BioNanofluidics for Drug Screening, Disease Diagnosis, Medical Device Design, and Personalized Medicine

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Brief Bio of Yaling Liu

• ASME Fellow, Associate editor of Journal of Medical Device

• Education
  Northwestern University, Department of Mechanical Engineering, PhD 2006

• key publications

• Keywords for research
  Biotransport, Microfluidics, Nanomedicine, Cell Mechanics, MEMS, NEMS
Biomimetic Drug Evaluation Platform

Nanoparticle binding on biomimetic blood vessel

We developed cell-seeded microfluidic chips for evaluation of various nanoparticles drug carriers

Binding distribution of ICAM-1 coated 210nm fluorescence nanoparticle on anti-ICAM-1 coated microfluidic channels

Real-time particle binding study under flow

Vascular Permeability dynamics
Cancer Diagnosis and Personalized Medicine

In collaboration with Lehigh Valley Hospital, we are using liquid biopsy (circulating tumor cell and circulating tumor DNA) for cancer diagnosis, monitoring, and personalized drug screening.

3D culturing of tumor spheroid for personalized drug testing.
Hemolysis evaluation is an important step for FDA approval of any blood-wetting device. In collaboration with University of Maryland Medical School, we aim to develop a cellular model that can predict hemolysis in any device.
Contact

- Looking for PhD student and Post Doc

- Our research is supported by
  - National Institute of Health (NIH)
  - National Science Foundation (NSF)

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