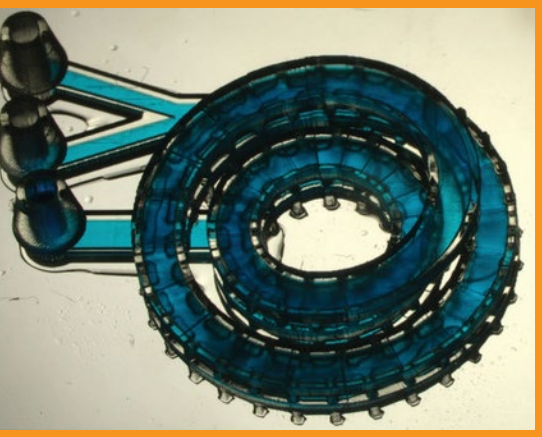
MONTANA STATE UNIVERSITY
NORM ASBJORNSON College of ENGINEERING

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

NACOE Seminar Speaker

4 p.m. – 5 p.m.



Title:

Digital Manufacturing of Microfluidic Tissue Chips

Abstract:

The microfluidics field is at a critical crossroads. The vast majority of microfluidic devices are presently manufactured using micromolding processes that work very well for a reduced set of biocompatible materials, but the time, cost, and design constraints of micromolding hinder the commercialization of many devices. PDMS, in particular, is extremely popular in academic labs, yet the fabrication procedures are based on cumbersome manual methods and the material itself strongly absorbs lipophilic drugs. As a result, the dissemination of many cell-based microfluidic chips – and their impact on society – is in jeopardy. Digital Manufacturing (DM) is a family of computer-centered processes that integrate digital 3D designs, automated (additive or subtractive) fabrication, and device testing in order to increase fabrication efficiency. Importantly, DM enables the inexpensive realization of 3D designs that are impossible or very difficult to mold. The adoption of DM by microfluidic engineers has been slow, likely due to concerns over the resolution of the printers and the biocompatibility of the resins. We have developed microfluidic devices by SL in PEG-DA-based resins with automation and biocompatibility ratings similar to those made with PDMS. I will also present our work on our microfluidics platform (digitally-manufactured in thermoplastics) for cancer diagnostics using live tumor biopsies and I will review the bright future ahead for the promising, fertile field of DM.

Main Contact:

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- April 22nd 2019 -
NAH 165

Biography:

Albert Folch received his BSc in physics from the University of Barcelona (UB), Spain, in 1989. In 1994, he received his PhD in surface science and nanotechnology from the UB's Physics Dept. During his PhD he was a visiting scientist from 1990–91 at the Lawrence Berkeley Lab working on AFM under Dr. Miquel Salmeron. From 1994–1996, he was a postdoc at MIT developing MEMS under the advice of Martin Schmidt (EECS) and Mark Wrighton (Chemistry). In 1997, he joined the laboratory of Mehmet Toner as a postdoc at Harvard's Center for Engineering in Medicine to apply soft lithographic methods to tissue engineering. He has been at Seattle's UW BioE since June 2000 where he is now a full Professor, accumulating over 7,800 citations (averaging >87 citations/paper over his whole UW career). Albert has been awarded a NSF Career Award in 2001 and was elected to the American Institute for Medical and Biological Engineering (AIMBE) College of Fellows (Class of 2015) in 2014.