

HST.410J/6.07J

Lecture 1
February 6, 2007

Projects in Microscale Engineering for the Life Sciences
HST.410J / 6.07J

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Janice Balzer (secretary)

Web site:
<http://umech.mit.edu/6.07J/index.html>

Microscale Engineering
Electronics

Medicine and Biology

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revised March 5, 2007

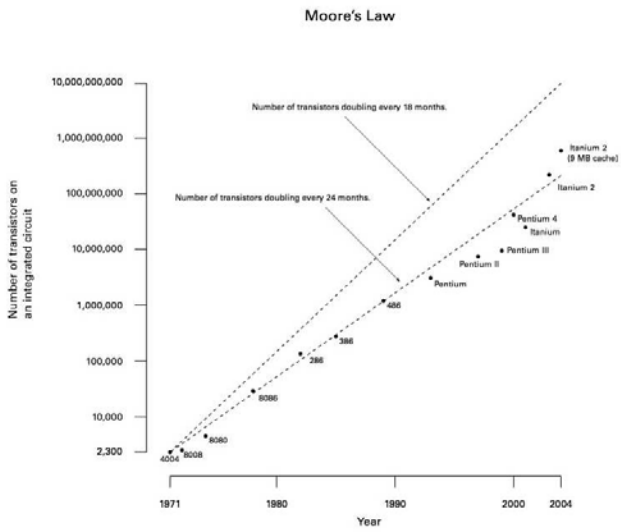
HST.410J/6.07J Calendar

Introductory Exercises
(weeks 1-7)

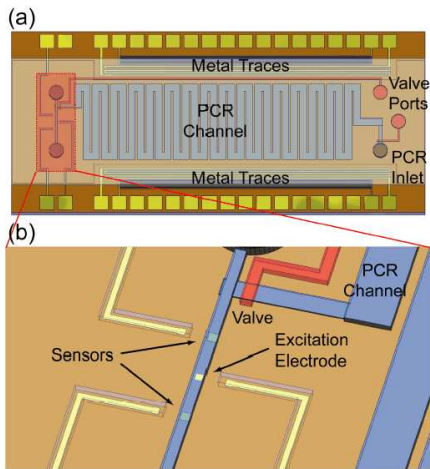
Projects
(weeks 8-14)

Tuesday		Thursday		Tuesday		Thursday	
	2/6 L1		2/8 L2	Project Proposal Due	4/3 L14	Homework #6 Due	4/5 L15
Microfluidics		Microfabrication		Projects		Projects	
	2/13 L3		2/15 L4		4/10 L16		4/12 L17
Cells and Membranes		Cells and Membranes		Projects		Projects	
Homework #1 Due	2/20		2/22 L5		4/17		4/19 L18
No Lecture / No Lab		Models of Diffusion & Cell Experiment		Patriot's Day No Lecture / Lab		Projects	
Homework #2 Due	2/27 L6		3/1 L7		4/24 L19		4/26 L20
Laminar Flow		Data Analysis using Matlab		Projects		Projects	4/26 L20
Homework #3 Due	3/6 L8		3/8 L9		5/1 L21		5/3 L22
Research Applications		Research Paper Discussion		Projects		Projects	5/3 L22
Homework #4 Due	3/13 L10		3/15 L11		5/8 L23		5/10 L24
Research Applications		Cell Traps		Project Presentation Dry Runs		Project Presentation Dry Runs	5/10 L24
Homework #5 Due	3/20 L12		3/22 L13		5/15 L25		5/17 L26
Cell Traps		Statistics		Project Presentations		Project Presentations	5/17 L26

Spring Week



<http://en.wikipedia.org>

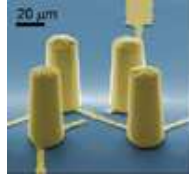
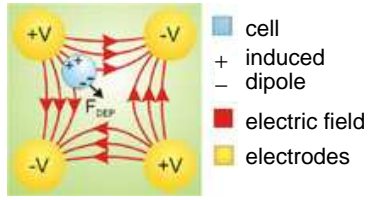
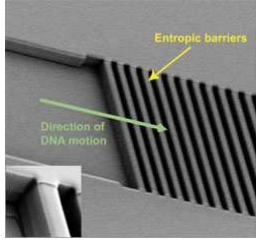
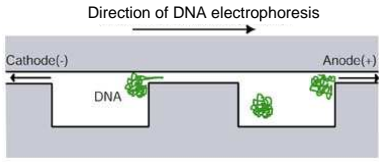


Johnson Hou and Prof. Scott Manalis

Johnson Hou MIT PhD thesis, 2007

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Micro/Nano Fluidics

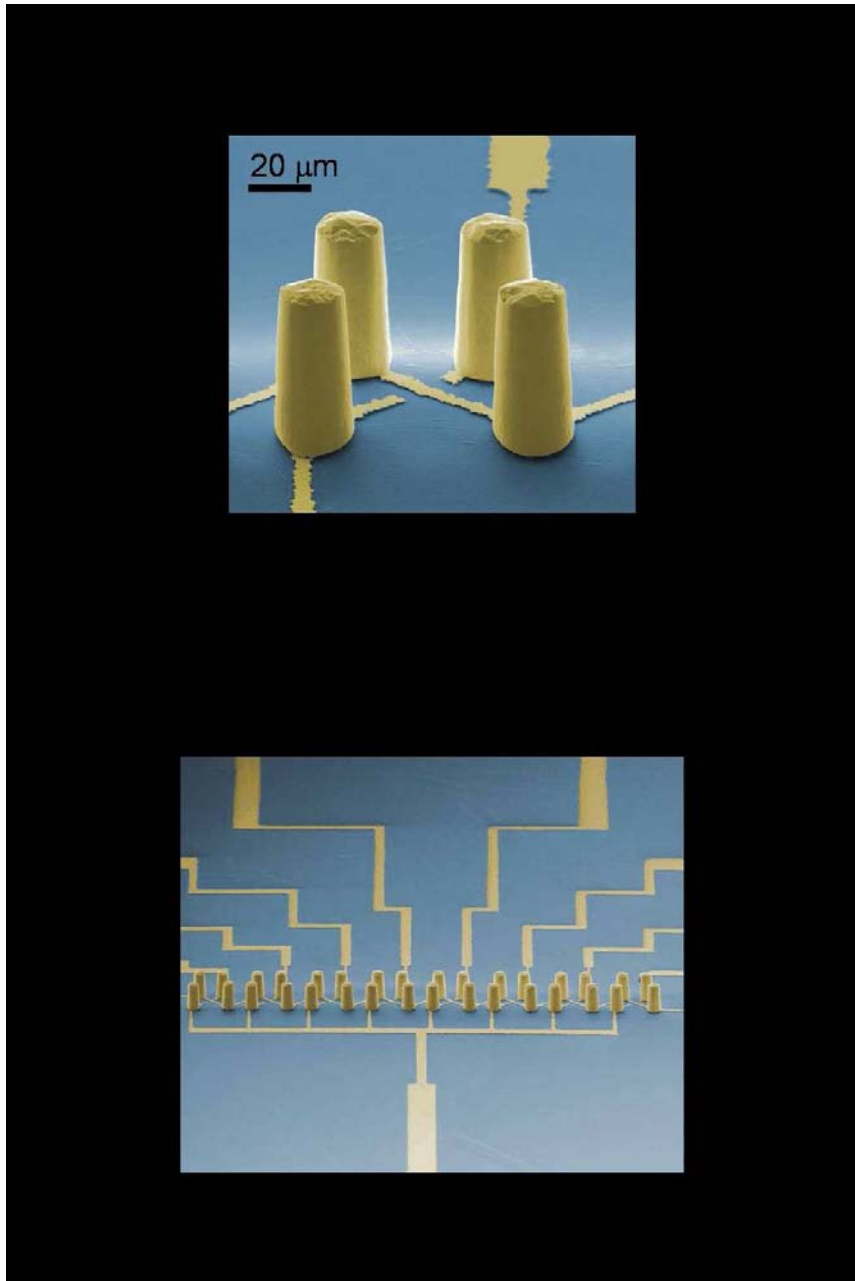


Courtesy of JongYoon Han. Used with permission.

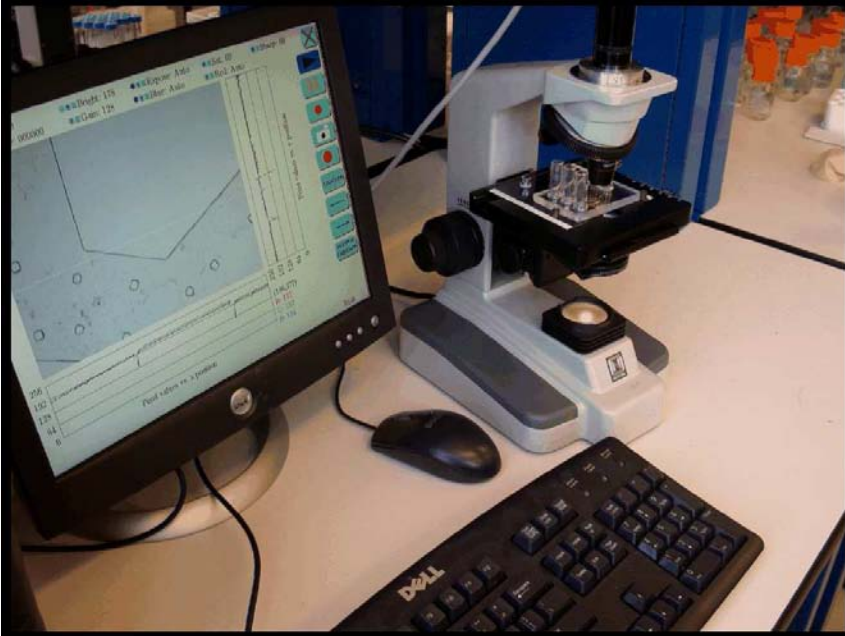
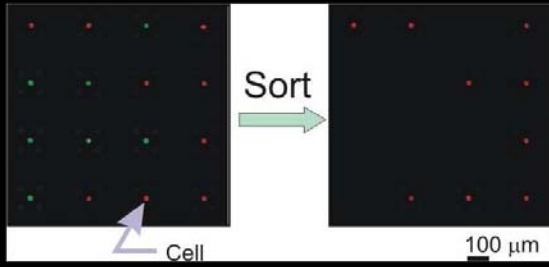
Courtesy of Joel Voldman. Used with permission.

JongYoon Han

Joel Voldman



Courtesy of Joel Voldman. Used with permission.



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 Sat: 60
 Sharp: 60
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 Gain: 128
 Blue: Auto
 Red: Auto

Avg

Pixel values vs. y position

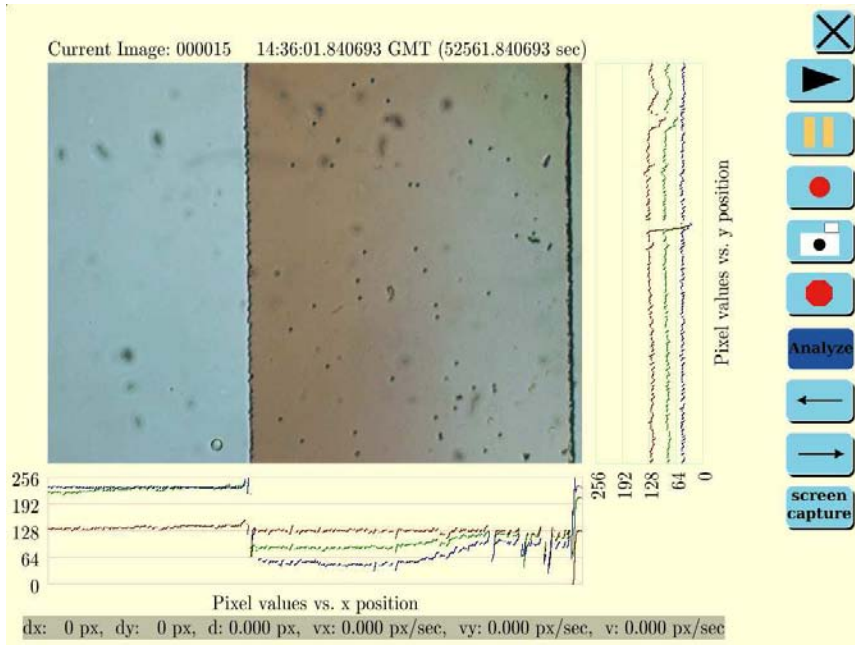
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Pixel values vs. x position

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64
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screen capture

RGB



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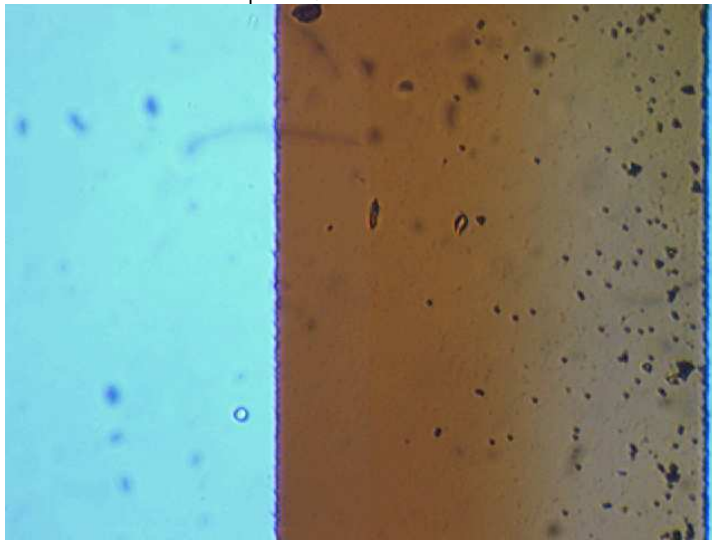
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011 139 175 180
...
637 137 161 143
638 138 162 144
639 138 162 144

RGB Values for Column 447
y_value R G B
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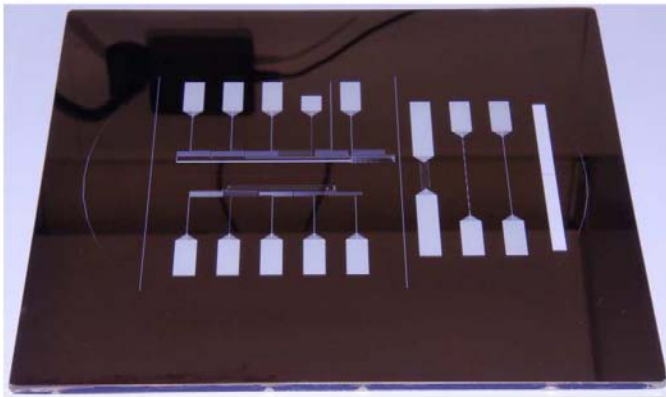
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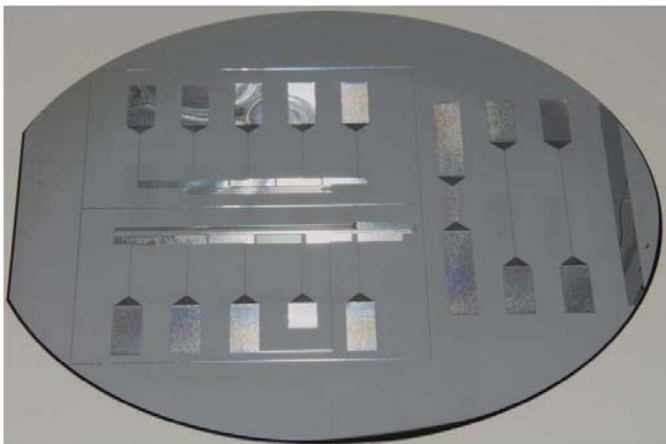
O-Ring Fluid Reservoirs



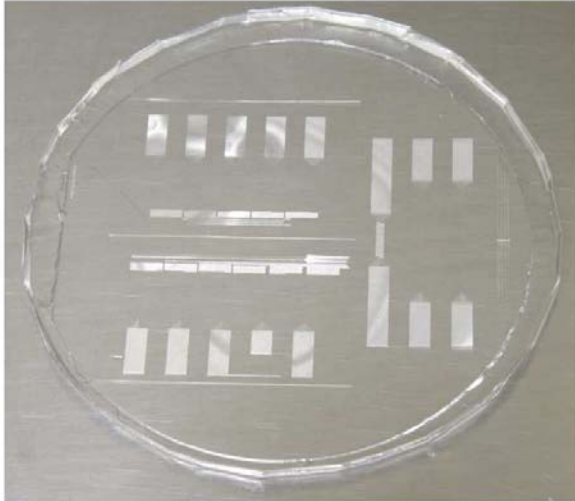
Chrome Mask



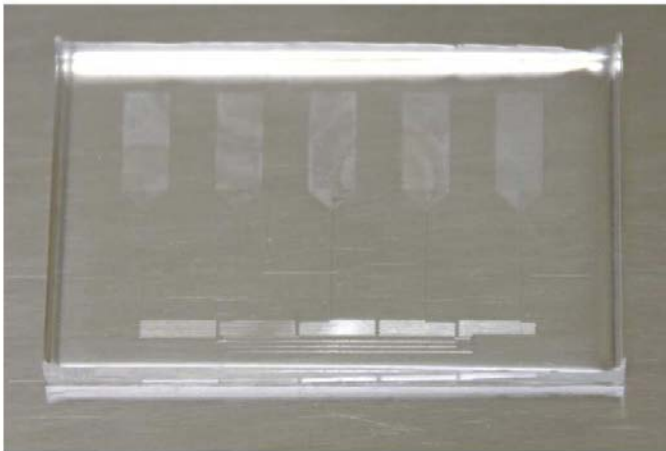
Silicon Master



PDMS Cast of Master



Unpunched PDMS Device



Plastic Master and Source Mold



Plastic Master Of PDMS Device



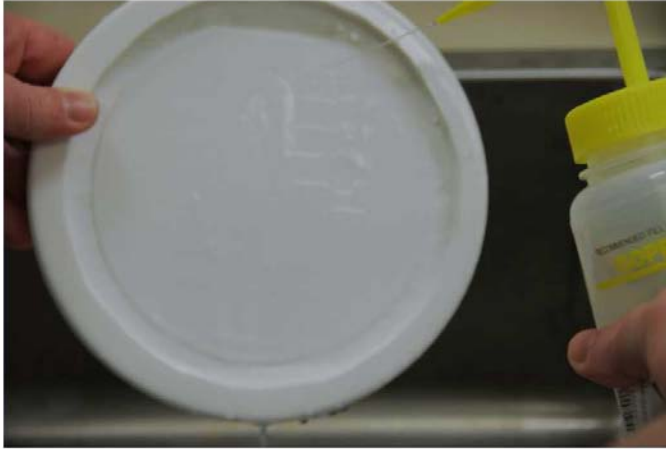
Washing Mold With Soap And Water



Rising Mold In Deionized Water



Rinsing Mold With Isopropyl Alcohol



Drying Mold With Compressed Air



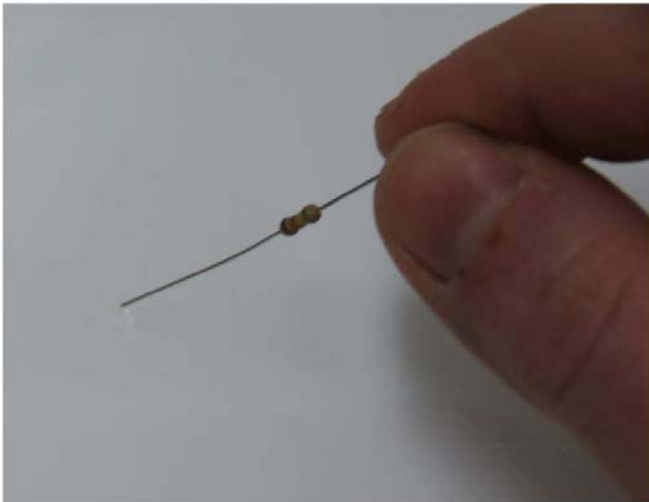
Removing Excess Crud With Tape



Pouring PDMS



Popping Bubbles In PDMS



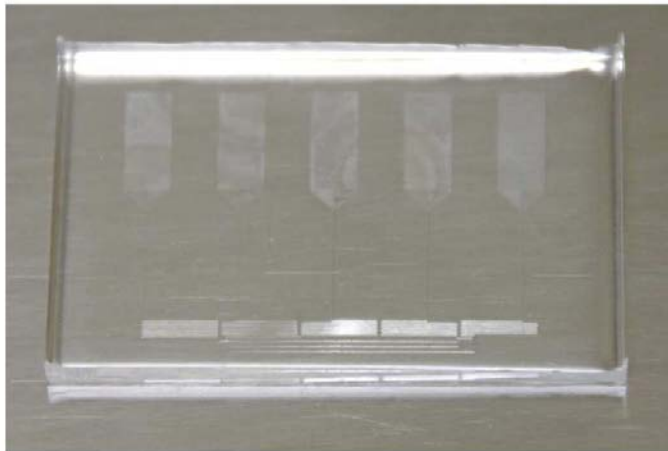
Placing Mold And PDMS In Oven



Proper Oven Settings For Baking PDMS



Unpunched PDMS Device



PDMS and Glass on Taped Slides



Placing Device In Plasma Cleaner



Plasma Cleaner On



Vacuum Ready



Plasma Cleaner On



Plasma Without Oxygen



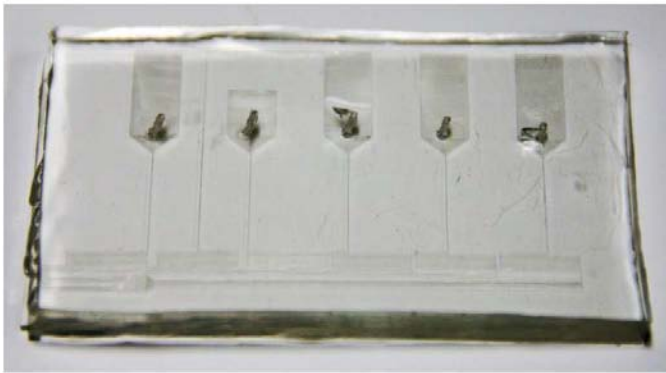
Plasma With Oxygen



Device Partially Bonded To Glass



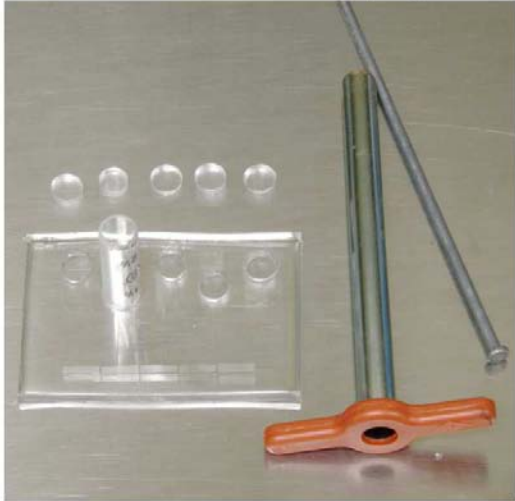
PDMS Device With Holes Punched



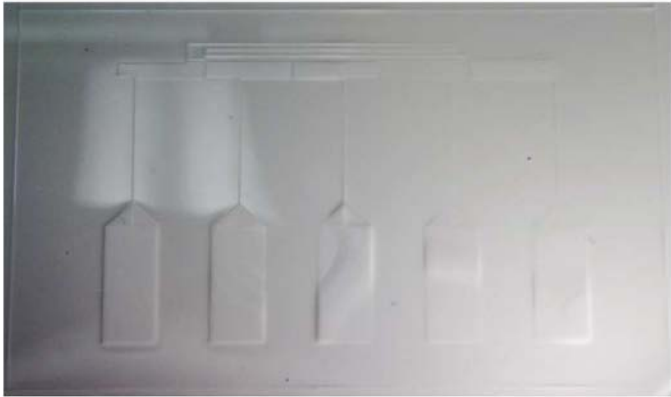
PDMS Device With Pipette Reservoir



PDMS Device With Punched Syringe Holes



Plastic Master Of PDMS Device



Plastic Master With O-Ring Molds



O-Ring Fluid Reservoirs



PDMS Reservoirs



PDMS Reservoir Bonded To Device

