FACULTY OF THE CENTER FOR BIOENGINEERING

CBEPeople

Sumita Pennathur

Detection and Diagnostics

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EDUCATION

Stanford University
Ph.D., Mechanical Engineering (2006)

Massachusetts Institute of Technology
B.S. and M.S, Aerospace Engineering (2000 and 2001)

HONORS AND AWARDS

SLAS Invitation award finalist (2016)

Santa Barbara Chamber of Commerce Innovator of the Quarter Award (2012)

Presidential Early Career Award in Science & Engineering (2010)

UC Regents Junior Faculty Fellowship (2009)

DARPA Young Faculty award (2008)

RESEARCH OVERVIEW

The Pennathur group focuses on novel studies of chemical and biological species using fabricated micro- and nanoscale devices. The scope of the research program is broad, spanning the fields of Physics, Biology, Chemistry, and Engineering. The research goals are also broad, focusing on the fundamental science of nanoscale systems, while also exploring exciting technological possibilities. Major efforts include, general electrokinetics, creating and developing enabling micro- and nanofluidic tools to identify and characterize chemical and biological compounds, improving current bionalaytical devices, and designing/engineering entire systems for point-of-care usage.

Group Website: engineering.ucsb.edu/~nanolab/

Selected Publications

1. Rajan, N. K., Rajauria, S., Ray, T., Pennathur, S., & Cleland, A. N. (2016). A simple microfluidic aggregation analyzer for the specific, sensitive and multiplexed quantification of proteins in a serum environment. **Biosensors and Bioelectronics**, 77, 1062-1069.
2. McCallum, C., & Pennathur, S. (2016). Accounting for electric double layer and pressure gradient-induced dispersion effects in microfluidic current monitoring. **Microfluidics and Nanofluidics**, 20(1), 1-9.
3. Liu, Y. W., Pennathur, S., & Meinhart, C. D. (2016). Electrophoretic mobility of spherical particles in bounded domain. **Journal of colloid and interface science**, 461, 32-38.
4. Del Bonis-O'Donnell, J. T., Pennathur, S., & Fygenson, D. K. (2015). Changes in spectra and conformation of hairpin DNA-stabilized silver nanoclusters induced by stem sequence perturbations. **Langmuir**, 32(2), 569-576.
5. Venkateswaran, N., Kogot, J. M., & Pennathur, S. (2015). Interplay between Peptide Length, Ionic Strength and pH in Electrophoretic Separations of Polyglutamate. **J Anal Bioanal Tech S**, 13, 2.
6. Janssen, K. G., & Pennathur, S. (2015). Electrocavitation in nanofluidics: unique phenomenon and fundamental platform. **Lab on a Chip**, 15(20), 3980-3983.
7. Ray, T. R., Lettiere, B., de Rutte, J., & Pennathur, S. (2015). Quantitative Characterization of the Colloidal Stability of Metallic Nanoparticles using UV-Vis Absorbance Spectroscopy. **Langmuir**, 31(2), 3577-3586.
8. Wynne, T.M., McCallum, C., Del Bonis O'Donnell, J.T., Crisalli, P., and Pennathur, S., (2015) "Hybridization Thermodynamics of DNA Oligonucleotides during Microchip Capillary Electrophoresis" **Analytical Chemistry** 87.5 2811-2818.
9. Del Bonis O-Donnell, J.T., Fygenson. D., and Penanthur, S., (2015) "Fluorescent silver nanocluster DNA probes for multiplexed detection using microfluidic capillary electrophoresis" **The Analyst**, DOI: 10.1039/C4AN1735H.
10. Crisalli, P., McCallum C., and Pennathur. S. (2015) "Label Free detection of nucleic acids by modulating nanochannel surfaces" **Chemical Communications**, 51, 2335-2338.
11. Liu, Y-W., Pennathur S., and Meinhart, C.D., (2014) "Electrophoretic mobility of a spherical nanoparticle in a nanochannel", **Physics of Fluids**, 26, 112002.
12. Russell, A., Wynne, T. M, O'Donnell, J.T.D., Napoli, M., and Pennathur, S. (2013) "Separation behavior of short single and double stranded DNA in 1 micron and 100nm glass channels", **Electrophoresis**, 35, 2-3, 412-418.
13. Gillespie, D., and Pennathur, S. (2013)"Separation of Ions in Nanofluidic Channels with Combined Pressure-Driven and Electro-osmotic Flow" Analytical Chemistry, 85, 2991-2998.
14. Wynne, T.M., Dixon, A.H., and Pennathur, S., "Electrokinetic characterization of individual nanoparticles in nanofluidic channels," 2012, Microfluidics and Nanofluidics,12, 1-4, 411-421.