao, H., Erickson, D. "Engineering waveguide surface by gradient etching for uniform light scattering in photocatalytic applications" Submitted
4. Oeschger, T., Erickson, D. "Visible colorimetric growth indicators of *Neisseria gonorrhoeae* for low-cost diagnostic applications" *PLOS-ONE* 16(6): e0252961 (2021).
5. Shanmugakani, R., K., Erickson, D., Mehta, S. "An isothermal amplification-based point-of-care diagnostic platform for the detection of *Mycobacterium tuberculosis*: a proof-of-concept study" *Current Research in Biotechnology* 3 154-159 (2021)
6. Srinivasan, B., Finkelstein, J.L, Erickson, D, Mehta, S. "Point-of-Care Quantification of Serum Alpha-Fetoprotein for Screening Birth Defects in Resource-Limited Settings: Proof-of-Concept Study" *JMIR Biomedical Engineering* 6 (1), e23527 (2021)
7. Colt, S., Gannon, B.M., Finkelstein, J.L., Zambrano, M.P., Andrade, J.K, Centeno-Tablante, E., August, A., Erickson, D., Cardenas, W.B., Mehta, S., "Vitamin A status, inflammation adjustment, and immunologic response in the context of acute febrile illness: A pilot cohort study among pediatric patients" *Clinical Nutrition*, 40 (5), 2837-2844 (2021).
8. Wang, R., Erickson, D., "Paper-Based Semi-Quantitative Antimicrobial Susceptibility Testing" *ACS Omega*, 6, 2, 1410-1414 (2021)
9. Cao, X.E, Kaminer, Y., Tao, H., Schein, P., Liu, T., Hanrath, T., Erickson, D. "HI-Light: A Glass-Waveguide-Based "Shell-and-Tube" Photothermal Reactor Platform for Converting CO<sub>2</sub> to Fuels" *iScience*, 23(12) 101856 (2020)
10. Masello, M., Ren, Y., Erickson, D., Giordano, J.O., "An automated controlled-release device for intravaginal hormone delivery" *Journal of Dairy Science Communications - Hot Topic* 1 15-20 (2020)
11. Wang, R., Vemulapati, S., Westblade, L.F., Glesby, M., Mehta, S., Erickson, D. "cAST: Capillary-Based Platform for Real-Time Phenotypic Antimicrobial Susceptibility Testing" *Anal. Chem.* 92(3) 2731-2738 (2020)
12. Shanmugakani, R.K., Srinivasan, B., Glesby, M.J., Westblade, L.F., Cardenas, W.B., Raj, T., Erickson, D., Mehta, S., "Current state of the art in rapid diagnostics for antimicrobial resistance" *Lab-on-a-Chip* 20, 2607-2625 (2020)
13. Snodgrass, R., McCloskey, D., Benecke, P., Erickson, D., "An energy-flexible mechanism for qPCR thermal cycling using shape memory alloys" *Smart Materials and Structures*, *Smart Materials and Structures* 29 045038 (2020)
14. Masello, M., Lu, Z., Erickson, D., Giordano, J., "A Lateral Flow-Based Portable Platform for Determination of Reproductive Physiological Status of Lactating Dairy Cows" *Journal of Dairy Science* 103(5) (2020)
15. Bowden, A.K., Durr, N.J., Erickson, D., Ozcan, A., Ramanujam, N., Jacques, P.V.. "Optical Technologies for Improving Healthcare in Low-Resource Settings: introduction to the feature issue" 11(6), 3091-3094 (2020)
16. Case, E., Shragai, T., Harrington, L., Ren, Y., Morreale, S., Erickson, D., "Evaluation of Unmanned Aerial Vehicles and Neural Networks for Integrated Mosquito Management of *Aedes albopictus* (Diptera: Culicidae)" *Journal of Medical Entomology* 57, 1588-1595 (2020).
17. Snodgrass, R., Erickson, D., "A multistage elastocaloric refrigerator and heat pump with 28°K temperature span" *Scientific Reports* 9, 18532 (2019)
18. Kim, J., Cao, X., Finkelstein, J.L., Cardenas, W.B., Erickson, D., Mehta, S., "A two-color multiplexed lateral flow immunoassay system to differentially detect human malaria species on a single test line" *Malaria Journal* 18, 313 (2019)
19. Zanutelli, M.R., Rahman-Zaman, A., Vanderburgh, J.A., Taufalele, P.V., Jain, A., Erickson, D., Bordeleau, F., Reinhart-King, C.A "Energetic costs driven by cell mechanics govern decision-making during confined migration" *Nature Communications* 10, 4185 (2019)
20. Oeschger, T., McCloskey, D., Koppaarth, V., Singh, A., Erickson, D. "Point of Care Technologies for Sepsis Diagnosis and Treatment" *Lab-on-a-Chip* 19,728-737 (2019)
21. Wang, R., Ongagna-Yhombi, S.Y., Lu, Z., Centeno-Tablante, E., Colt, S., Cao, X., Ren, Y., Cárdenas, W.B., Mehta, S., Erickson, D. "A rapid diagnostic platform for colorimetric differential detection of dengue and chikungunya viral infections" *Analytical Chemistry* 91(8), 5415-5423 (2019).

22. Rey, E., Finkelstein, J.L., Erickson, D. "Fluorescence lateral flow competitive protein binding assay for the assessment of serum folate concentrations" *PLoS ONE* 14(6): e0217403 (2019)
23. Srinivasan, B., O'Dell, D., Finkelstein, J.L., Erickson, D., Mehta, S. "Development of lateral flow assay for soluble transferrin receptor on ironPhone platform" *EBioMedicine* 42, 28-29 (2019).
24. Vemulapati, S., Erickson, D. "Portable Resource-Independent Blood-Plasma Separator" *Analytical Chemistry* 91(23), 14824-14828 (2019)
25. Gannon, B.M. Glesby, M.J., Finkelstein J.L., Raj, T., Erickson, D., Mehta, S. "A point-of-care assay for alpha-1-acid glycoprotein as a diagnostic tool for rapid, mobile-based determination of inflammation" *Current Research in biotechnology* 1, 41-48 (2019)
26. Lu, Z., Rey, E., Vemulapati, S., Srinivasan B, Mehta, S., Erickson, D. "High-yield paper-based quantitative blood separation system" *Lab-on-a-Chip* 18, 3865-3871 (2018)
27. Koppaarth, V., Snodgrass, R., Erickson, D. "Holographic diagnosis of lymphoma" *Nature Biomedical Engineering* 2, 631-632 (2018).
28. Vemulapati, S., Erickson, D., "H.E.R.M.E.S: Rapid Blood-Plasma Separation at the Point-of-Need" *Lab-on-a-Chip* 18, 3285-3292 (2018).
29. **Snodgrass, R., Gardner, A., Semeere, A., Koppaarth, V., Duru, J., Maurer, T., Martin, J., Cesarman, E., Erickson, D., "TINY: A portable nucleic acid quantification system heated by sunlight, flame, or electricity" *Nature Biomedical Engineering*, 2, 657-665 (2018)**
30. Rey, E., Jain, A., Abdullah, S., Choudhury, T., Erickson, D. "Investigating Relationships between Cortisol, Melatonin, and Alertness: An Exploration of Salivary Biomarkers and Human Performance" *Personal and Ubiquitous Computing* 2(4), 867-877 (2018)
31. Srinivasan B., O'Dell, D., Lee, S., Erickson, D., Mehta, S., "ironPhone: mobile diagnostic platform for assessment of iron status by quantification of serum ferritin" *Biosensors and Bioelectronics*, 99, 115-121, (2018)
32. Hohenstein, J., O'Dell, D., Murnane, E., Lu, Z., Erickson, D., Gay, G. "Enhancing the Usability of an Optical Reader System to Support Point-of-Care Rapid Diagnostic Testing: An Iterative Design Approach" *JMIR Human Factors*, 4(4) e29 (2017).
33. **Lu, Z., O'Dell, D., Srinivasan B, Mehta, S., Erickson, D. "A rapid diagnostic testing platform for iron and vitamin A deficiency" *Proceedings of the National Academy of Sciences*, 114, 13513-13518 (2017)**
34. Erickson, D., "Optofluidics and Point-of-Need Diagnostics for Precision Medicine and Global Health" part of "Roadmap for Optofluidics", *Journal of Optics*, 19(9), 093003 (2017)
35. Vemulapati, S., Rey, E., O'Dell, D.O., Mehta, S., Erickson, D., "A Quantitative Point-of-Need Assay for the Assessment of Vitamin D3 Deficiency" *Scientific Reports* 7, 14142 (2017)
36. Mehta, S., Cold, S., Lee, S., Erickson, D. "Rainer Gross Award Lecture 2016 - A Laboratory in Your Pocket: Enabling Precision Nutrition" *Food and Nutrition Bulletin*, 38 (2), 140-145 (2017)
37. Srinivasan B., Lee, S., Erickson, D., Mehta, S., "Precision nutrition — review of methods for point-of-care assessment of nutritional status" *Current Opinion in Biotechnology* 44, 103-108 (2017)
38. Schein, P., O'Dell, D., Erickson, D. "Orthogonal Nanoparticle Size, Polydispersity, and Stability Characterization with Near-Field Optical Trapping and Light Scattering" *A CS Photonics* 4(1), 106-113 (2017)
39. Rey, E., O'Dell, D., Mehta, S., Erickson, D. "Mitigating the Hook Effect in Lateral Flow Sandwich Immunoassays Using Real-Time Reaction Kinetics" *Analytical Chemistry* 89(9), 5095-5100 (2017)
40. O'Dell, D., Schein, P., Erickson, D., "Simultaneous characterization of nanoparticle size and particle-surface interactions with 3D Nanophotonic Force Microscopy" *Phys. Rev. Applied* 6, 034010 (2016)
41. Lee, S, Mehta, S., Erickson, D. "Two-color lateral flow assay for multiplex detection of causative agents behind acute febrile illnesses" *Analytical Chemistry* 88 (17) 8359-8363 (2016)
42. Lee, S., Srinivasan, D., Vemulapati, S., Mehta, S., Erickson, D., "Personalized Nutrition Diagnostics at the Point-of-Need" *Lab-on-a-Chip* 16, 2408-2417 (2016)
43. Schein, P., O'Dell, D., Erickson, D., "Dynamics of an Optically Confined Nanoparticle Diffusing Normal to a Surface" *Physical Review* E93, 062139 (2016)

44. Lee, S., O'Dell, D., Hohenstein, J., Colt, S., Mehta, S., Erickson, D., "NutriPhone: a mobile platform for low-cost point-of-care quantification of vitamin B12 concentrations" *Scientific Reports* 6, 28237 (2016)
45. Snodgrass, R., Gardner, A., Jiang, L., Fu, C., Cesarman, E., Erickson, D., "KS-Detect - Validation of solar thermal PCR for the diagnosis of Kaposi's sarcoma using pseudo-biopsy samples" *PLOS-One* 11(1):e0147636 (2016).
46. Gumus, A., Ahsan, S., Belgin, D., Jiang, L., Snodgrass, R., Gardner, A., Lu, Z., Simpson, K., Erickson, D., "Solar-Thermal Complex Sample Processing for Nucleic Acid Based Diagnostics in Limited Resource Settings" *Biomedical Optics Express*, 1(5), 1974-1984 (2016)
47. Ahsan, S., Gumus, A., Erickson, D., "Stacked Waveguide Reactors with Gradient Embedded Scatterers for High-Capacity Water Cleaning" *Optics Express*, 23(24), A1664-A1671 (2015)
48. Kang, P., Schein, P., Serey, X., O'Dell, D., Erickson, D., "Nanophotonic detection of freely interacting molecules on a single influenza virus" *Scientific Reports*, 5 12087 (2015)
49. Schein, P., Ashcroft, C.K., O'Dell, D., Adam, I.S., DiPaolo, B., Sabharwal, M., Shi, Ce., Hart, R., Earhart, C., Erickson, D., "Near-field Light Scattering Techniques for Measuring Nanoparticle-Surface Interaction Forces" *Journal of Lightwave Technology*, 33(16), 3494-3502 (2015)
50. Ahsan S., Gumus A., Jain A., Angenent L. T. and Erickson D. "Integrated hollow fiber membranes for gas delivery into optical waveguide based photobioreactors." *Bioresource Technology* 192, 845-849 (2015).
51. Jain A., Voulis N., Jung E. E., Doud D. F. R., Miller W., Angenent L. T. and Erickson D. "Optimal intensity and biomass density for biofuel production in a thin light-path photobioreactor". *Environmental Science & Technology*, 49(10), 6327-6334 (2015)
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### **Contributed conference publications/presentations (invited talks listed separately)**

170. McCloskey, D., Erickson, D. “Early-stage Diagnosis of Kaposi’s Sarcoma in Africa using KSHV DNA Quantification” Pittcon, Chicago IL, March 2020
171. Wang, R., Vemulapathi, S., Mehta, S., Erickson, D. “A Novel Capillary-based Platform for Antimicrobial Susceptibility Testing” Pittcon, Chicago IL, March 2020
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192. Vemulapati, S., et al. "NutriPhone – A Quantitative Point-of-Care Assay for the assessment of Vitamin D deficiencies" MicroTAS 2017, Savannah, Georgia, USA, October 2017.
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195. Lu, Z., Erickson, D., "Smartphone-assisted multiplex nutrition deficiency diagnostics: multicolored quantification of inflammation marker, iron and vitamin A status" Photonics West, San Francisco, Jan 2017

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210. Schein, P., Kang, P., Erickson, D. "Nanophotonic force microscopy: measuring particle-surface interactions using near-field photonics" Photonics West, San Francisco, Feb 2015
211. Lee, S., Mehta, S., Erickson, D. "Vitamin D Testing on your Smartphone" BMES 2014 Annual Meeting, October 2014.
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216. Ahsan, S.S., Pereyra, B., Erickson, D. "Uniform algal growth in photo-bioreactors using surface scatterers" Photonics West, San Francisco, Feb. 2014
217. Oncescu, V., Erickson, D. "Smartphone based detection of blood cholesterol and vitamin D status" mHealth Summit. Washington, D.C, Dec.2013.

218. Mancuso, M., Erickson, D. "Smartphone Based Detection of Kaposi's Sarcoma Associated Herpes Virus DNA" mHealth Summit. Washington, D.C, Dec.2013.
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221. Kalontarov, M., Jung, E., Jain, A., Ahsan, S.S., Erickson, D, "Hollow Fiber Membrane (HFM) Facilitated CO<sub>2</sub> Delivery to a Cyanobacteria Substrate for Biofuel Production", ASME International Mechanical Engineering Congress and Exposition, San Diego, CA. Nov. 2013.
222. Oncescu, V., Lee, S., Gumus, A., Karlsson, K., Erickson, D. "Autonomous Implantable Device with Application in Late Phase Hemorrhagic Shock Prevention" Micro Total Analysis Systems ( $\mu$ TAS), Freiburg, Germany, Oct. 2013.
223. Kang, P., Chen, Y.-F., Erickson, D., "Label-free Optofluidic Biomolecular Sensing using a Photonic Crystal Nanotweezer: The Wiggle Assay," Micro Total Analysis Systems ( $\mu$ TAS), Freiburg, Germany, Oct. 2013.
224. Gumus, A., Lee, S., Karlsson, K., Gabrielson, R., Winkler, D.W., Erickson, D. "Real-time Biosensor System for Biophysical Monitoring of Birds" Micro Total Analysis Systems ( $\mu$ TAS), Freiburg, Germany, Oct. 2013.
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226. Kang, P., Erickson, D., "Optofluidic Nanomanipulation with Photonic Crystal Nanotweezers: A Simplified Design for Variation," US-KOREA Conference (UKC) 2013, East Rutherford, NJ, Aug. 2013
227. Mancuso, M., Erickson, D. "Smartphone based Molecular Diagnostics." OSA Congress on Advanced Photonics. Rio Grande, Puerto Rico, Jul. 2013. (Invited Talk)
228. Mancuso, M., Erickson, D. "Smartphone Based Optical Detection of Kaposi's Sarcoma Associated Herpesvirus DNA." Conference on Lasers and Electrooptics (CLEO). San Jose, CA, Jun. 2013. (Invited Talk)
229. Cordovez, B., Hart, R., Erickson, D. "The Molecular NanoTweezer: nanomanipulation taken to new lows" *Photonics West*, San Francisco, CA, February 2013.
230. Kang, P., Serey, X., Chen, Y.-F., O'Dell, D., Erickson, D., "Near-Field Angular Orientation Of Biological Materials," Biophysical Society 57th Annual Meeting, Philadelphia, PA, Feb. 2013
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232. Ahsan, S., Erickson, D., "Microscale Transport Processes in Photocatalytic Reactors" *ASME International Mechanical Engineering Congress and Exposition*, Houston, Tx. Nov. 2012.
233. Jung, E., Erickson, D., "Flexible Photonics Based Optofluidic PhotoBioReactors" *ASME International Mechanical Engineering Congress and Exposition*, Houston, Tx. Nov. 2012.
234. Mancuso, M. Jiang, L., Cesarman, E., Erickson, D. "Lab-on-a-Syringe Diagnosis of Kaposi's Sarcoma in the Developing World" *Micro Total Analysis Systems ( $\mu$ TAS)*, Okinawa, Japan, October 2012.
235. Jiang, L., Mancuso, M., Erickson, D. "Light-Driven Microfluidics Towards Solar-Powered Point-Of-Care Diagnostics" *Micro Total Analysis Systems ( $\mu$ TAS)*, Okinawa, Japan, October 2012.
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240. Jain, A., Erickson, D. "Agarose gel optical waveguides with encapsulation of live cells and integrated microfluidics" *Conference on Lasers and Electrooptics (CLEO)*, San Jose, May 2012.
241. Serey, X., Chen, Y.F., Fain, R., Kang, P., Erickson, D. " Overcoming the Temperature Increase Hurdle in Photonic Crystal Molecular Tweezers" *Conference on Lasers and Electrooptics (CLEO)*, San Jose, May 2012.
242. Ooms, M., Sieben, V.J., Erickson, D., Sinton, D., "An Optofluidic Photobioreactor Strategy for Bioenergy" *ASME International Mechanical Engineering Congress and Exposition*, Denver, Co, Nov. 2011.
243. Oncescu, V.-V., Erickson, D., "A Microfabricated Enzyme-Free Glucose Fuel Cell for Implantable Devices " *ASME International Mechanical Engineering Congress and Exposition*, Denver, Co, Nov. 2011.
244. Jiang, L., Erickson, D., "Directed assembly of microstructures using bubble latches" *ASME International Mechanical Engineering Congress and Exposition*, Denver, Co, Nov. 2011.
245. Gumus, A., Winkler, D., Erickson, D., "Lab on a Bird: Autonomous Microsystems for In-Vivo real time biophysical monitoring of birds" *Micro-Total Analysis Systems ( $\mu$ TAS)*, Seattle, Washington, USA, October 2011.
246. Kang, P., Ogunbo, S.O., Erickson, D., "High Resolution Reversible Color Images on Photonic Crystal Substrates" *Micro-Total Analysis Systems ( $\mu$ TAS)*, Seattle, Washington, USA, October 2011.
247. Serey, X., Erickson, D. "Advancements in photonic crystal resonators for optical trapping" 1<sup>st</sup> EOS conference on Optofluidics, Munich, Germany May 2011.
248. Jung, E.E., Chung, A.J., Erickson, D. "Advancements in Microfluidically Reconfigurable Photonics" 1<sup>st</sup> EOS Conference on Optofluidics, Munich, Germany May 2011
249. Mancuso, M., Goddard, J., Erickson, D. "Porous Polymer Waveguides and Ring Resonators." *CLEO: Science and Innovations*, Baltimore, MD May 2011.
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251. Krishnan, M., Erickson, D. "Optofluidically reconfigurable channel based microfluidics" *CLEO: Science and Innovations*, Baltimore, MD May 2011.
252. Chen, Y.-F., Serey, X., Mandal, S., Erickson, D. "Nanomanipulation using silicon nitride photonic crystal resonators" *IEEE Winter Topicals*, Keystone, CO, Jan. 2011.
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257. Krishnan, M., Erickson, D., "Optically Reconfigurable Microfluidics" *Micro-Total Analysis Systems ( $\mu$ TAS)*, Groningen, The Netherlands, October 2010.
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259. Choi, I., Huh, Y.S., Erickson, D., "A Nanofluidic Device for Selective Concentration and Label-Free Surface-Enhanced Raman Detection of Protein Aggregates" *Micro-Total Analysis Systems ( $\mu$ TAS)*, Groningen, The Netherlands, October 2010.
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262. Jung, E., Huh, Y.S., Erickson D., “Surface Enhanced Raman Scattering (SERS) on-an-Optofluidic Chip Using Roof Collapse Method” *Conference on Lasers and Electrooptics (CLEO)*, San Jose, May 2010.
263. Chung, A.J., Jung, E., Erickson D., “Reconfigurable Photonics from Microfluidic Waveguides” *Conference on Lasers and Electrooptics (CLEO)*, San Jose, May 2010.
264. Serey, X., Mandal S., Erickson D., “Design and Experimental Demonstration of Optical Resonators for Nanotweezing” *Conference on Lasers and Electrooptics (CLEO)*, San Jose, May 2010.
265. Kalontarov, M., Krishnan, M., Erickson, D., “Fluid Dynamically Driven Assembly in 3D for Programmable Matter” *ASME International Mechanical Engineering Congress and Exposition*, Orlando, FL, Nov. 2009.
266. Cordovez, B., Erickson, D., “Optofluidic Data Storage” *ASME International Mechanical Engineering Congress and Exposition*, Orlando, FL, Nov. 2009.
267. Yang, A.H.J, Moore, S., Schmidt, B., Klug, M., Lipson, M., Erickson, D., “Biomolecular Optical Transport in Nanoscale Slot Waveguides” *American Institute of Chemical Engineers (AIChE) Annual Meeting*, Nashville, TN, Nov. 2009.
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278. Chung, A.J., Erickson, D. “Microfluidic Control of Insect Locomotor Activity” *ASME International Mechanical Engineering Congress and Exposition*, Boston, Massachusetts, Nov. 2008.
279. Huh, Y.S., Chung, A.J., Cordovez, B., Erickson, D. “Optofluidic Surface Enhanced Raman Spectroscopy Chip for Detection of Dengue Virus” *ASME International Mechanical Engineering Congress and Exposition*, Boston, Massachusetts, Nov. 2008.
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283. Erickson, D. "Nanoscale Optofluidic Transport" *SPIE Optics and Photonics*, San Diego, CA, August 2008.
284. Cordovez, B., Psaltis, D., Erickson, D., "Optofluidic Data Storage." *IEEE/LEOS Summer Topical on Optofluidics*, Acapulco, Mexico, July 2008.
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291. Yang, A., Erickson, D., "Waveguide Based Particle Trapping in Integrated Microfluidic Devices" *AICHE Annual Meeting*, Salt Lake City, Utah, Nov. 2007.
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297. Mandal, S., Erickson, D., "Optofluidic Transport in Liquid Core Photonic Crystal Fibers" *Conference on Lasers and Electro-Optics (CLEO)*, Baltimore, Maryland, May 2007.
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299. Tolley, M., Zykov, V., Lipson, H., Erickson, D., "Directed Fluidic Self-Assembly of Microscale Tiles" *Micro-Total Analysis Systems ( $\mu$ TAS)*, Tokyo, Japan, Oct. 2006.
300. Mandal, S., Erickson, D., "Optical Chromatography in Hollow Core Photonic Crystal Fibers" *Micro-Total Analysis Systems ( $\mu$ TAS)* Tokyo, Japan, Oct. 2006.
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316. Erickson, D., Adleman, J., Li, B., Pu, Y., Rockwood, T., Psaltis, D., "Optofluidics" *Optical Society of America Topical Meeting on Information Photonics*, June 2005.
317. Erickson, D., Liu, X., Venditti, R. Krull, U., Li, D "Electrokinetics for control of on-chip chemical reactions" *American Physical Society March Meeting*, Los Angeles, CA, March 2005.
318. Heng, X., Erickson, D., Psaltis, D., Yang C. "Optofluidic microscopy" *Conference on Lasers and Electro-Optics (CLEO)*, Baltimore, MD, May 2005.
319. Erickson, D., Liu, X., Venditti, R. Krull, U., Li, D "A DNA hybridization chip with Electrokinetically-Based Single Nucleotide Polymorphism (SNP) Discrimination." *2004 ASME International Mechanical Engineering Congress and Exposition, Anaheim, CA, Nov 2004*.
320. Erickson, D., Liu, X., Krull, U., Li, D. "An Electrokinetically Controlled DNA Hybridization Chip" *2<sup>nd</sup> International Conference on Microchannels and Minichannels*, Rochester, NY, June 2004.
321. Biddiss, E., Erickson, D., Li, D. "Heterogeneous surface charge enhanced micro-mixer for electrokinetic flows" *2<sup>nd</sup> International Conference on Microchannels and Minichannels*, Rochester, NY, June 2004.
322. Erickson, D., Sinton, D., Nikolic, V., Li, D. "Heat Transfer and Electrokinetic Flow Analysis in Poly(dimethylsiloxane) Microfluidic Systems" *2003 ASME International Mechanical Engineering Congress and Exposition, Washington D.C., Nov 2003*.
323. Sinton, D., Erickson, D., Li, D. "Molecular Tagging in Microchannels with Micro-Bubble Lensing Induced Photobleaching (micro-BLIP)" *2003 ASME International Mechanical Engineering Congress and Exposition, Washington D.C., Nov 2003*.
324. Krull, U.J., Park, S.H., Liu, X., Zeng, J., Li, D., Erickson, D. "Genomic target identification using distributed gradients of selective single-stranded oligonucleotide probes in conjunction with microfluidics" *39th International Union of Pure and Applied Chemists (IUPAC) Congress, Ottawa, Ontario, August 2003*.



325. Lin, F.Y.H., Erickson, D. Li, D., Sherman, P.M. "Development of a Novel Microfluidics-based Biochip System for the Detection of Helicobacter pylori" *103<sup>rd</sup> General Meeting of the American Society for Microbiology*, Washington D.C., May 2003.
326. Lin, F.Y.H., Erickson, D. Li, D., Sherman, P.M. "Development of a novel microfluidics based biochip system for the detection of microbial pathogens" *Annual Meeting of the Canadian Association of Gastroenterology (CAG)*, Banff, February 2003.
327. Erickson, D., Li, D. "3D Numerical Simulations of Pressure Driven Flow over Electrokinetically Heterogeneous Surfaces." *ELKIN 2002* Krakow, Poland, June 2002.
328. Sinton, D., Erickson, D., Li, D. "Photo-Injection and Sample Transport in Microfluidic-Chip Applications." *CSME Forum 2002* Kingston, Ontario, June 2002.
329. Erickson, D., Li, D., and Werner, C. "Simultaneous Determination of the Zeta (z)-Potential and Surface Conductance using the Improved Slope Intercept Technique." *75th ACS Colloid and Surface Sciences Symposium*, Pittsburgh, Pennsylvania, June 2001.
330. Erickson, D., and Li, D., "Modeling Electrokinetic Flow through Microchannels with Heterogeneous Surface Properties." *75th ACS Colloid and Surface Sciences Symposium*, Pittsburgh, Pennsylvania, June 2001.
331. Wong, F.C. and Erickson, D., "Time-Temperature Independent Fracture Analysis of an Instrumented Solid Rocket Motor" *36th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit*, AIAA Paper 2000-3324, 2000.

### **Invited/Keynote Talks**

1. *Optically based Point-of-Care Diagnostic Technologies for Infectious Diseases and Nutritional Deficiencies* - SAS (Society for Applied Spectroscopy) - Smartphone Spectroscopy for Analyses and Assays in Low Resource Areas – Pittcon, Chicago, IL, March 2020.
2. *Point-of-Care Diagnostic Technologies for Infectious Diseases and Nutritional Deficiencies*, Weill Cornell Medicine, Department of Pathology, New York, NY, September 2019
3. *Engagement to Enterprise* Weill Cornell Medicine Start-up Symposium, New York, NY, Feb 2019
4. *Point-of-Care Technologies for Infectious Diseases and Nutritional Deficiencies* University of Texas at Austin, March 2018
5. *Point-of-Care Technologies for Infectious Diseases and Nutritional Deficiencies* Duke University, North Carolina, February 2018
6. *Point-of-Care Diagnosis of Kaposi's Sarcoma in Limited Resource Settings using TINY technology* AORTIC International Conference on Cancer in Africa, Kigali, Rwanda, November 2017
7. *TINY: A portable tool for nucleic acid quantification in resource limited settings (delivered by Snodgrass, R.)*- European Optical Society Conference on Optofluidics – Munich, Germany, June 2017
8. *NutriPhone and FeverPhone - Mobile enabled biomedical diagnostics.*– ACM Mobisys, Niagara Falls, NY, June 2017
9. *Optofluidic nanotweezer methods for characterizing nanoparticles and viruses* – Materials Research Society Spring Meeting, April 2017
10. *KS-Detect – Rapid diagnosis of Kaposi's Sarcoma in limited resource settings* – Infectious Diseases Institute, Kampala, Uganda, July 2016
11. *NutriPhone - Rapid Vitamin and Micronutrient Assessment* – Engredea 2016, Anaheim, California, March 2016.
12. *Mobile Technologies for Personalized Diagnostics and Global Health (delivered by O'Dell, D.)* – Pittcon, Atlanta, GA, March 2016
13. *Optofluidic nanotweezer methods for characterizing nanoparticles and viruses* – Photonics West, San Francisco, CA, Feb 2016.
14. *Point-of-care devices for nutrition and infectious disease diagnostics* – ESPOL, Guayaquil, Ecuador January 2016
15. *Optofluidics: Photonic Technologies for Mobile and Global Health* – International Mechanical Engineering Congress & Exposition – Houston, Tx, Nov. 2015

16. *Mobile Technologies for Personalized Nutrition Diagnostics and Global Health* – NIH/IEEE Healthcare Innovations & Point-of-Care Technologies Conference, Bethesda, MD, November 2015.
17. *Mobile Technologies for Personalized Nutrition Diagnostics and Global Health* – American Association of Clinical Chemists - Emerging Clinical & Laboratory Diagnostics, Los Angeles, November 2015.
18. *Optofluidics: Photonic Technologies for Mobile and Global Health* – Frontiers in Optics – San Jose, CA, October 2015
19. *Smartphone Based Molecular Diagnostics for Mobile and Global Health* - Point of Care Diagnostics & Global Health World Congress, San Diego, CA, September 2015
20. *Smartphone Based Molecular Diagnostics for Mobile Health* – American Association of Clinical Chemists (AACC), Atlanta, Georgia, July 2015.
21. *Optofluidics: Photonic Technologies for Mobile and Global Health* – European Optical Society Third Conference on Optofluidics – Munich, Germany, June 2015
22. *Mobile Technologies for Personalized Diagnostics and Global Health* – University of Toronto, Toronto, Canada, June 2015.
23. *Mobile health for global health - 2015 China-America Frontiers of Engineering Symposium*, National Academy of Engineering, Irvine, CA, June 2015
24. *Optofluidics: Photonic Technologies for Mobile and Global Health* - ASME 2015 4th Global Congress on NanoEngineering for Medicine and Biology – Minneapolis, MN, April 2015
25. *Smartphone Based Molecular Diagnostics for Mobile and Global Health* – Photonics West, San Francisco, CA, Feb. 2015.
26. *Smartphone Based Molecular Diagnostics for Mobile and Global Health* – Ohio State University, Columbus, Ohio, January 2015
27. *Smartphone Based Molecular Diagnostics for Mobile and Global Health* – University of Houston, Houston, Texas, January 2015
28. *Optofluidics for Nanomanipulation and Bioenergy Production* – University of North Carolina, Chapel Hill, September 2014
29. *Optofluidics for Mechanical Chemistry and BioEnergy Production* – University of Washington, Seattle, September 2014
30. *Technologies for Mobile and Global Health - Next Generation Dx Summit* – Washington, DC, August 2014.
31. *Optofluidics - High-throughput particle characterization and smartphone based medical diagnostics* – Biological and Pharmaceutical Complex Fluids II: Novel Trends in Characterizing Interactions, Microstructure and Rheology, Durham NC, August 2014.
32. *Optofluidics - High-throughput particle characterization and smartphone based medical diagnostics* – Nanotech 2014, Washington DC, June 2014.
33. *Optofluidics for High-throughput Particle Analysis and Protein Imaging* – Conference on Lasers and Electrooptics (CLEO), San Jose, CA, June 2014.
34. *Technologies for Mobile and Global Health - Biotechnology Symposium: Opening the Biotechnology Toolbox*, Syracuse, NY, May 2014
35. *KS-Detect and Solar-PCR based diagnostics using saliva* – SPIE Defense, Security, and Sensing, Baltimore, Maryland, May 2014
36. *Optofluidics for Mobile & Global Health, and Nanoparticle Analysis* – FOCAS Research Institute, Dublin, Ireland, April 2014.
37. *KS-Detect - Smartphone and Solar based point-of-care diagnosis of Kaposi's Sarcoma* – Infectious Diseases Institute, Kampala, Uganda, February 2014
38. *KS-Detect - Smartphone and Solar based point-of-care diagnosis of Kaposi's Sarcoma* – AMPATH/Moi University, Eldoret, Kenya, February 2014
39. *Smartphone Based Molecular Diagnostics for Mobile and Global Health* – Photonics West, San Francisco, CA, February 2014.
40. *Point-of-care diagnostics using smartphones and solar energy* – NIH conference on Point of Care Technologies for Cancer, Bethesda, MD, January 2014

41. *Smartphone Based Molecular Diagnostics for Mobile and Global Health* – Optics for the developing world: point-of-care low cost diagnostics, Massachusetts Institute of Technology, November 2013.
42. *Optofluidics: Addressing problems with BioEnergy, Pharmaceuticals, and Smartphone based Molecular Diagnostics with light and fluids.* – Department of Mechanical Engineering, University of Alberta, October 2013.
43. *Smartphone based Molecular Diagnostics* – Frontiers in Optics, Orlando, Florida, October, 2013.
44. *Smartphone based Molecular Diagnostics* – Optofluidics 2013, Hong Kong, August 2013.
45. *Optofluidics - From Opto-Mechanical Chemistry to Smartphone Based Molecular Diagnostics* – Center for Photomedicine, Harvard University/Massachusetts General Hospital, August 2013.
46. *Opto-Mechanical Chemistry - Nanophotonic techniques for molecular trapping and controlling chemical reactions* – Kavli Symposium on Multiscale systems: linking quantum chemistry, molecular dynamics, and microfluidic hydrodynamics, Chicheley, United Kingdom, July 2013.
47. *Smartphone based Molecular Diagnostics* – OSA Congress on Advanced Photonics, Puerto Rico, July 2013.
48. *Smartphone based Optofluidic Systems for Vitamin D screening and Kaposi's Sarcoma diagnostics in limited resource settings* – Gordon Research Conference, Physics and Chemistry of Microfluidics, Italy, June 2013
49. *Commercialization of Molecular NanoTweezer Technology* – European Optical Society World of Photonics Congress, Munich, Germany, May 2013.
50. *Smartphone based biosensing for healthy living* – OSA Topical Meeting on Bio-Optics: Design and Applications, Honolulu, Hawaii, April 2013
51. *Controlled Photonic Manipulation of proteins and other biological materials* – Photonics West, San Francisco, February 2013
52. *Optofluidics* – University of Illinois at Urbana Champaign, November 2012.
53. *Optofluidics for BioEnergy, Nutrition, Diagnostics, and Pharmaceuticals* - Second International Conference on Optofluidics (Optofluidics 2012), Suzhou, China, September 2012.
54. *Handling the very small - Nano-manipulation using near-field photonics* – SPIE Optics and Photonics, San Diego, California, August 2012.
55. *Optofluidics for Energy* – Microsystems Seminar Series, Institute of Systems Research, University of Maryland, College Park, April 2012
56. *Handling the smallest matter and other uses for optofluidics* – Department of Mechanical Engineering, University of Central Florida, Orlando, FL, March, 2012.
57. *Handling the smallest matter and other uses for optofluidics* – Department of Mechanical Engineering, Columbia University, New York, NY, February, 2012.
58. *Optofluidics from Single Molecule Analysis to BioEnergy* – Department of Mechanical Engineering, University of Pennsylvania, Philadelphia, PA, January, 2012.
59. *Optofluidics for Energy and Single Molecule Analysis* – Swiss Federal Institute of Technology, Zurich Basel Campus (ETHZ), Basel, Switzerland, December 2011.
60. *Optofluidics for Energy and Single Molecule Analysis* – Swiss Federal Institute of Technology, Zurich (ETHZ), Zurich, Switzerland, November 2011.
61. *Optofluidics for Defense* – Nanotechnology for Defense, Seattle, WA, October, 2011.
62. *Single-molecule biophysics with optofluidic trapping* – Frontiers in Optics, San Jose, CA, October, 2011.
63. *Single-molecule biophysics with optofluidic trapping* – EOS topical meeting on Optical Microsystems, Capri, Italy, September, 2011.
64. *New directions in Optofluidics* – Swiss Federal Institute of Technology, Lausanne (EPFL), Lausanne, Switzerland, September 2011.
65. *Optofluidics for Molecular Diagnostics* - International Topical Meeting on Information Photonics (Photonics for Sensing), Ottawa, Ontario, May 2011.
66. *Optofluidics with Silicon Photonics* - International Topical Meeting on Information Photonics (Silicon photonics and nanophotonics), Ottawa, Ontario, May 2011.
67. *Energy and biological application of photonic crystal resonator nanomanipulators.* - OSA Topical Meeting on Optical Trapping, Monterey, CA, April 2011.

68. *Optical Resonators for Nanomanipulation: From Single Molecule Analysis to Directed Assembly* – Photonics West (Laser Resonators Conference), San Francisco, January 2011
69. *Optofluidic Techniques for Molecular Diagnostics* – Photonics West, San Francisco, January 2011
70. *Microfluidically reconfigurable photonics and matter* – Keynote - Asian-Pacific International Symposium on Lab on Chip (APLOC 2011), Singapore, January, 2011.
71. *Optofluidics for Biomedical and Industrial Applications* – Nanyang Technological University, Singapore, January 2011.
72. *Biophotonics and Optofluidics* – Institute of Microelectronics, Singapore, January 2011.
73. *Optofluidics for Materials Science* – 2010 Materials Research Society Fall Meeting, Boston, MA, November 2010.
74. *Microfluidically reconfigurable photonics and matter* – Department of Mechanical and Industrial Engineering, University of Toronto, Toronto, Ontario, November 2010.
75. *Microfluidically reconfigurable photonics and matter* – Department of Mechanical, Aerospace and Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, NY, October 2010.
76. *Microfluidically reconfigurable photonics and matter* - 8<sup>th</sup> International Conference on Nanochannels, Microchannels and Minichannels, Montreal, Quebec, August, 2010.
77. *Optofluidic Sensing – Combining near-field detection and trapping for enhanced biomolecular detection* - SPIE Optics and Photonics, San Diego, August 2010.
78. *Optofluidics* - Danish Technical University, Copenhagen, Denmark, March, 2010.
79. *Nanomedical Applications of Optofluidics* - ASME 2010 First Global Congress on Nanoengineering for Biology and Medicine, Houston, Texas, February, 2010.
80. *Optofluidics and Fluid Optics* – University of California, San Diego, January 2010.
81. *Microfluidics of Programmable Matter* - American Vacuum Society annual meeting, San Diego, California, November 2009.
82. *Optofluidics for Biomolecular Analysis* - University of California, Los Angeles, October 2009.
83. *Optofluidics* - Frontiers in Optics (OSA Annual Meeting), San Jose, California, October 2009.
84. *Optofluidics and Programmable Matter* - NATO Advanced Study Institute on Microfluidics Based Microsystems. Izmir, Turkey, August 2009.
85. *Optical Manipulation of Nanoparticles and Nucleic Acids using Silicon Photonics* - SPIE Optics and Photonics, San Diego, August 2009.
86. *Optically Resonant Molecular Sensors* - SPIE Optics and Photonics, San Diego, August 2009.
87. *Optofluidics – Fusing Nanofluidics and Nanophotonics* - State Key Laboratory of Non-Linear Mechanics, Institute of Mechanics, Chinese Academy of Sciences, Beijing, April 2009.
88. *Biomolecular Detection with Optofluidics* - SPIE Defense, Security and Sensing, Orlando, Florida, April 2009.
89. *Optofluidics* - University of Maryland, Baltimore County March 2009.
90. *Optofluidics* - California Institute of Technology, Pasadena, California February 2009.
91. *Optofluidics for Biomolecular Analysis* - University of California, Santa Cruz, California January 2009.
92. *Silicon Optofluidic Devices for Biomolecular Analysis* - Photonics West, San Jose, California January 2009.
93. *Nanofluidically Active Photonic Crystals* - SPIE Optics and Photonics, San Diego, August 2008.
94. *Optofluidics* - Brown University, Providence, Rhode Island, August 2008.
95. *Optically Resonant Biosensors* - Gordon Research Conference on Bioanalytical Sensors, Rhode Island, July 2008.
96. *Optofluidics* - 6<sup>th</sup> International Conference on Nanochannels, Microchannels, and Minichannels, Technische Universitaet of Darmstadt, Darmstadt, Germany, June 2008.
97. *Microfluidically enabled optical, living and manufacturing systems* - Yale University, New Haven, Connecticut April 2008.
98. *Microfluidically enabled optical, living and manufacturing systems* - Tufts University, Medford, Massachusetts, April 2008.
99. *Optofluidics: Fluidics Enabling Optics and Optics Enabling Fluidics* - ASME Micro/Nanoscale Heat Transfer International Conference, Tainan, Taiwan, January 2008.

100. *Optofluidics* - Department of Mechanical Engineering, University of Victoria, November 2007.
101. *Optofluidic Transport and Sensing* - École Polytechnique Fédéral de Lausanne (EPFL), October 2007.
102. *Integrated Micro-, Nano- and Optofluidic Systems* - Department of Mechanical Engineering, Vanderbilt University, September 2007.
103. *Whole Chip Numerical Simulation of Integrated Biomolecular Microfluidic Devices* - 9th US National Congress on Computational Mechanics (USNCCM9) Symposium on Modeling and computation of active small (nano) systems. Berkeley, California, July 2007.
104. *Integrated Micro-, Nano- and Optofluidics Devices* - US-Japan Young Nanotechnology Researchers Exchange, Osaka University, Osaka, Japan, June 2007.
105. *Optofluidics: Fusing Microfluidics with Microphotonics* - Department of Mechanical Engineering, Clemson University, February 2007.
106. *Optofluidics: Emerging Technologies and Applications* - College of Nanoscale Science and Engineering, SUNY Albany. February 2007.
107. *Optofluidics* - 5<sup>th</sup> International Conference on Optics-photonics Design and Fabrication. Nara, Japan, December 2006.
108. *Numerical Simulation for Integrated Microfluidic Devices* - Building Nanostructures Bit by Bit Workshop. Cornell Nanoscience and Technology Center, October 2006.
109. *Integrated Optofluidic Devices* - Department of Mechanical Engineering, Carnegie Mellon University, Pittsburgh, Pennsylvania, October 2006.
110. *Micro- and Nanofluid Dynamics in Optofluidic and Nanophotonic Devices* - Optical Society of America, Frontiers in Optics, Rochester, NY, October 2006.
111. *Nanoscale Fluid Dynamics* - Symposium on Nonlinear Dynamics of Nanosystems, Chemnitz, Germany, August 2006.
112. *Photofluidics* - SPIE Optics and Photonics Conference, San Diego, California, August 2006.
113. *Optofluidics* - Department of Biomedical Engineering, University of Rochester, Rochester, NY, November 2005.
114. *Optical Nanofluidics* - MAE Colloquium Series, Sibley School of Mechanical and Aerospace Engineering, Cornell University. Ithaca, NY, September 2005.
115. *Microscale Transport Analysis and the Development of DNA Hybridization Chips* - Applied Physics and Optics Seminar, California Institute of Technology, Pasadena, California, May 2004.
116. *Microscale Transport Analysis and the Development of DNA Hybridization Chips* - Department of Mechanical and Aerospace Engineering, Cornell University, Ithaca, NY, May 2004.
117. *Microscale Transport Analysis and the Development of DNA Hybridization Chips* - Department of Mechanical Engineering, Tufts University, Boston, MA, May 2004.
118. *Microfluidics Based DNA Sensor Chips* - Department of Mechanical and Environmental Engineering, University of California, Santa Barbara, Santa Barbara, California, April 2004.
119. *Microscale Simulation for Integrated Microfluidic Devices* - Department of Mechanical Engineering, Rice University, Houston, Texas, February 2004.
120. *Microfluidics Based DNA Sensor Chips* - Department of Mechanical Engineering, Duke University, Durham, NC, February 2004,
121. *Microscale Simulation for Integrated Microfluidic Devices* - Department of Mechanical and Aerospace Engineering, University of Florida, Gainesville, Florida, December 2003.

### **Select Industrial, Workshop, Cornell based, OR Educational Talks**

122. *Precision Nutrition 2.0 - A Concept for Force Hardening Against Unknown Infectious Disease by Individualized Nutritional Interventions* – Institute for Defense Analysis, Washington, DC, October 2017.
123. *From the Lab to the Market Place* – NorCal Cornell Alumni, San Francisco, CA, May 2017
124. *Early Stage Diagnosis of Kaposi's Sarcoma in Limited Resource Settings using TINY (KS-Detect)* – NCI Affordable Care Technologies Program, Bethesda, Maryland, May 2017

125. *KS-Detect* – NIBIB Discoveries in Technology Showcase, Bethesda, Maryland, April 2014.
126. *Directed Assembly of Hybrid Nanostructures Using Optically Resonant Nanotweezers* – Biomolecular Materials Principal Investigators Meeting, Washington, DC, October 2011.
127. *Optofluidics for Biomolecular Analysis* – Department of Chemistry and Chemical Biology, Cornell University, February 2011.
128. *“Self-Reliant” Microsystems for Battlefield Health Assessment and Treatment* – DARPA/FDA *in-vivo* Diagnostics Workshop, Arlington, Va., February 2011.
129. *Microsystems for “Point of Use” Molecular Diagnostics* – DARPA Point of Use Nutritional Devices Workshop, Arlington, Va., November 2010.
130. *Optofluidic systems for Reconfigurable Photonics* - AFOSR Workshop on Reconfigurable Systems, Albuquerque, New Mexico, November 2010.
131. *Nanoscale Optofluidic Sensor Arrays* – DARPA SNIpHER Program Workshop, Washington, DC, March 2010.
132. *Fluids and Photons: Combining electromagnetics and hydrodynamics across all scales* – National Science Foundation, Washington, DC, December 2009.
133. *Fluid Dynamically Reconfigurable Photonics and Matter* - AFOSR Workshop on Reconfigurable Systems, Santa Fe, New Mexico, July 2009.
134. *Optofluidics for Biomolecular Analysis* - International Workshop on Nanotechnology-Enabled Sensors and Diagnostics, Dublin City University, Dublin, Ireland, May 2009.
135. *Optofluidics for Biomolecular Detection* - Draper Labs, Cambridge MA, January 2009.
136. *Optofluidics for Biomolecular Analysis and Detection* - Sigma-Aldrich, St. Louis, MO, October, 2008.
137. *Optofluidic Transport for Biomolecular Analysis* - Nanobiotechnology, Biomolecular Devices and Analysis Seminar Series. Ithaca, NY, December 2007.
138. *Optofluidic Transport* - Cornell Fluid Dynamics Seminar Series, Ithaca, NY, November 2007.
139. *The US National Nanotechnology Initiative Network (poster presentation)* - Third International Nanotechnology Conference on Communications and Cooperation, Brussels, Belgium, April 2007.
140. *Nanoscale Optofluidic Sensor Arrays* - Nanobiotechnology, Biomolecular Devices and Analysis Seminar Series. Ithaca, NY, January 2007.
141. *Optofluidics for NanoBioTechnology* - Nanobiotechnology Center, Cornell University, Ithaca, NY, April 2006.
142. *Electrokinetics for Lab-on-Chip devices* - Department of Chemical Engineering Colloquium Series, Cornell University, Ithaca, NY, March 2006.
143. *Optofluidics for Biomedical Engineering* - BME 501 – Biomedical Engineering Seminar (Dr. David Lipson). Oct. 2006.
144. *Lab on Chip Devices* - Nanotechnology Teachers Institute, Cornell University, Ithaca, NY. August 2006.
145. *Electrokinetic techniques for single nucleotide polymorphism discrimination and massively parallel biosensing* - Cornell Fluid Dynamics Seminar Series, Ithaca, NY, December 2005.
146. *Optofluidics* - Seminar Series in Photonics, Department of Electrical and Computer Engineering, Cornell University, Ithaca, NY, October 2005.

## **Teaching**

### **Biomedical Technologies for Point-of-Care Diagnostics and Mobile/Global Health (MAE 6620 – Graduate)**

Department of Mechanical and Aerospace Engineering, Cornell University  
Spring 2015, Spring 2016, Spring 2017, Spring 2019

### **Fundamentals of Fluid Dynamics and Aerodynamics (MAE 6010 - Graduate)**

Department of Mechanical and Aerospace Engineering, Cornell University  
Fall 2008, Fall 2009, Fall 2010, Fall 2013, Fall 2014, Fall 2015, Fall 2017

**Nanoscale Energy Transport and Conversion (MAE 6560 – Graduate)**

Department of Mechanical and Aerospace Engineering, Cornell University  
Spring 2006, Spring 2007, Spring 2008, Spring 2010, Spring 2014

**Thermodynamics (MAE/ENGRD 2210 – Undergraduate)**

Department of Mechanical and Aerospace Engineering, Cornell University  
Fall 2005, Fall 2006, Fall 2007, Spring 2009, Fall 2012

**Thermal Energy Conversion (Undergraduate)**

Department of Mechanical & Industrial Engineering, University of Toronto  
Spring 2004.