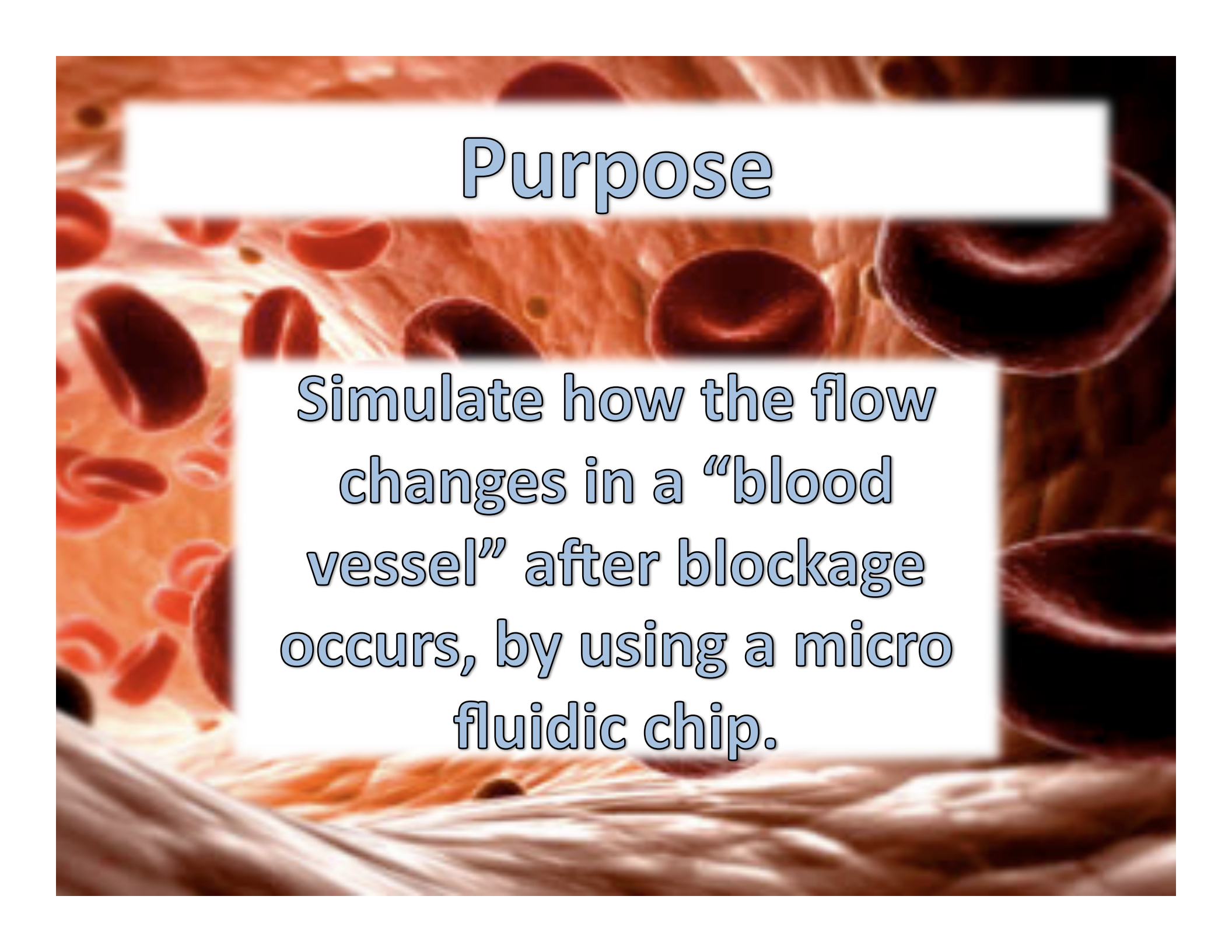


Microvascular Chips

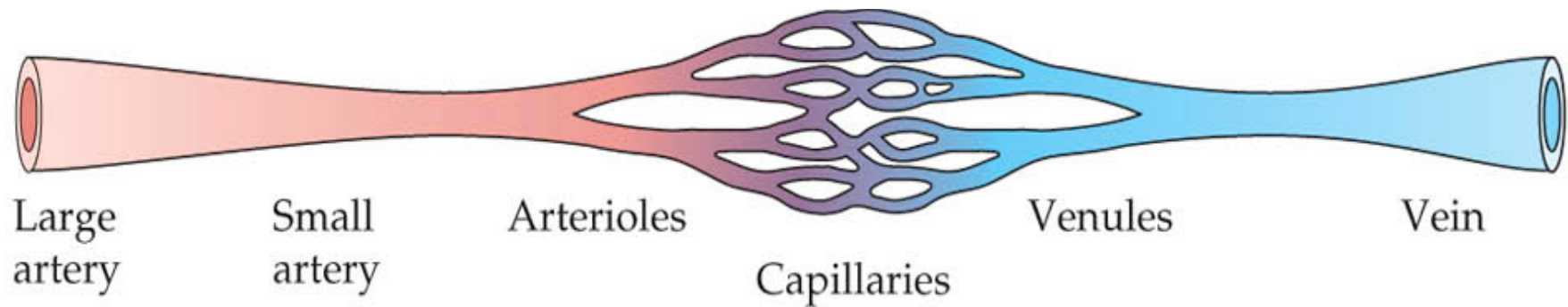
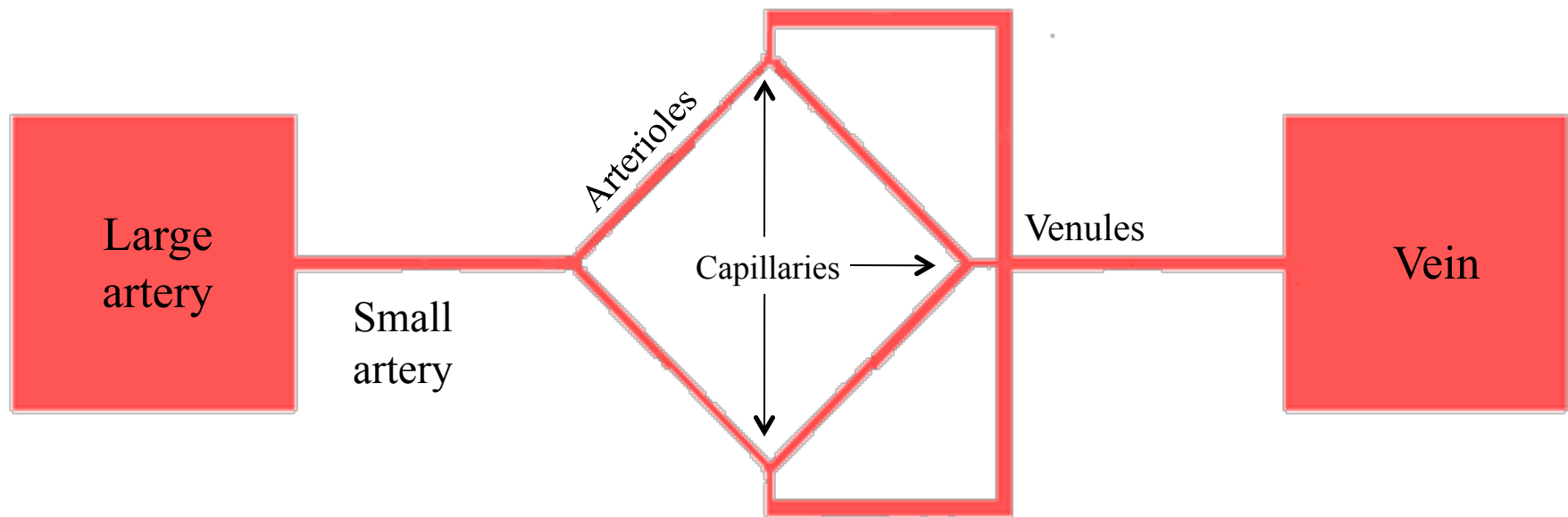
**The Vascular System Modeled by
Microfluidics**

By: Marissa Davis, Suni Christiansen, Daniela
Zuniga Sacks, Jhori Varner, Jonlin Chen

A microscopic view of blood cells, primarily red blood cells, flowing through a blood vessel. The cells are seen in various stages of motion, with some appearing as bright red discs and others as darker, more elongated shapes. The background is a warm, orange-brown color, suggesting the interior of a blood vessel.

Purpose

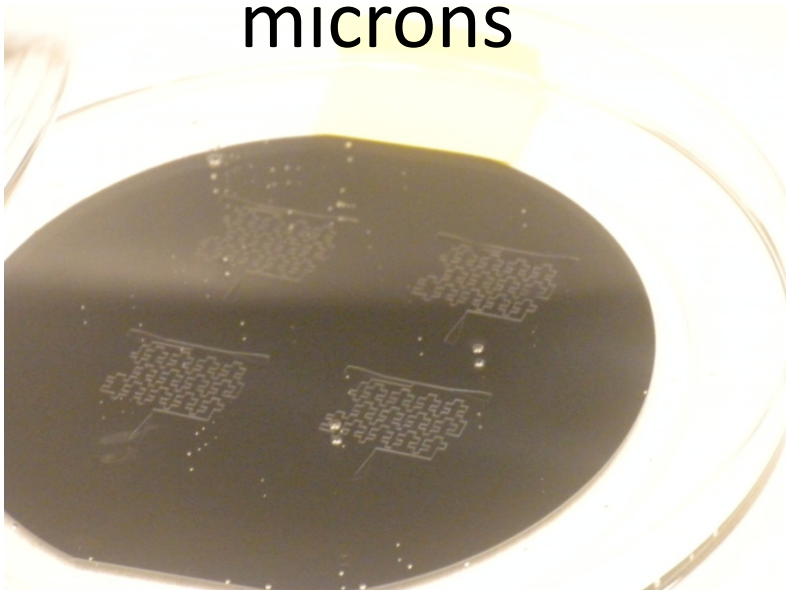
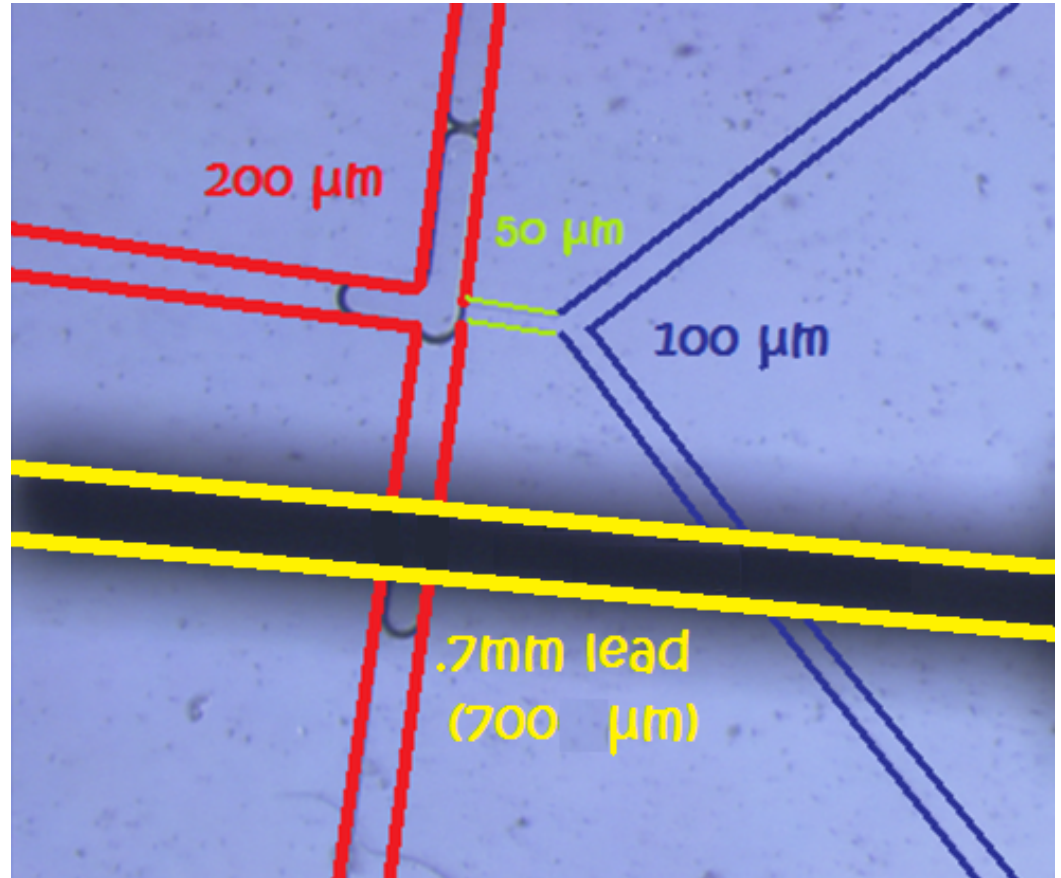
Simulate how the flow changes in a “blood vessel” after blockage occurs, by using a micro fluidic chip.

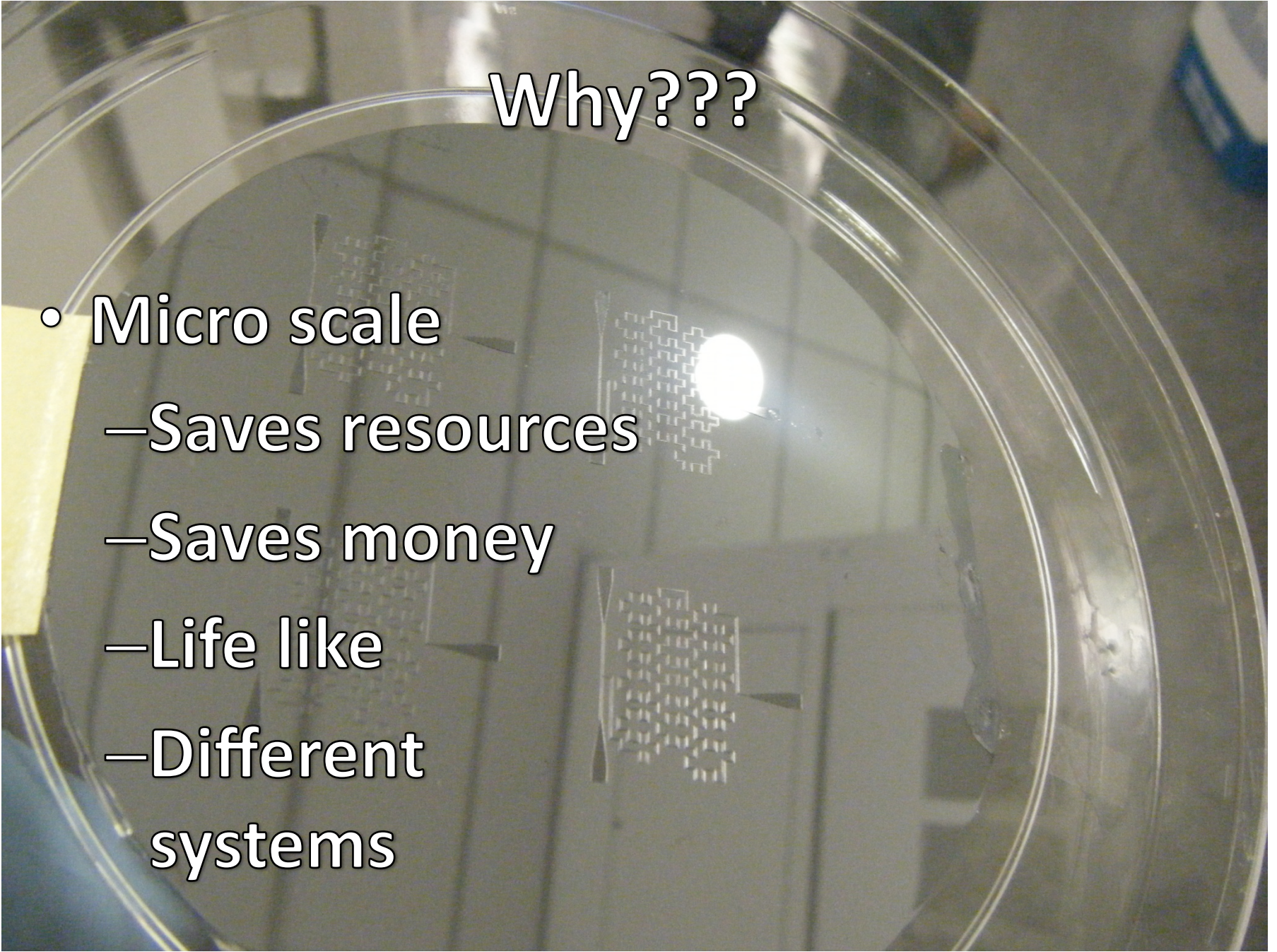


By: Marissa Davis, Suni Christiansen, Daniela Zuniga Sacks, Jhori Varner, Jonlin Chen

Crash Course in Microfluidics

- Nanotechnology
- Simulates small systems: blood vessels
- Average red blood cell: 8 microns



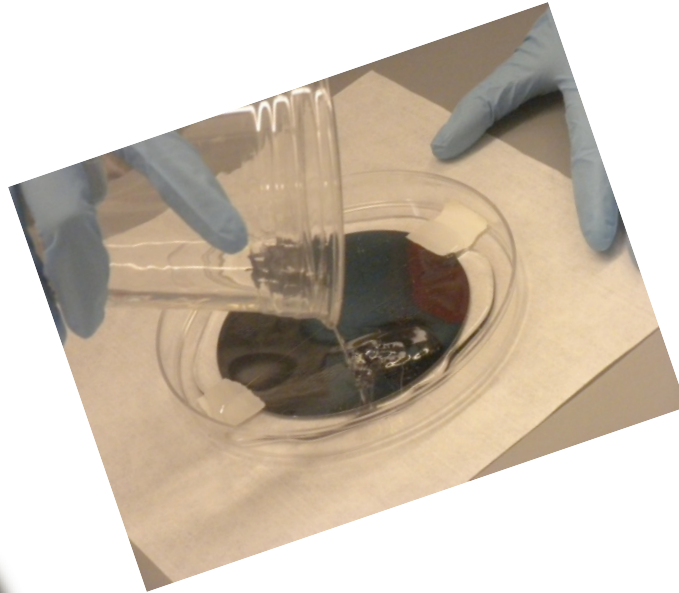
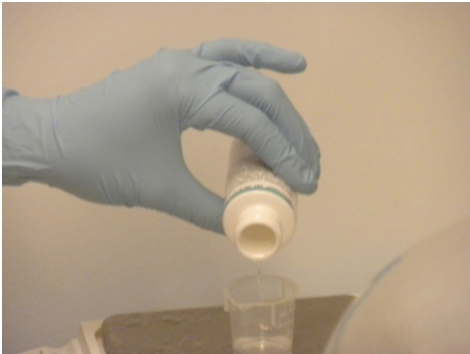


Why???

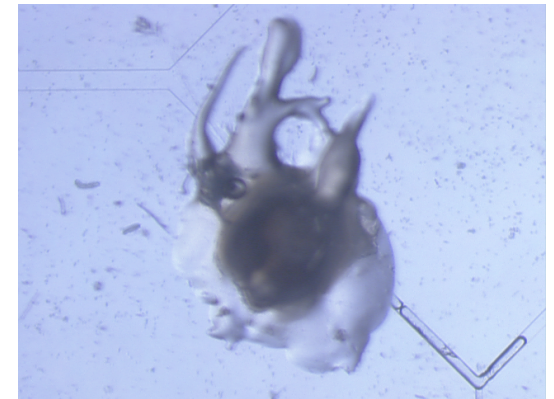
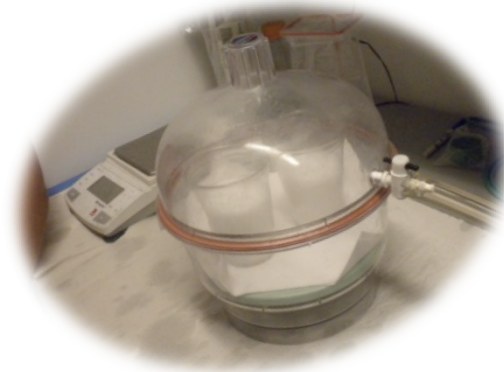
- Micro scale
 - Saves resources
 - Saves money
 - Life like
 - Different systems

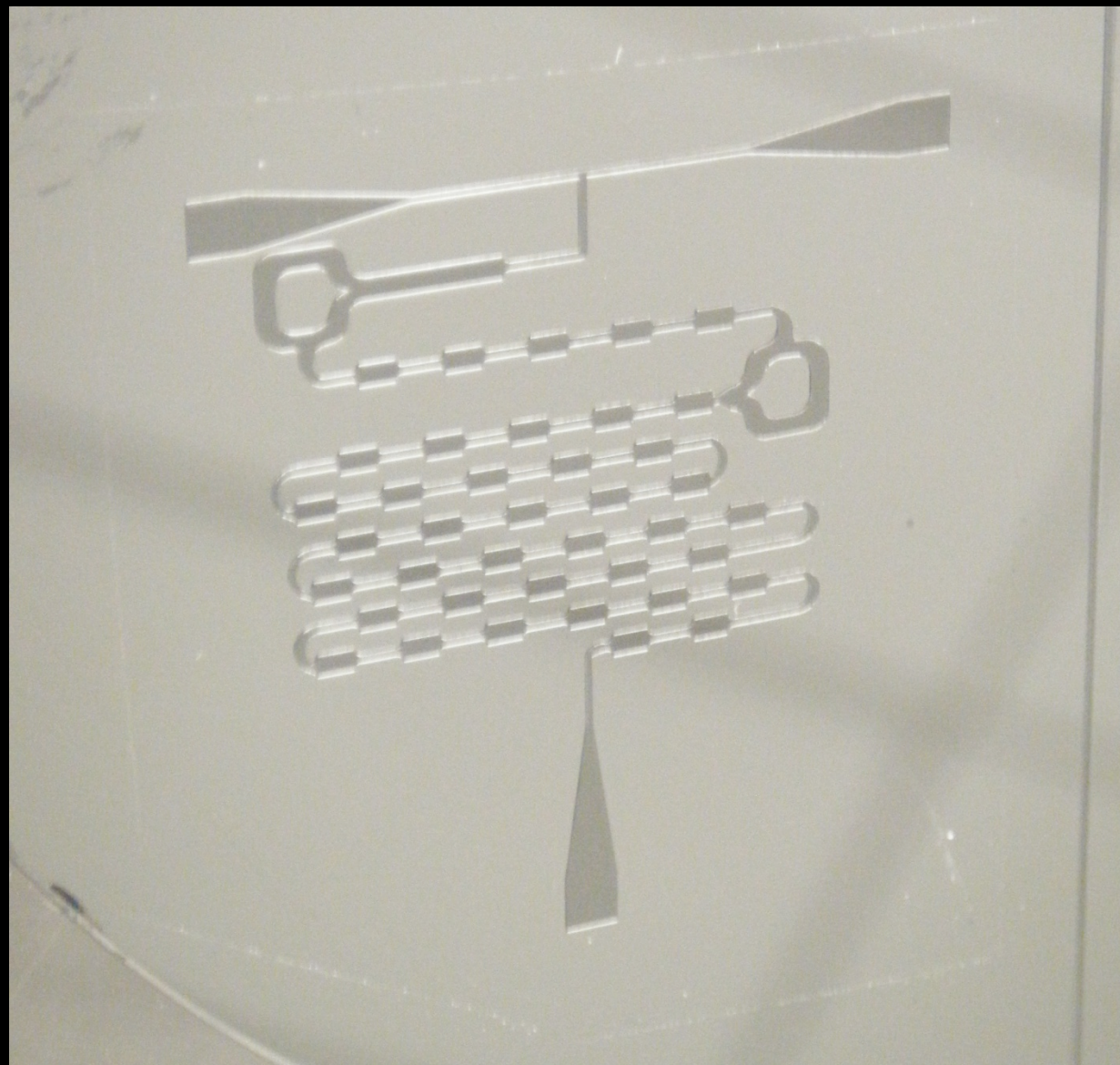
Making the Chip

PDMS



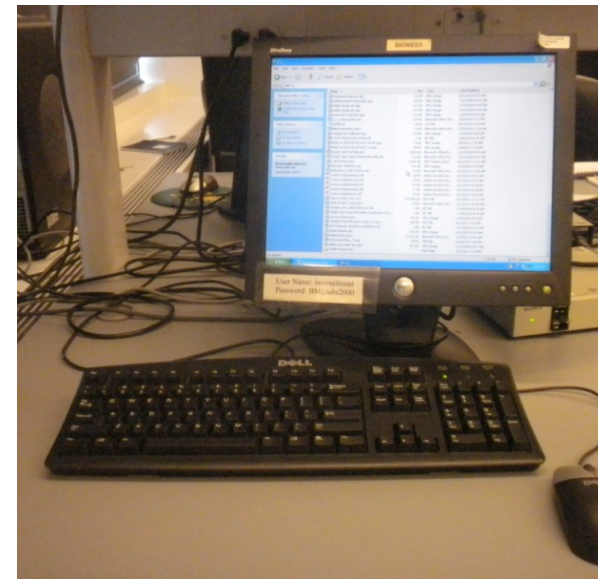
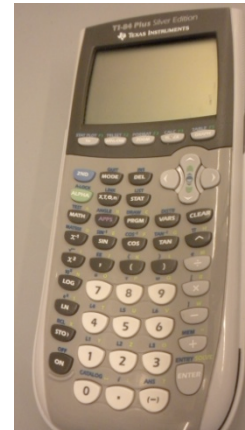
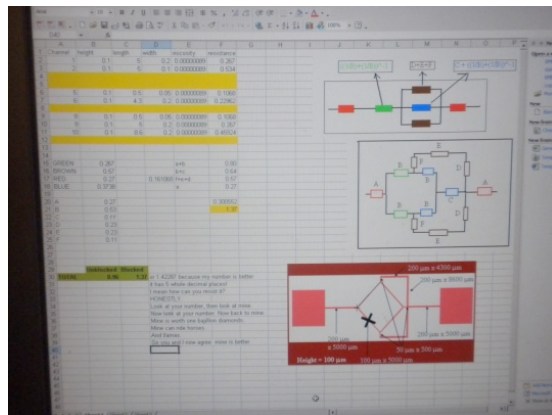
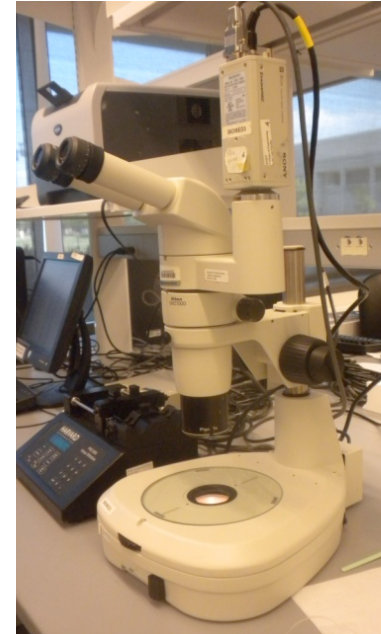
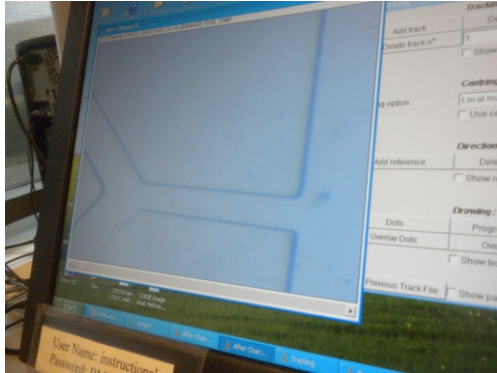
Chip





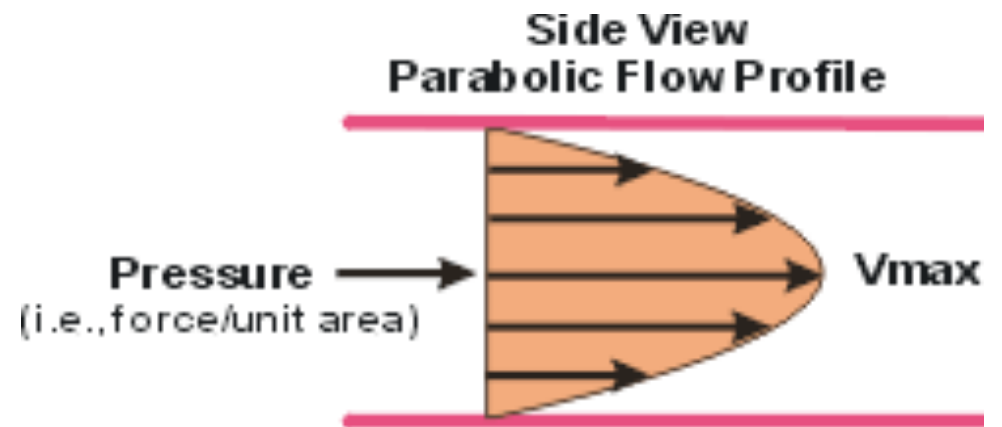
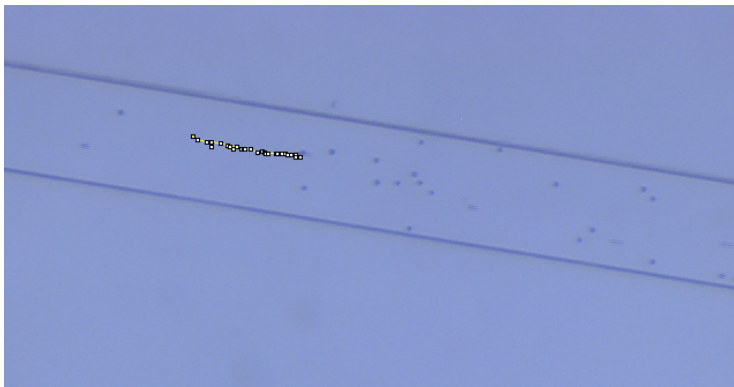
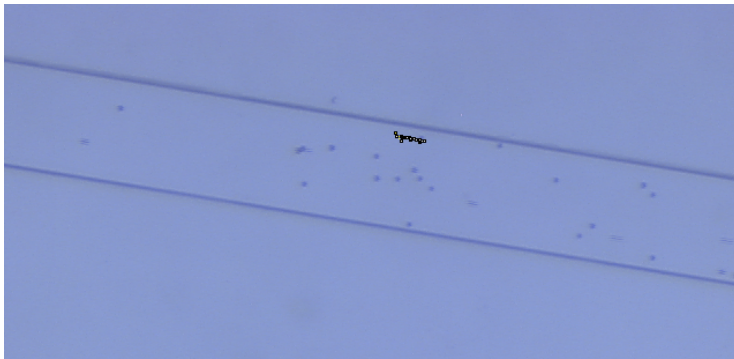
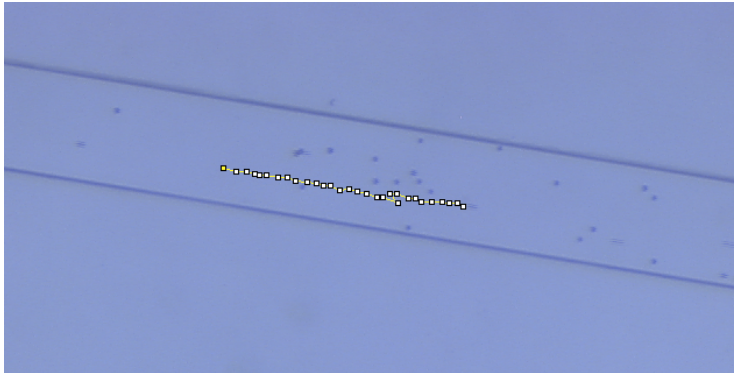


Tools of the Trade



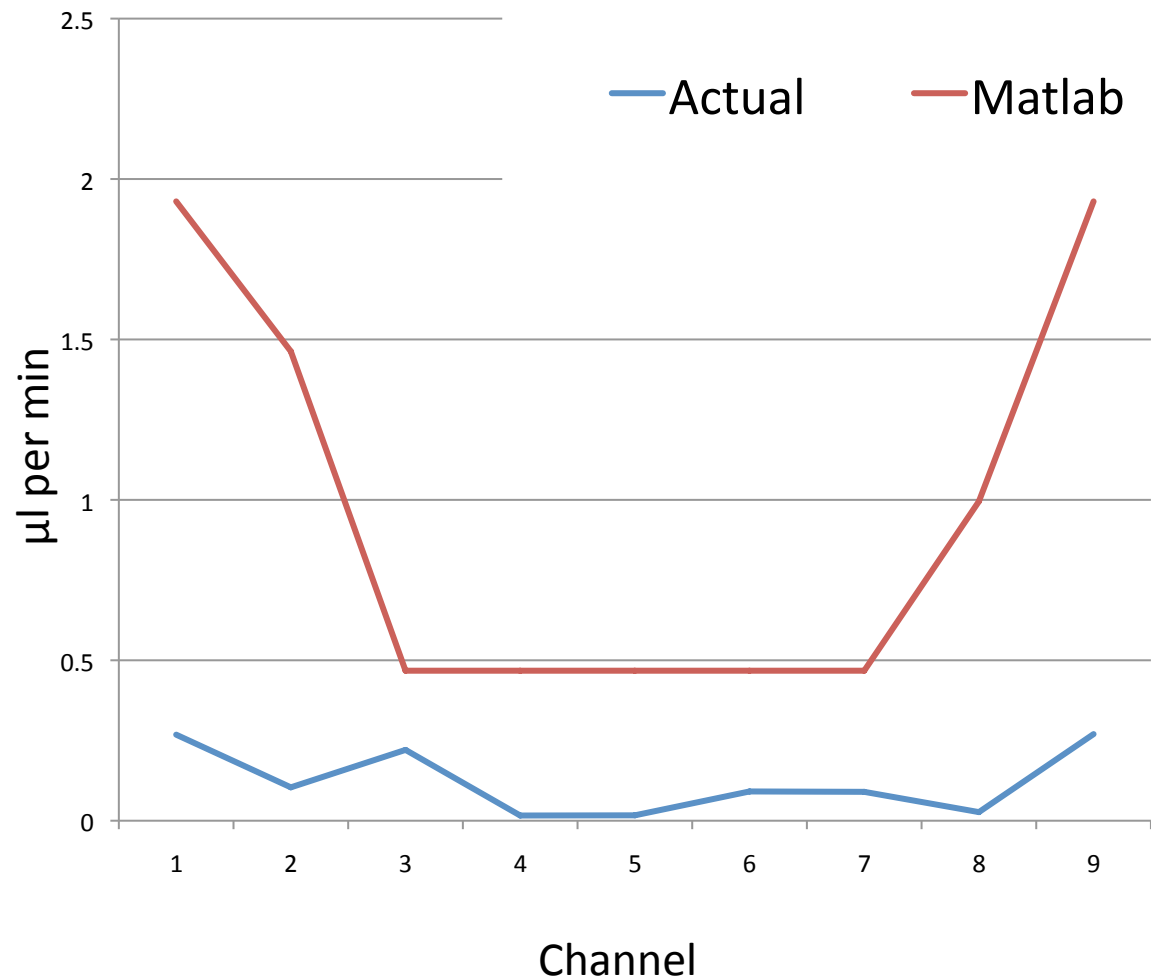
Technology

Picturing the Purpose



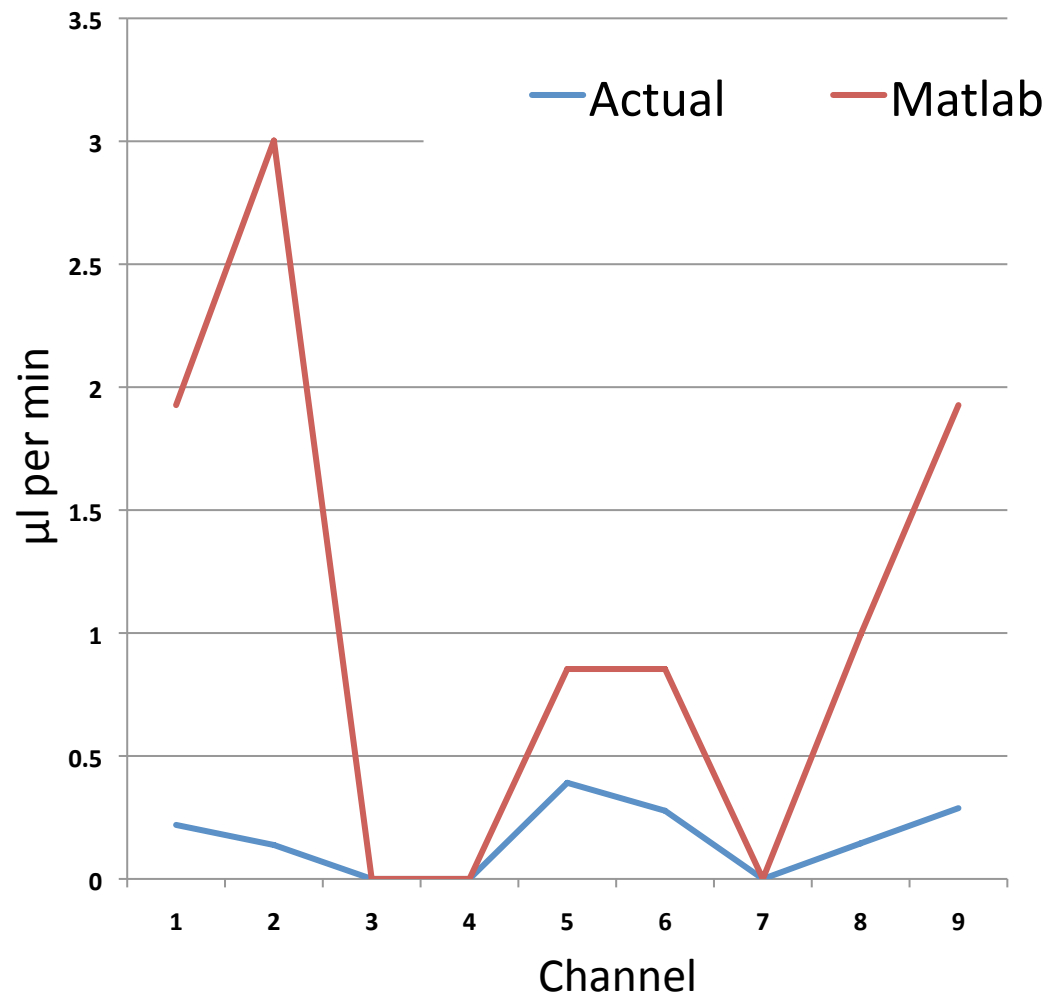
Unblocked Flow

Channel	Actual	MatLab
1	0.268	1.930
2	0.104	1.463
3	0.221	0.468
4	0.016	0.468
5	0.017	0.468
6	0.091	0.468
7	0.090	0.468
8	0.027	0.995
9	0.270	1.930

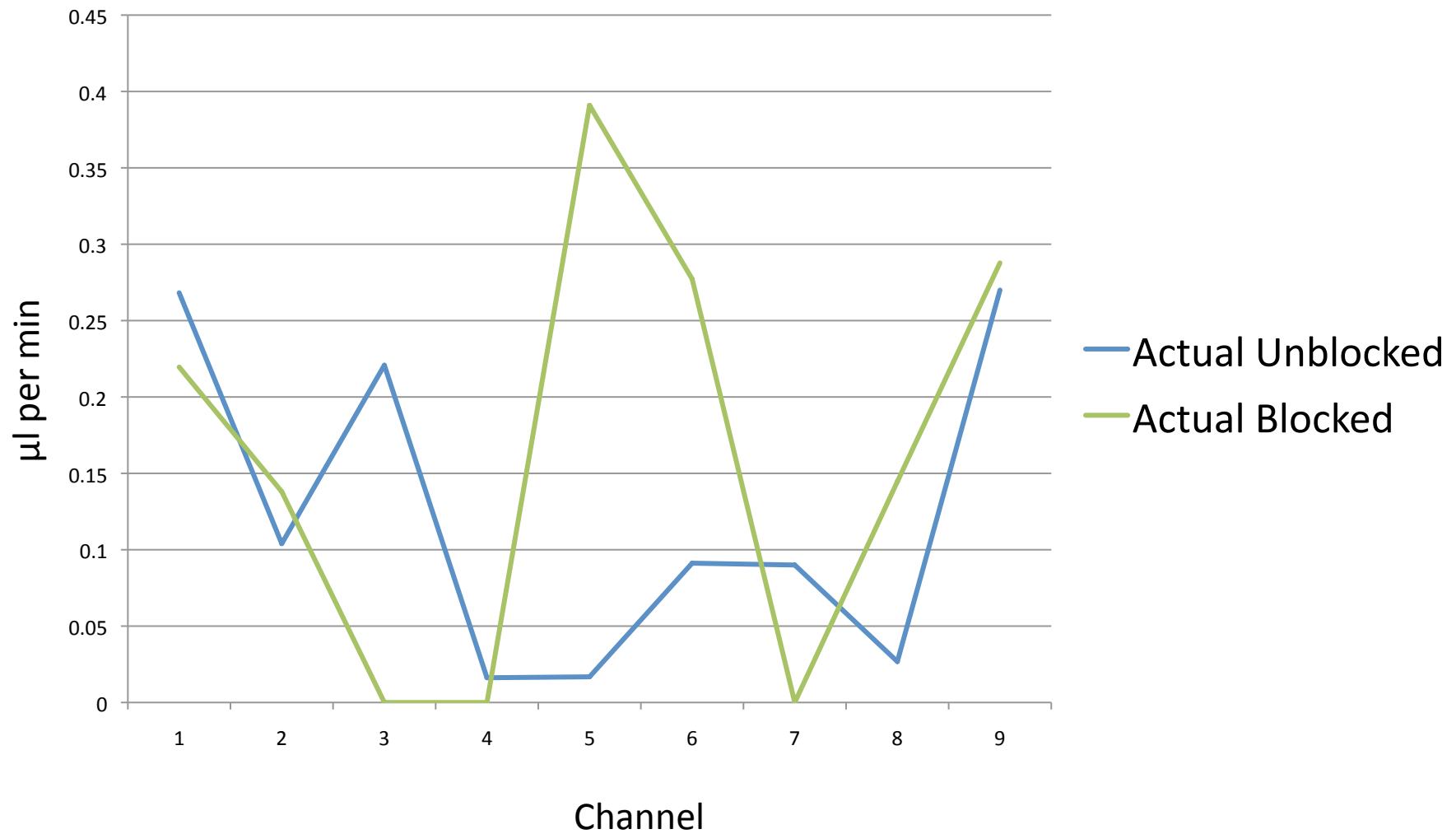


Blocked Flow

Channel	Actual	MatLab
1	0.220	1.927
2	0.138	3.003
3	0	0
4	0	0
5	0.391	0.854
6	0.277	0.854
7	0	0
8	0.145	0.994
9	0.288	1.927



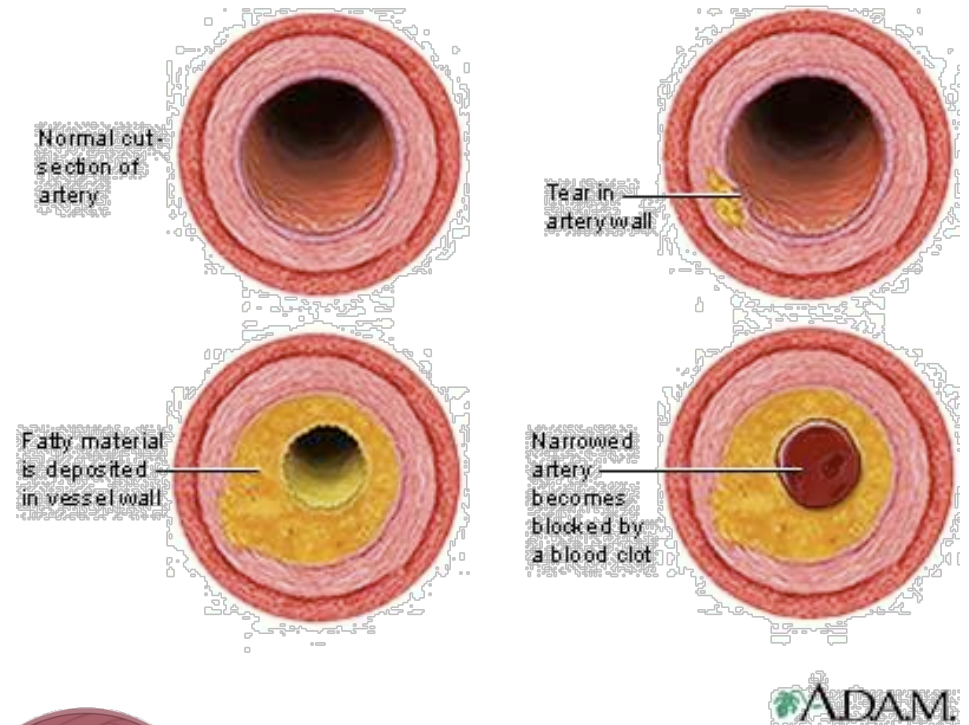
Blocked vs. Unblocked



Conclusion

What all of this means:

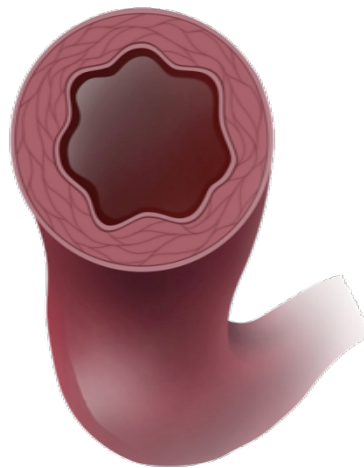
- Not just applicable to strokes
- Shows the dynamics of blood within smaller blood vessels
- Location, location, location!



Dilated Artery



Normal Artery



Constricted Artery

Thank You!



Acknowledgements

- Professor Shen
- Teaching Assistants
- Program Assistants
- Cornell University
College of Engineering



Cornell University
College of Engineering



Any Questions?