CPS: Small: Geometric Self Propelled Articulated Micro-Scale Devices Award #: 1739308, Award Date: September 1, 2017

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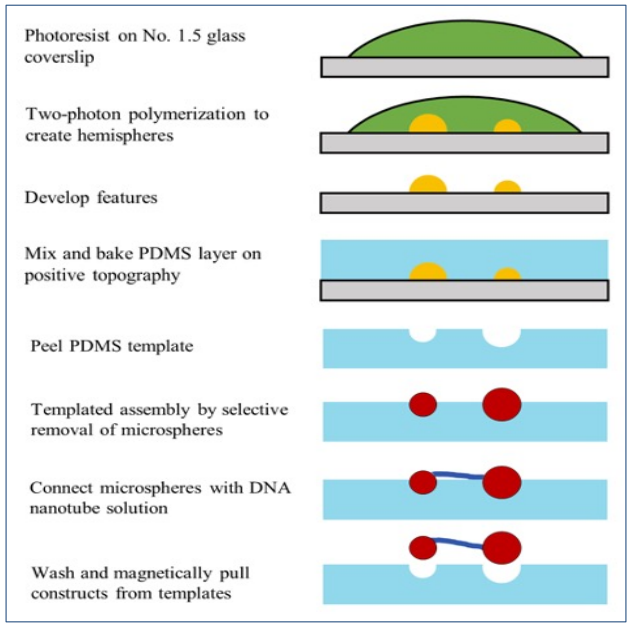
1: Carnegie Mellon: http://biorobotics.ri.cmu.edu/index.php 2: Carnegie Mellon: http://www.andrew.cmu.edu/user/bex/stories/welcome/

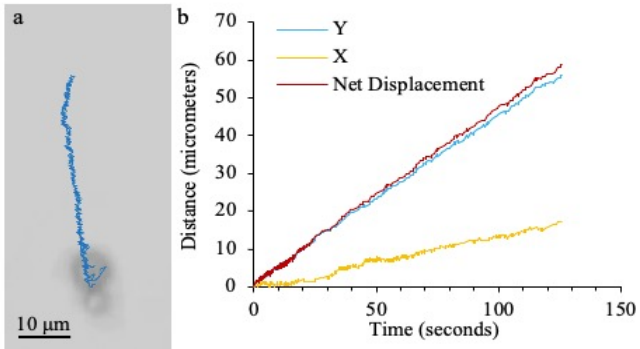
Challenge:

- Integrate motion planning and mechanical design for microscale devices

Solution:

- Demonstrate geometry-based trajectory generation methods for self-propelled millimeter-scale devices
- Prototype optimized micron-scale devices. Integrate robotics and microfabrication systems to fundamentally change cyber-physical system design and control





Scientific Impact:

- Develop cyber-physical system design process that informs the construction of mechanical prototypes via geometric modeling and optimal motion planning

Broader Impact:

- Establishes the foundation for novel medical device deployment. Enables non-invasive surgery, biosensing, targeted drug delivery
- Implemented real-time, web-based control of Helmholtz Coils, devised workflow, and outlined user interface for public dissemination