SRCCS
MacCHESS
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AS Biotechnology, TC3♪
BS Biological Sciences, CALS♪
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BioSAXS ♪

- Microcrystallography can give detailed and accurate images of samples down to 3Å♪

♪

- For biological samples that are difficult to crystallize, or where the goal is to analyze the interactions in solution, bioSAXS is ideal♪

- BioSAXS is able to image larger structures♪

- Some things to keep in mind are sample consumption, radiation damage, and aggregation of proteins♪

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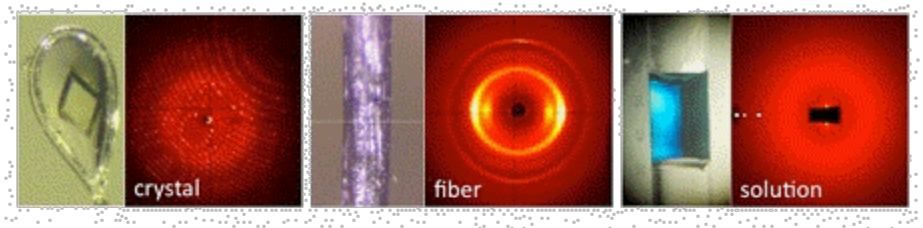
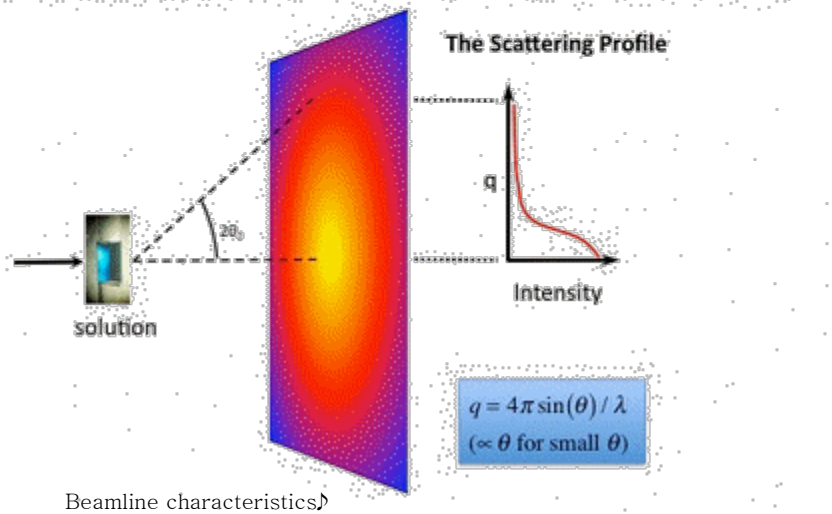
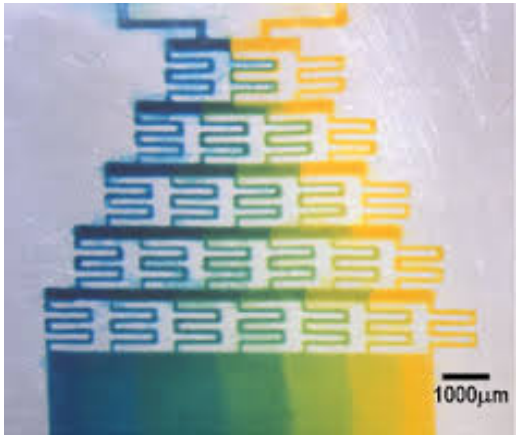




Beamline characteristics♪
G1 Station: ♪
E = 9.968 keV (1.257 A)
Beam diameter 250 um x 250 um
Flux = 1.6 x 10**11 photons/sec (as of 10/18/2013)
Minimum sample volumes:
using the robot 25 ul
manual loading 20 ul
recommended working volume 30 ul

Current Project and Goal

- Image protein transformations in real time♪
  - Design effective mixer flow cell♪
  - Establish dependable fabrication protocol♪
  - Ready for use by the end of the summer♪ ♪ ♪



Shrinky-Dink microfluidics: rapid generation of deep and rounded patterns
Anthony Grimes, David N. Breslauer, Maureen Long, Jonathan Pegan, Luke P. Lee and Michelle Khine, *Lab Chip*, 2008, **8**, 170
DOI: 10.1039/b711622e
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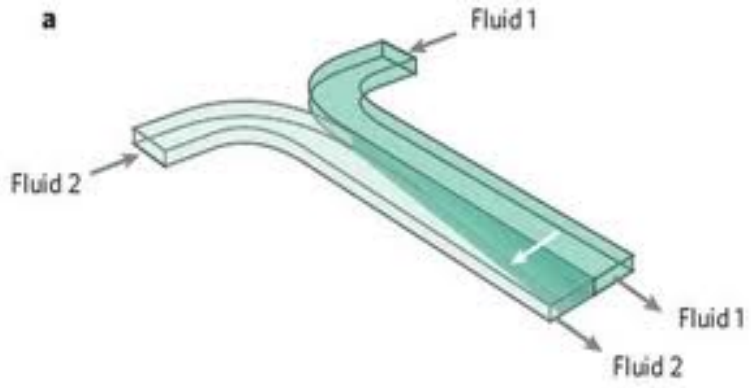
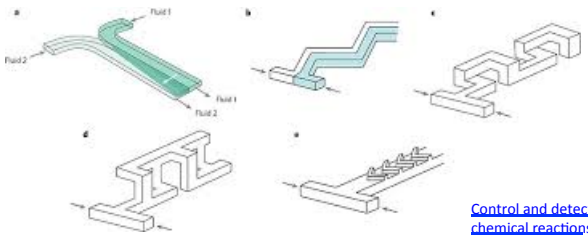


DeMello, A J., Control and detection of chemical reactions in microfluidic systems, *Nature*, 2006, 442, 395-402.♪

Microfluidics of flow cells



Control and detection of chemical reactions in microfluidic systems
Andrew J. deMello
Nature 442, 394-402(27 July 2006)
doi:10.1038/nature05062

- On the micro and nano scale, fluid behaves much differently.♪

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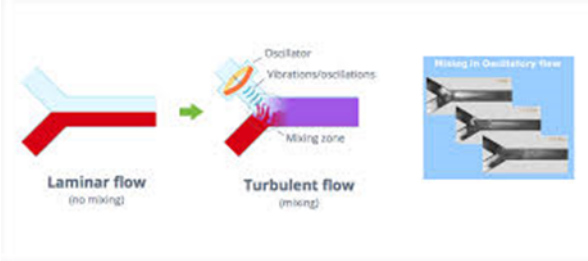
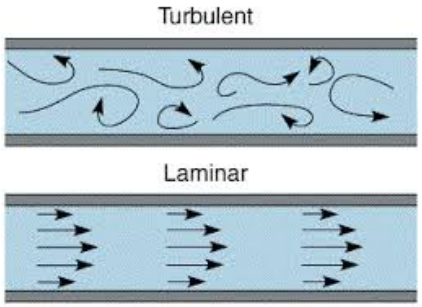
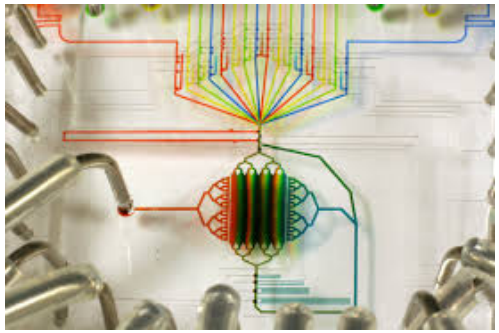
- Laminar flow, which occurs at low Re numbers, is when separate inputs become parallel currents that have only a small amount of mixing along the interface between them. ♪

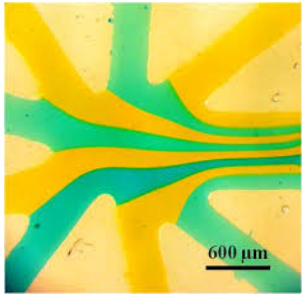


- There are several ways to increase the Re number so that turbulent flow is accomplished.♪



- For this project we have chosen to incorporate a simplistic design for ease in fabricating and using as a disposable flow cell to be utilized by MacCHESS users. ♪





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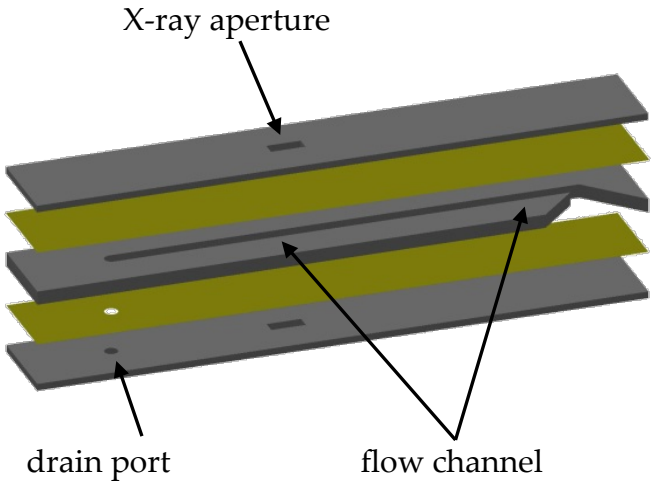
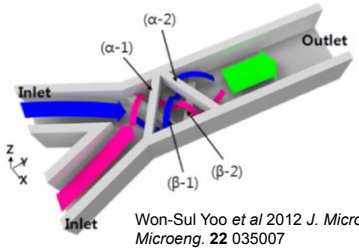
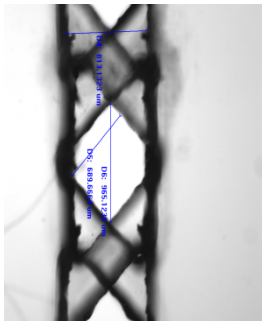
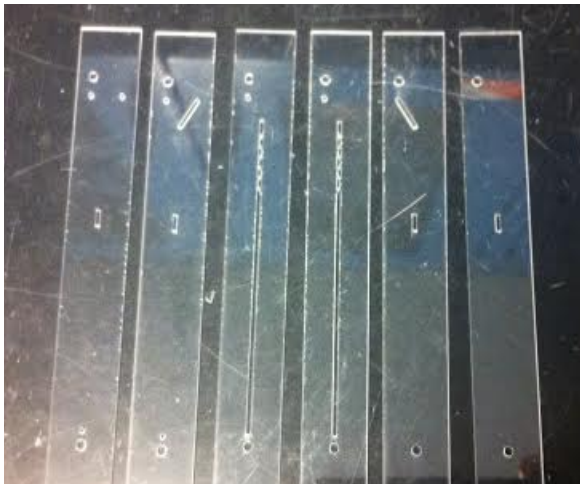
Designs & Methods of Fabrication♪

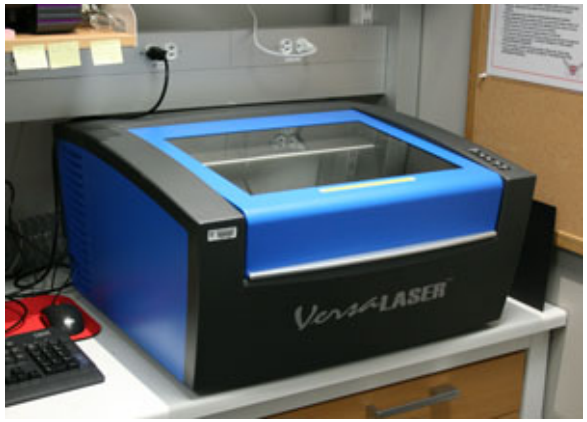


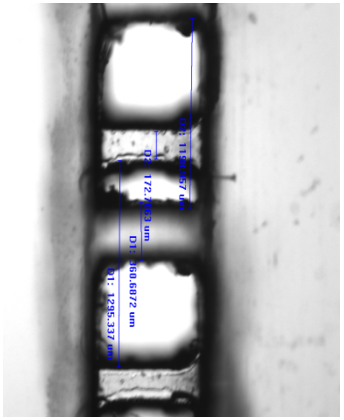


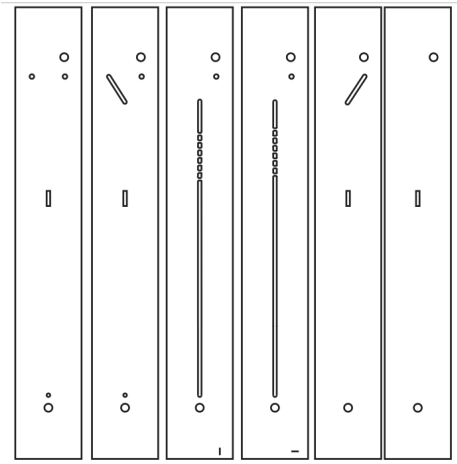
Won-Sul Yoo *et al* 2012 *J. Micromech. Microeng.* **22** 035007
doi:10.1088/0960-1317/22/3/035007





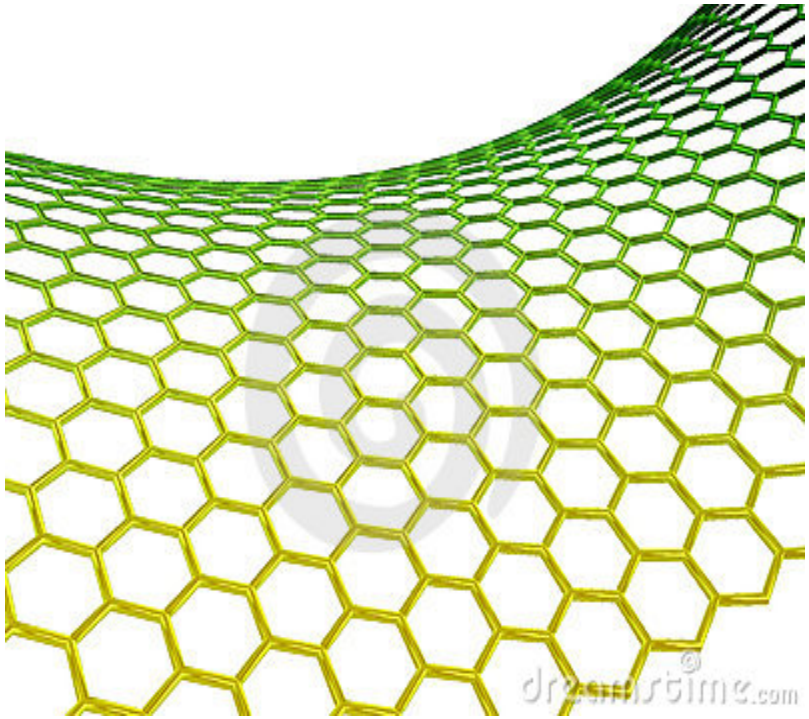






What's next?♪

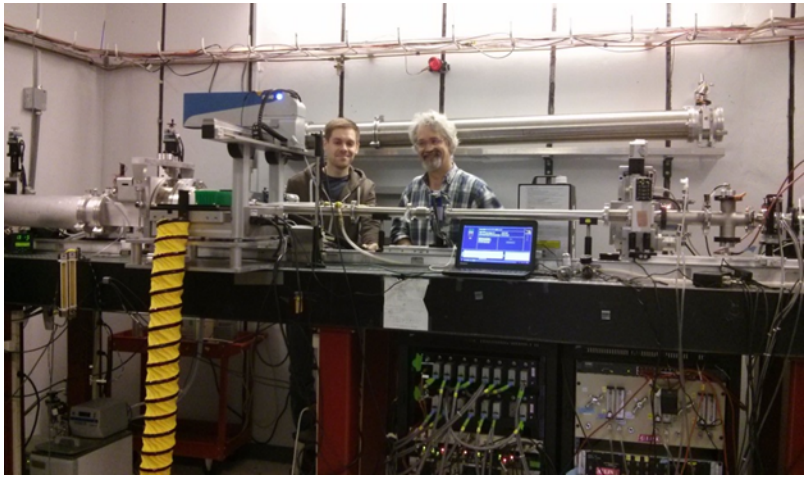
Graphene as an X-ray window material♪



Summary and immediate plans♪

- Assembly and testing of flow cells ♪
- Helping to make graphene and testing strength under vacuum♪

Thank You.♪



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