

# MICROFLUIDIC FABRICATION & CHIP HOLDER DESIGN

Matthew Johnson

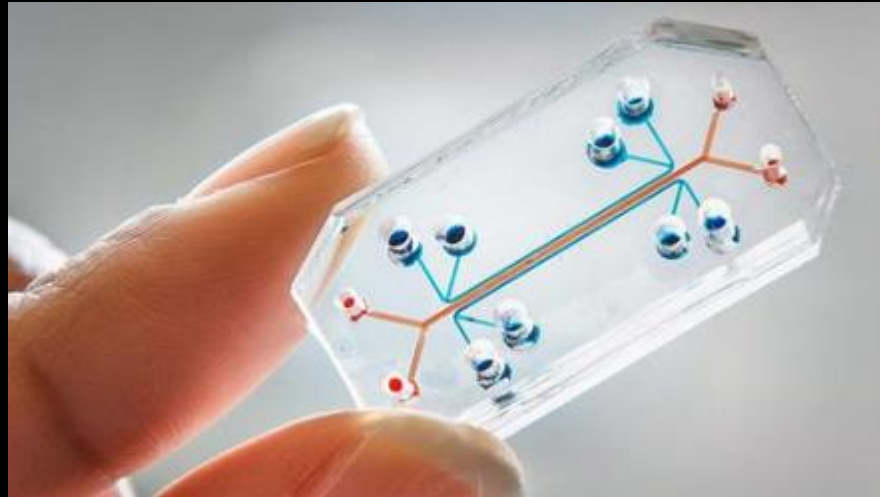
Georgia Institute of Technology REU 2018

Dr. Todd Sulchek

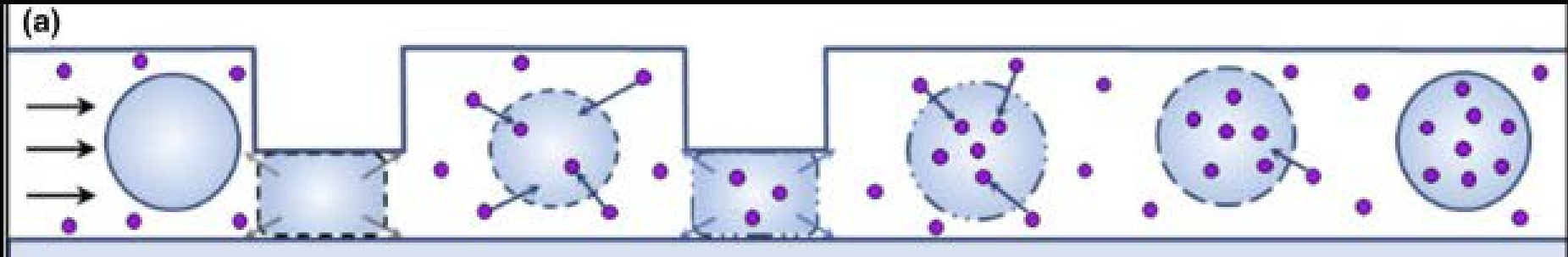
Southeastern Undergraduate  
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NSF EEC-1757579

# MICROFLUIDIC FABRICATION

- Delivery of particles to cells
- Sorting process for drug-resistant cancer cells



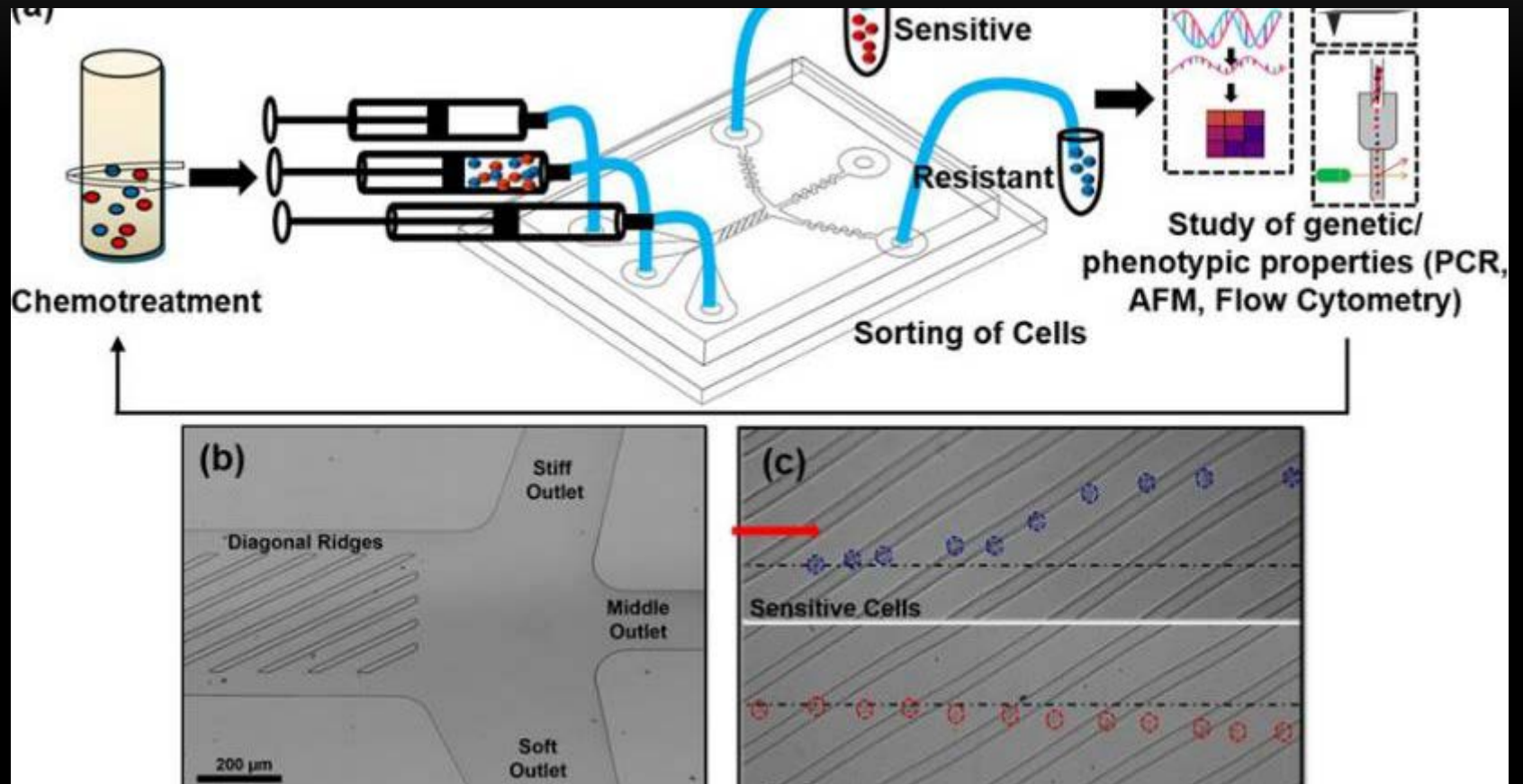
# DELIVERY OF PARTICLES TO CELLS



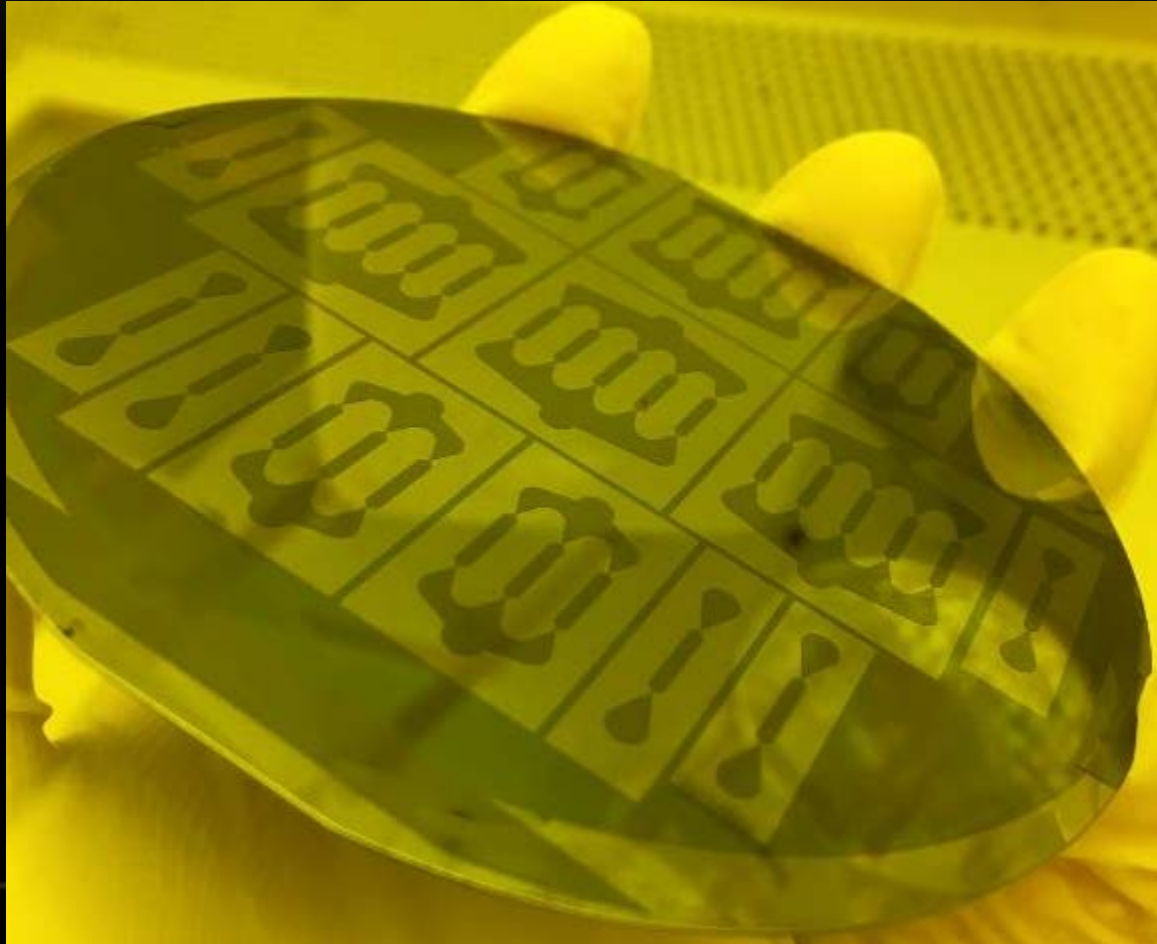
# SORTING PROCESS FOR DRUG-RESISTANT CELLS

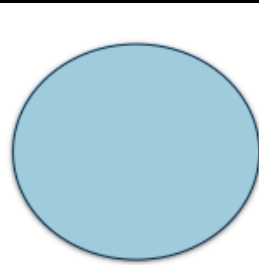


# SORTING PROCESS FOR DRUG-RESISTANT CELLS

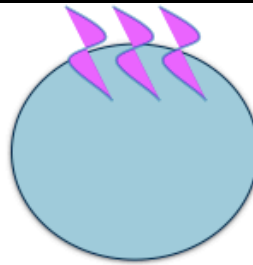


# FABRICATION PROCESS

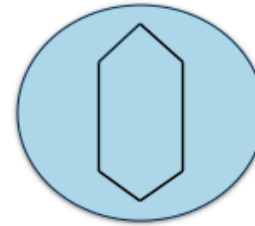




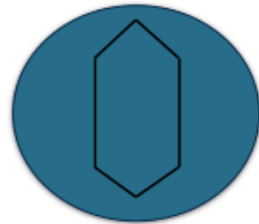
(1) First deposition of SU-8 photoresist onto silicon wafer



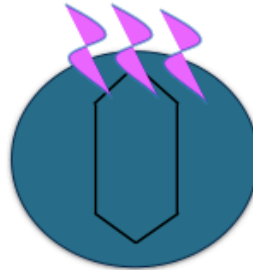
(2) First exposure of photoresist to UV radiation



(3) Development of microfluidic channels



(4) Second deposition of SU-8 photoresist onto silicon wafer



(5) Second exposure of photoresist to UV radiation



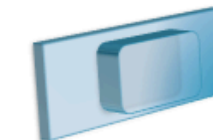
(6) Development of microfluidic ridges within channels



(7) Application of PDMS coating on top of SU-8 mold

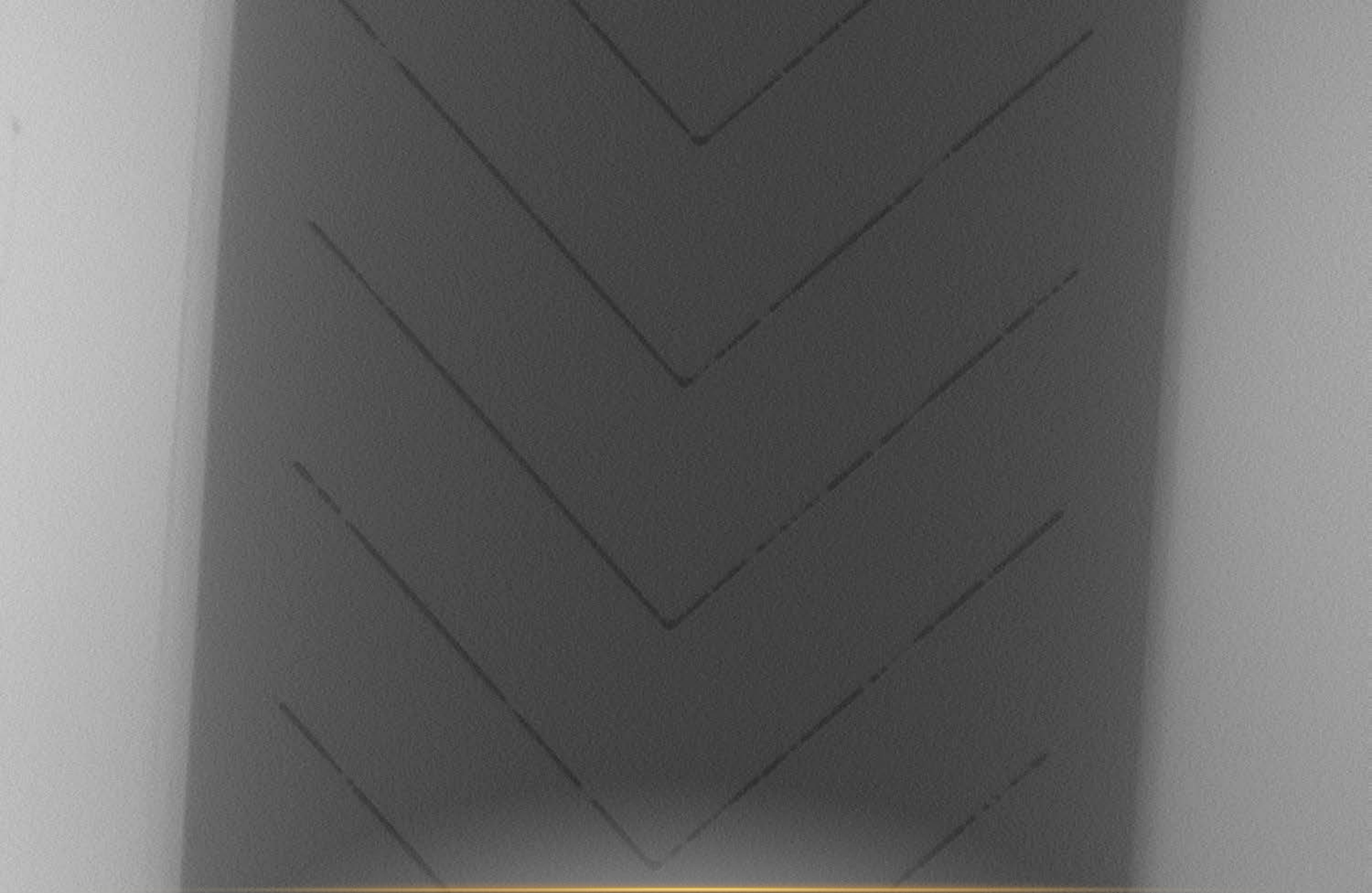


(8) Removal and cutting of PDMS device, plasma bonding to glass slide



(9) Completed microfluidic device

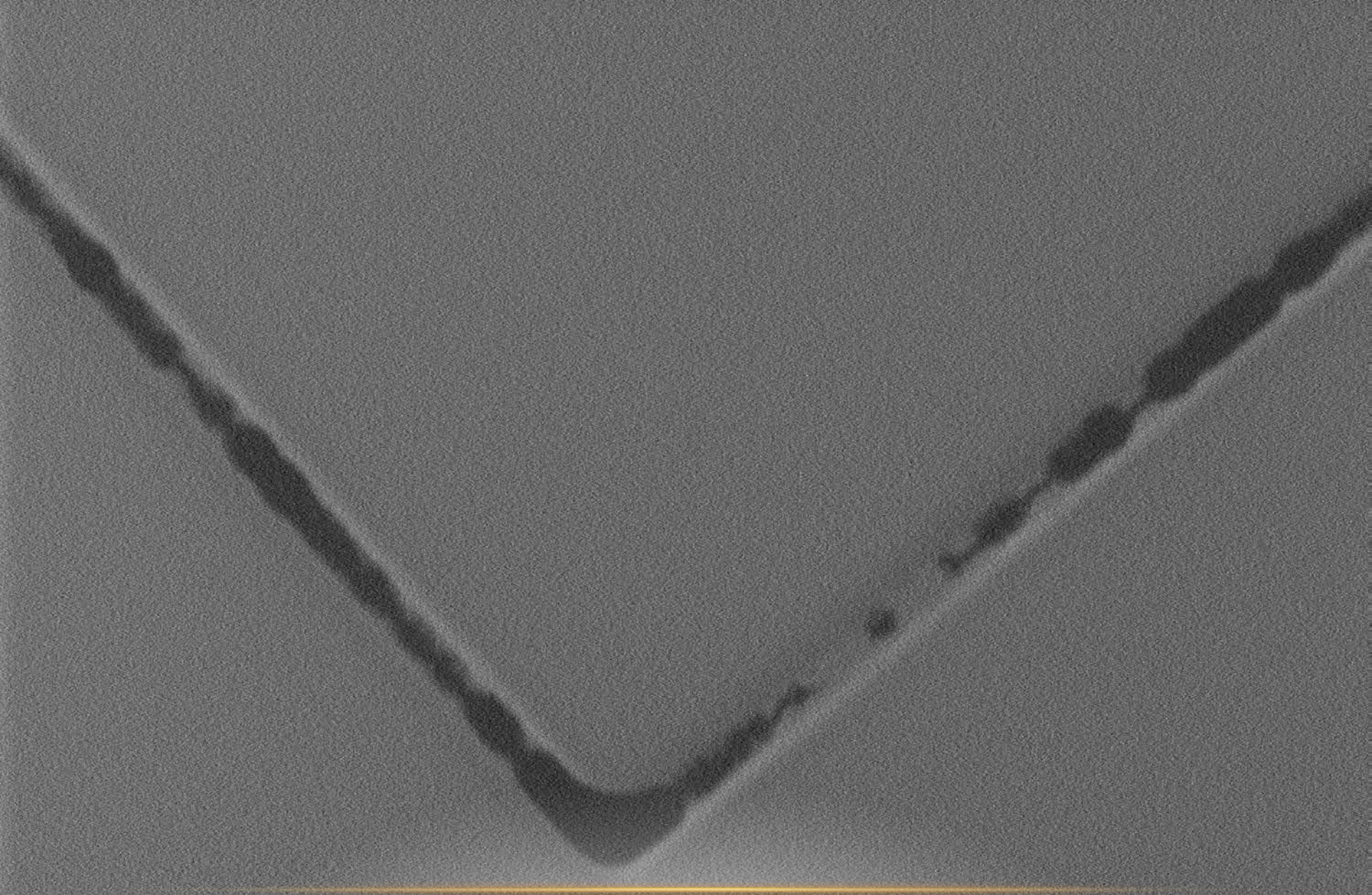




5.00kV 5.2mm x75 BSE3D 80Pa

500um

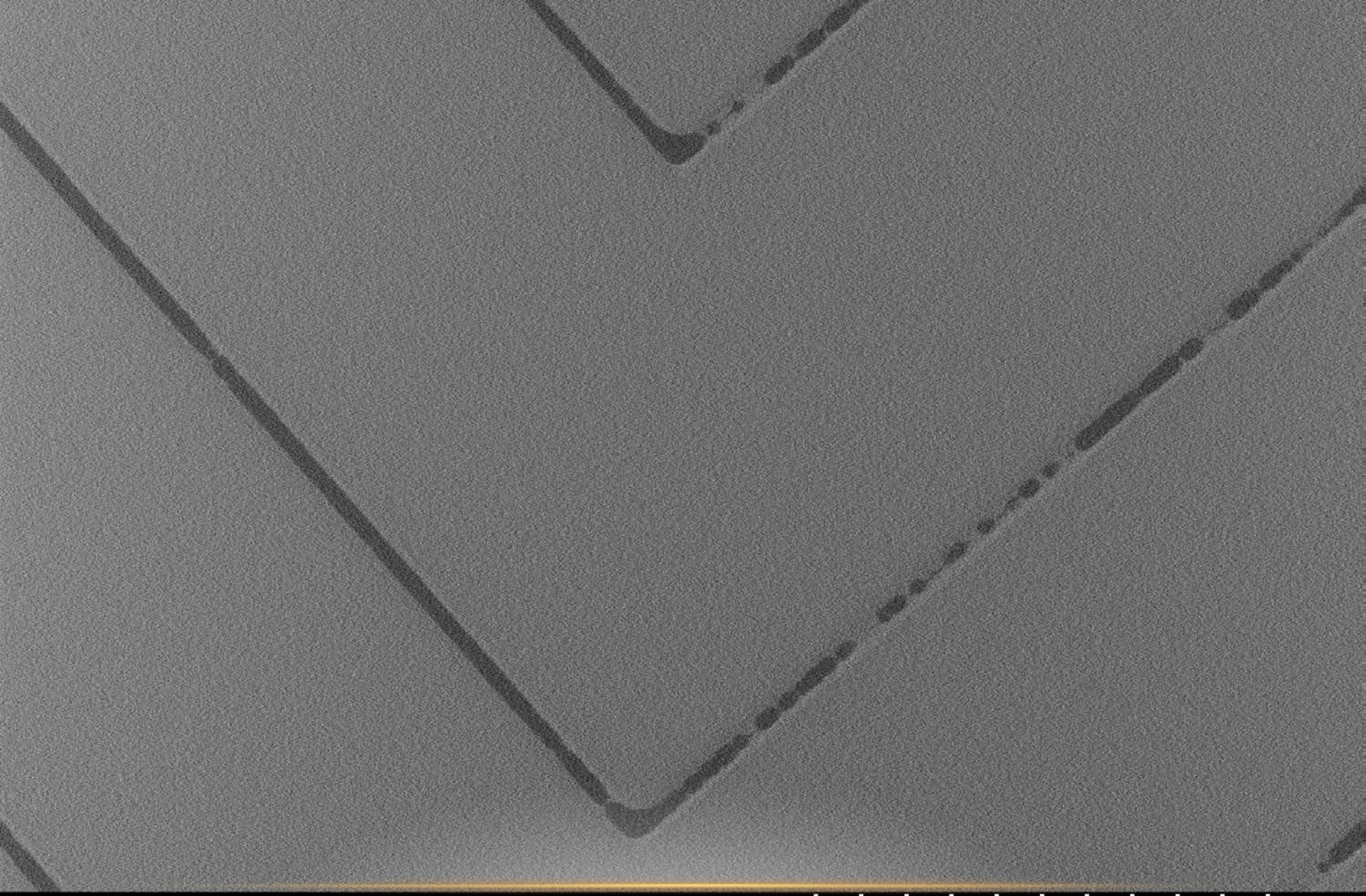




5.00kV 5.3mm x500 BSE3D 80Pa

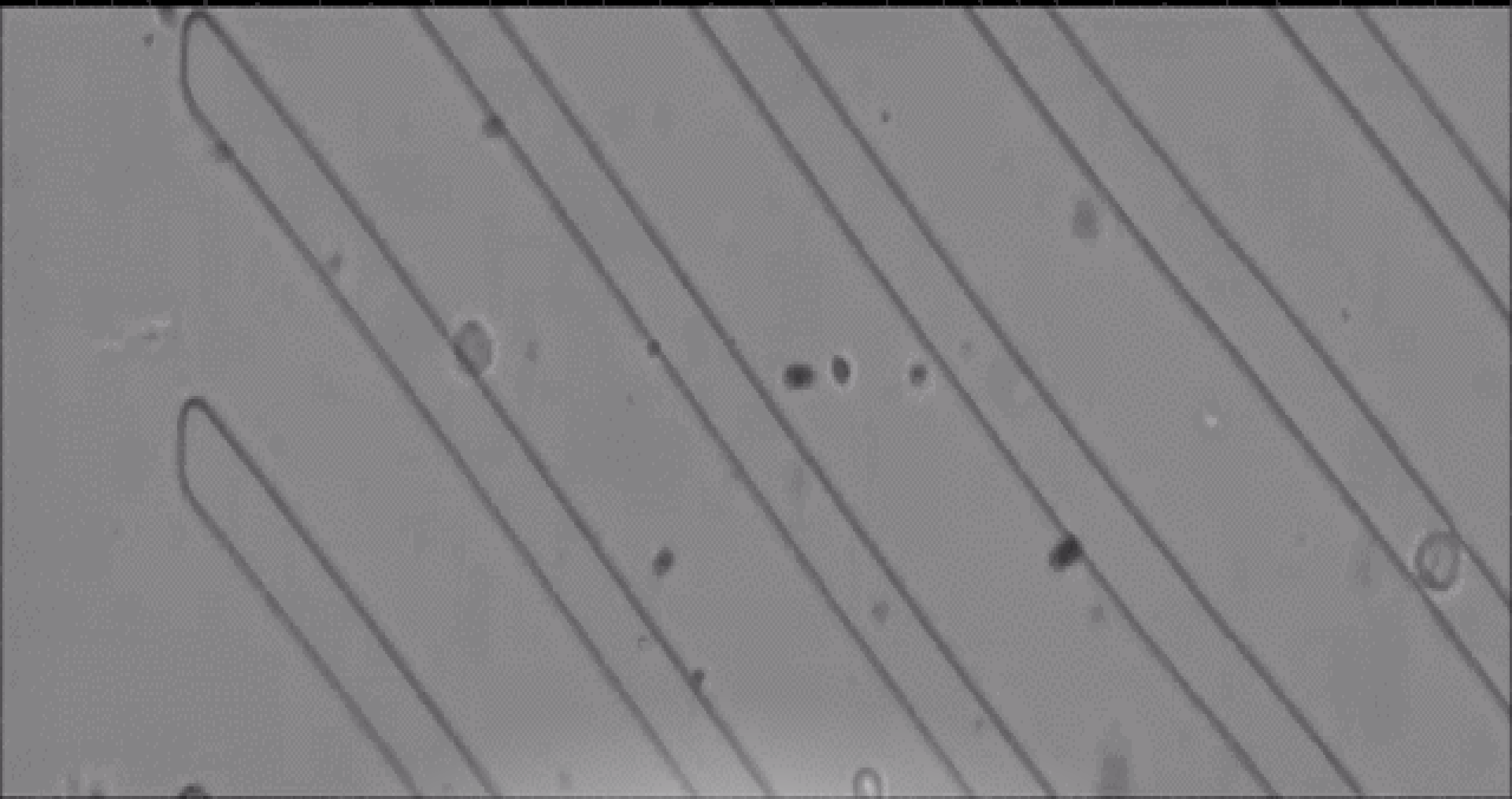
100um





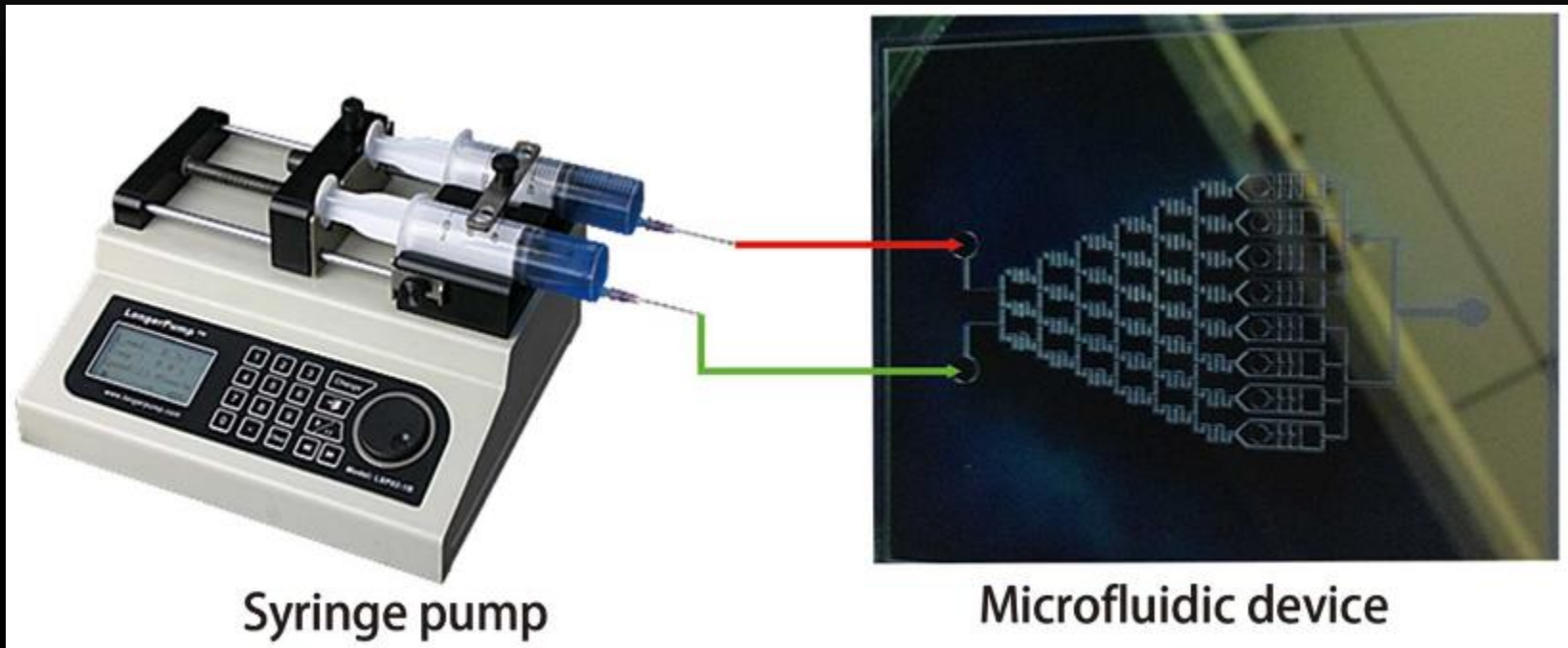
5.00kV 5.2mm x210 BSE3D 80Pa

200um





# CHIP HOLDER DESIGN



Can this be improved?

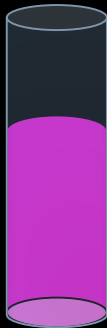
Positive Pressure  
Source



### GOALS:

- Limit human error
- Eliminate dead volume
- Ensure secure connection

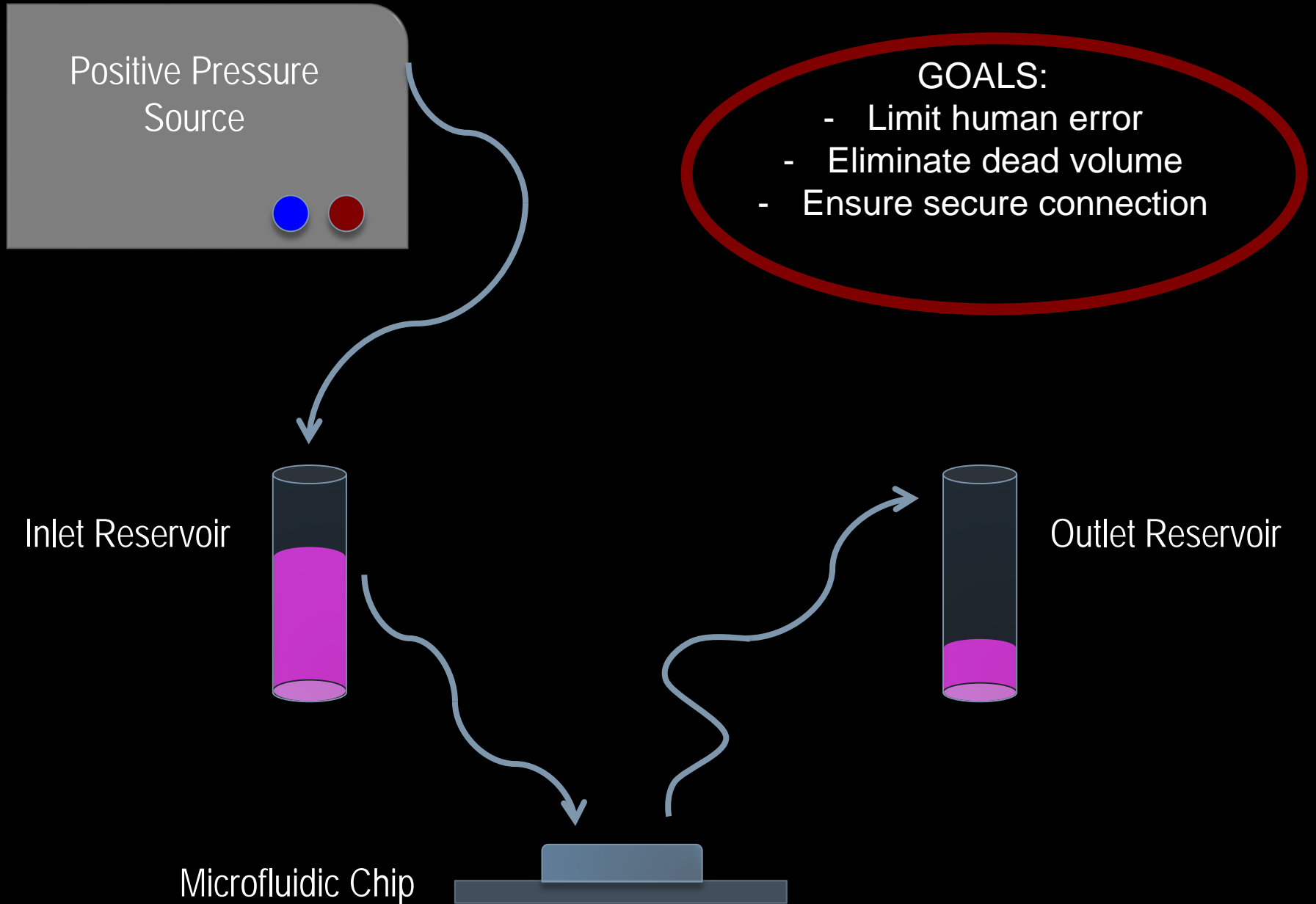
Inlet Reservoir

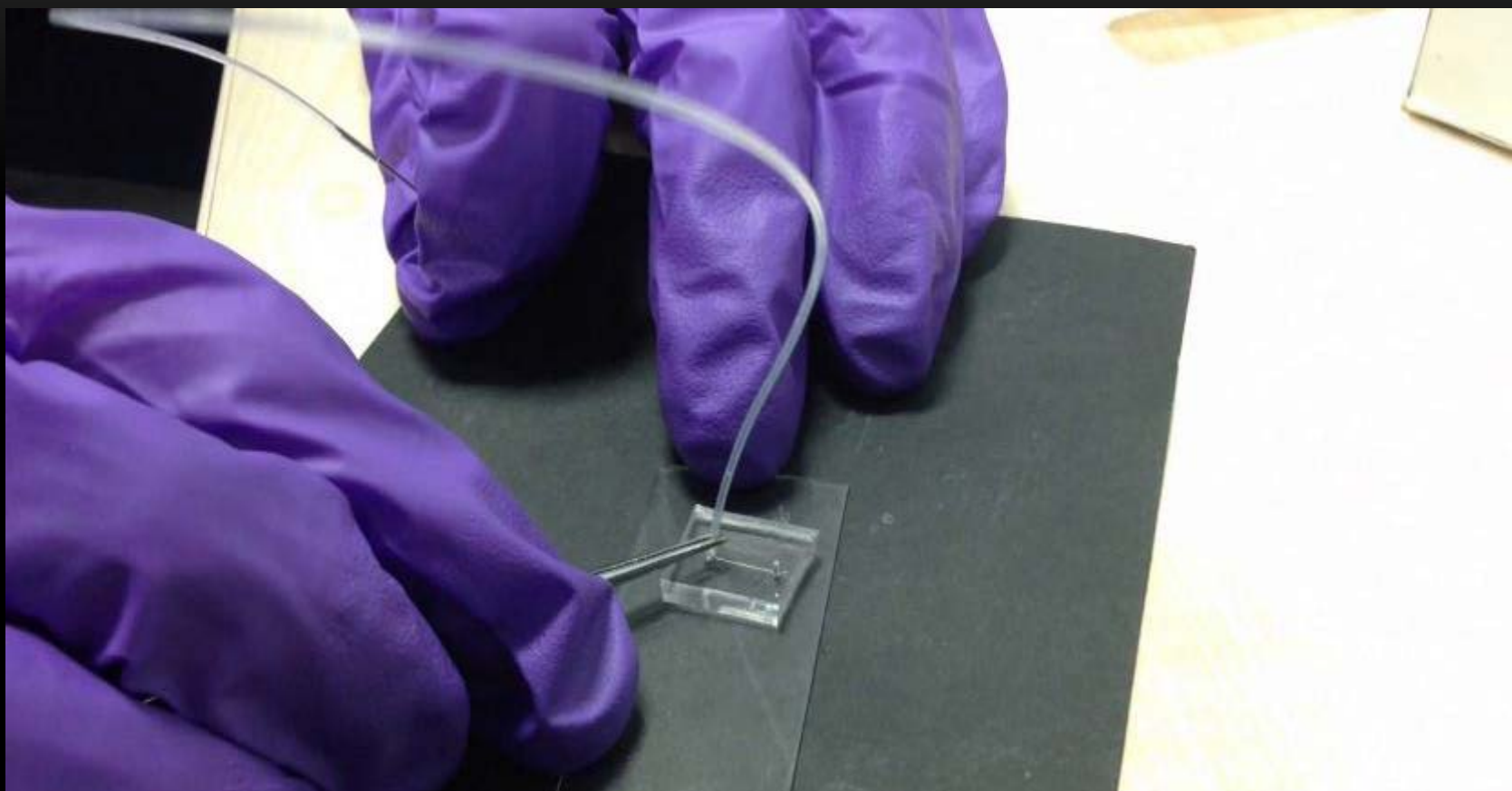


Outlet Reservoir

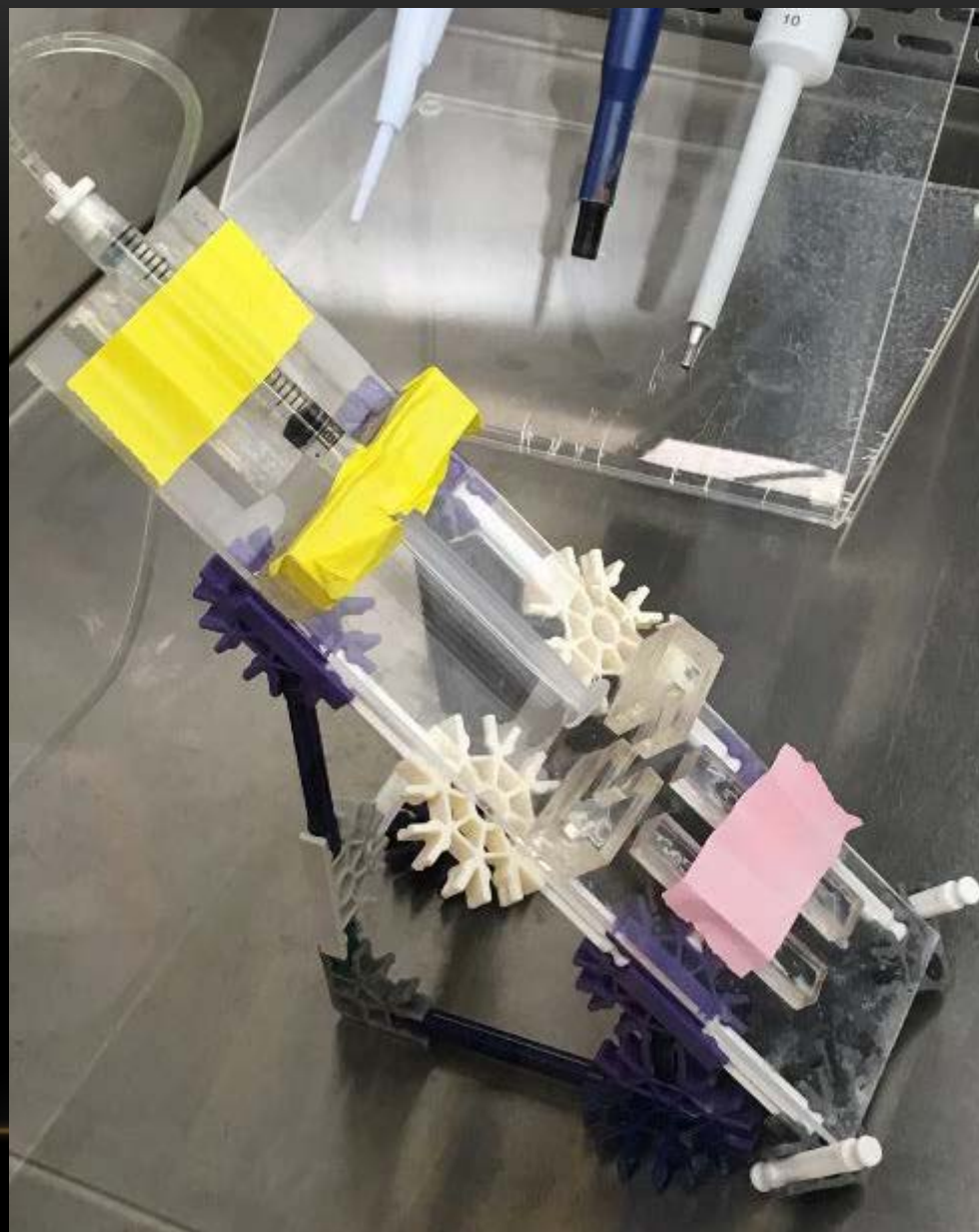


Microfluidic Chip

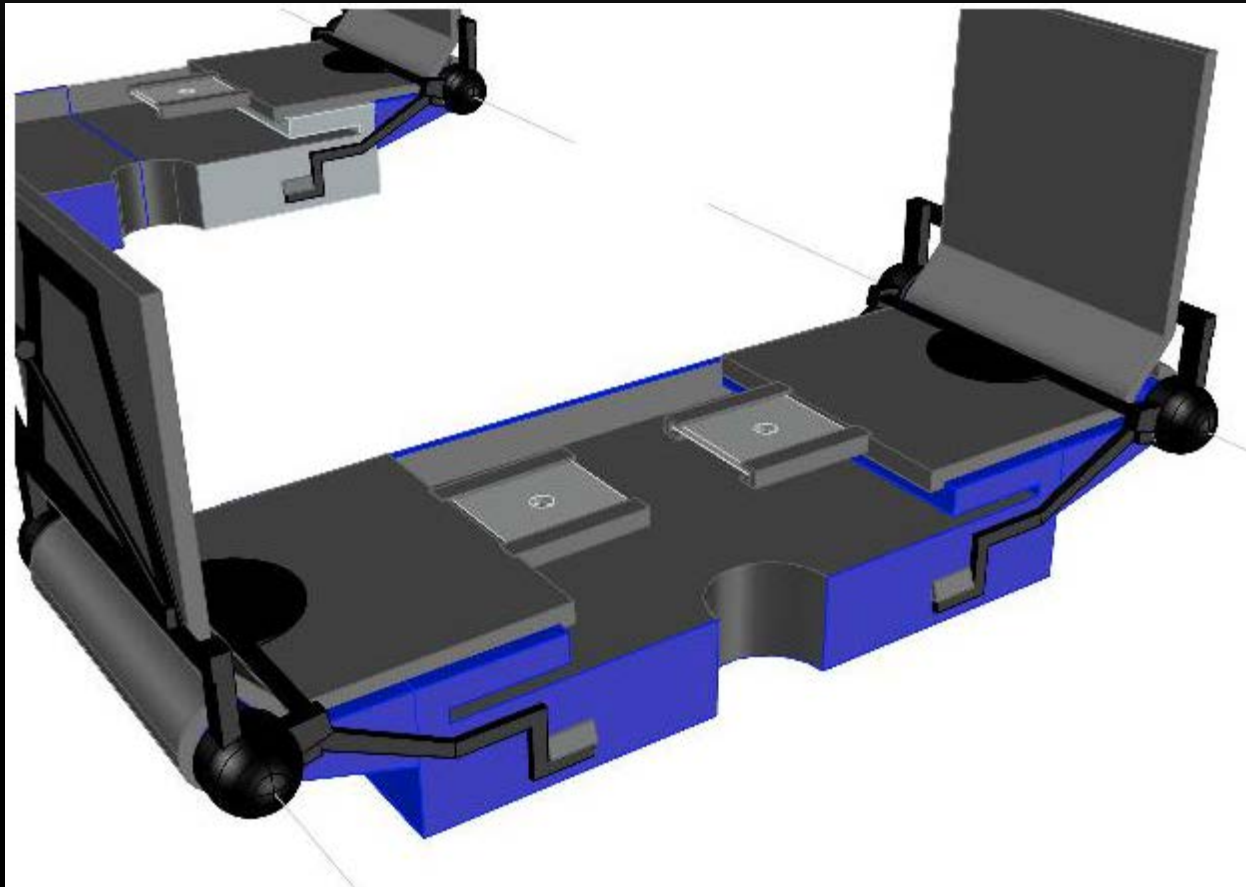




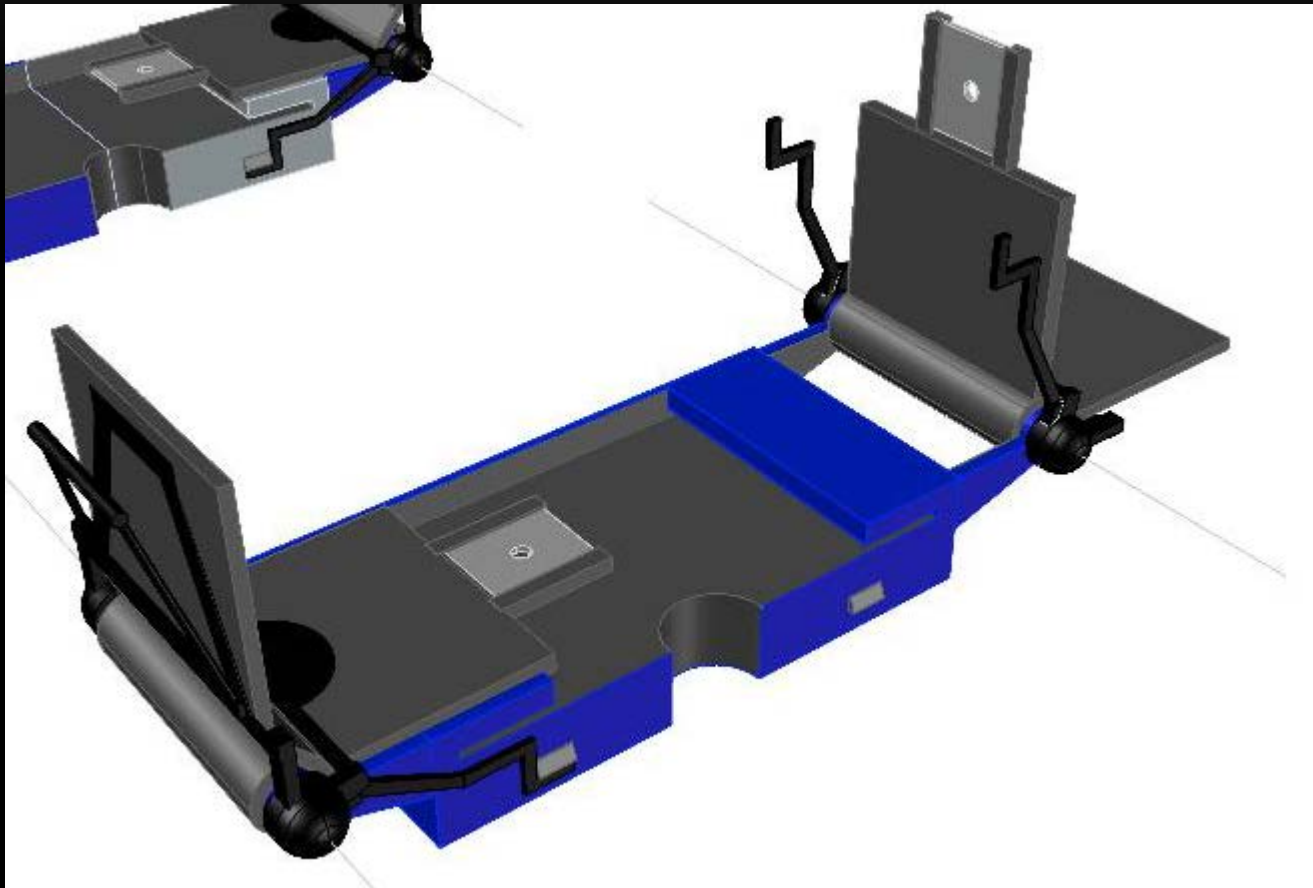




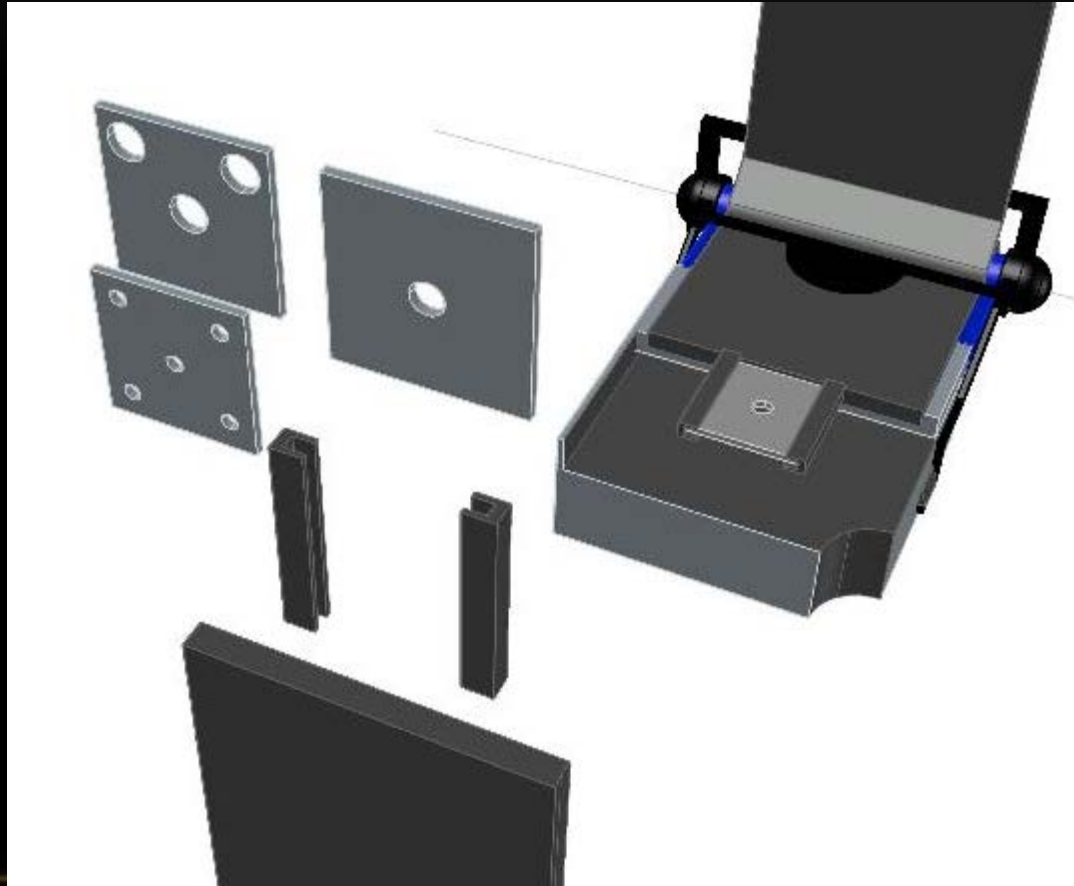
# CHIP HOLDER DESIGN



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THANK YOU