**Publishable summary**

The goal of this project was the fabrication of capacitive biosensors using laser deposition methods. Specifically, biological materials that will act as probes for specific analytes were deposited on the top plate of capacitive microsensors by a laser deposition technique, named Laser Induced Forward Transfer (LIFT), which provides spatial resolution of tens of m. Sensing of biological reactions will be possible by recording the changes in the sensors capacitance. The geometry and chemistry of the top plate of the capacitive sensors are very important for enhanced sensitivity. The sensor dimensions are on the order of 150-250 m, therefore increased spatial resolution is needed for the deposition of biological materials on the sensor surface.

During the project, we were able to optimize the LIFT process for the deposition of DNA spots. Specifically, we implemented and optimized the LIFT process by choosing the appropriate laser system, optimized the laser pulse intensity, selected the appropriate carrier for the material to be deposited, and optimized the distance between the material carrier and the receiving substrate. We successfully deposited DNA spots on various substrates using the LIFT technique. Figure 1 shows an optical microscope image of deposited DNA spots on Si for various laser energies.

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| **Figure 1:**  DNA spots deposited by LIFT on Si for various laser energies. |

Additionally, we worked on the fabrication of polyaniline microsensors and organic solar cells using laser deposition techniques and laser microstructuring of Si surfaces for technological applications.

The main results of the project are:

* Optimization of the Laser Induced Forward Transfer (LIFT) setup for printing biological materials in the liquid phase.
* Successful LIFT deposition of biological materials on the surface of capacitive sensors.
* Fabrication and characterization of polyaniline microsensors using LIFT.
* LIFT fabrication of P3HT/PCBM organic solar cells.
* Laser microstructuring of Si surfaces and applications.

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