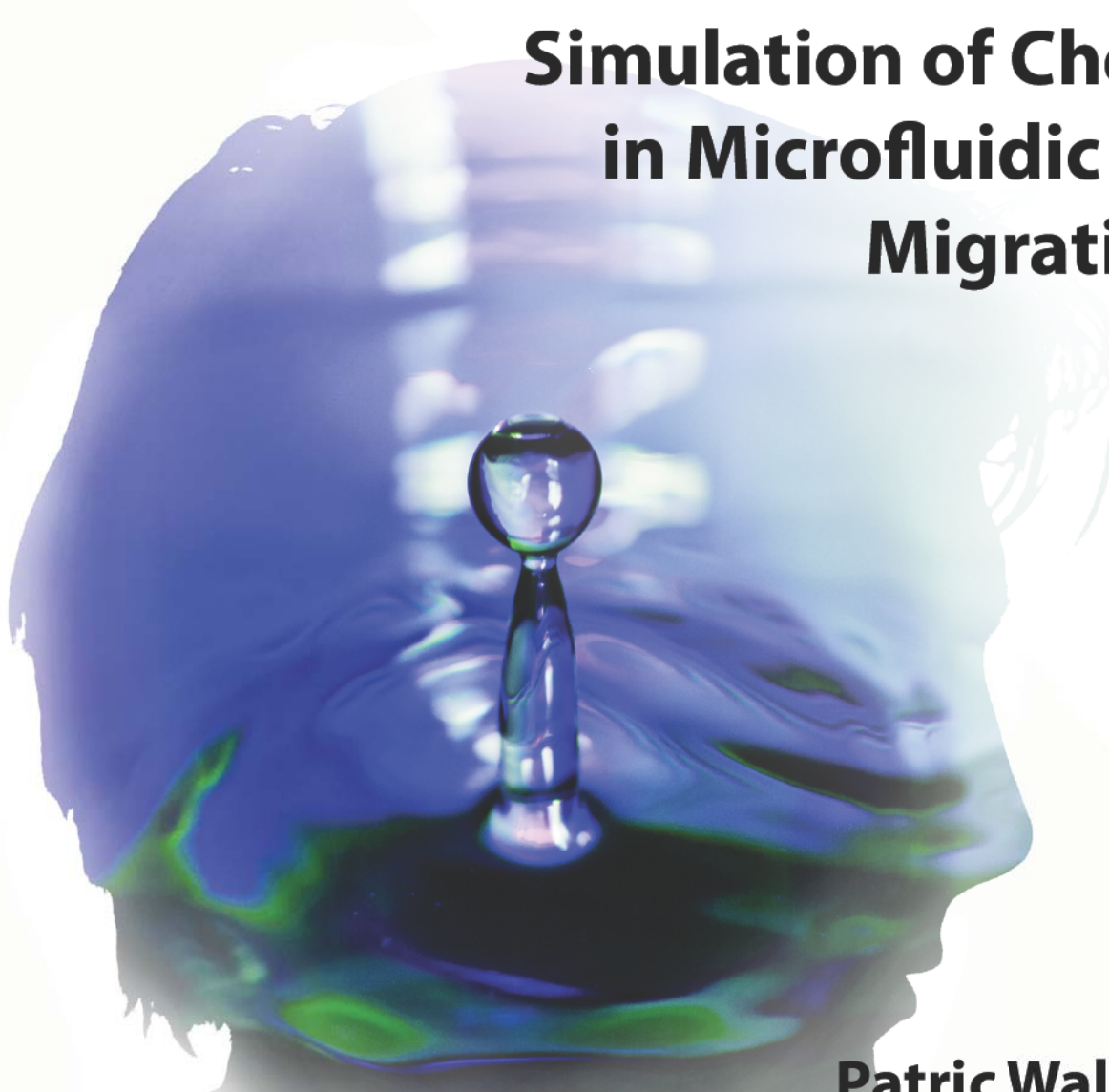




# Simulation of Chemottractant Gradients in Microfluidic Channels to Study Cell Migration Mechanism *in silico*

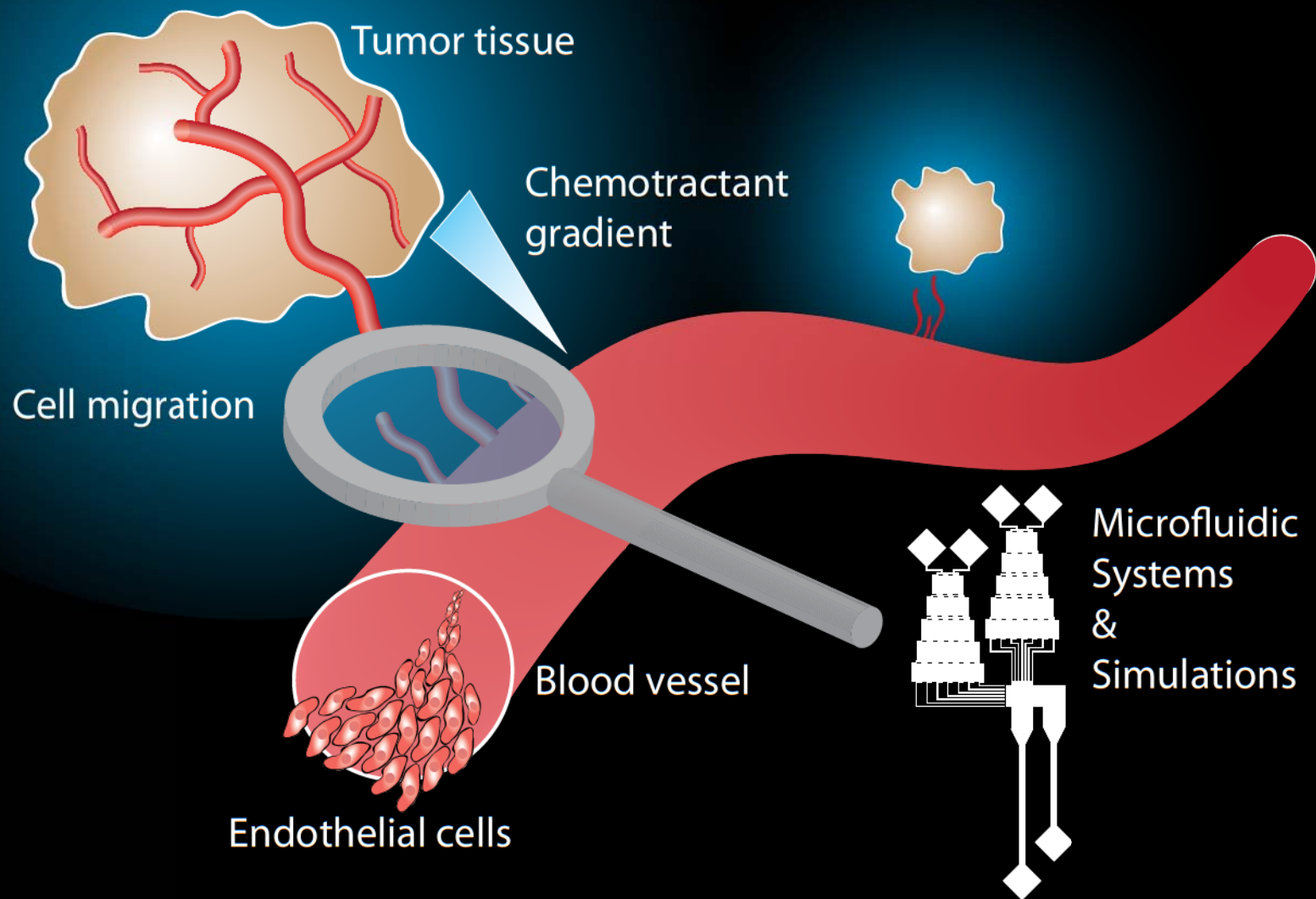


**Patric Wallin**

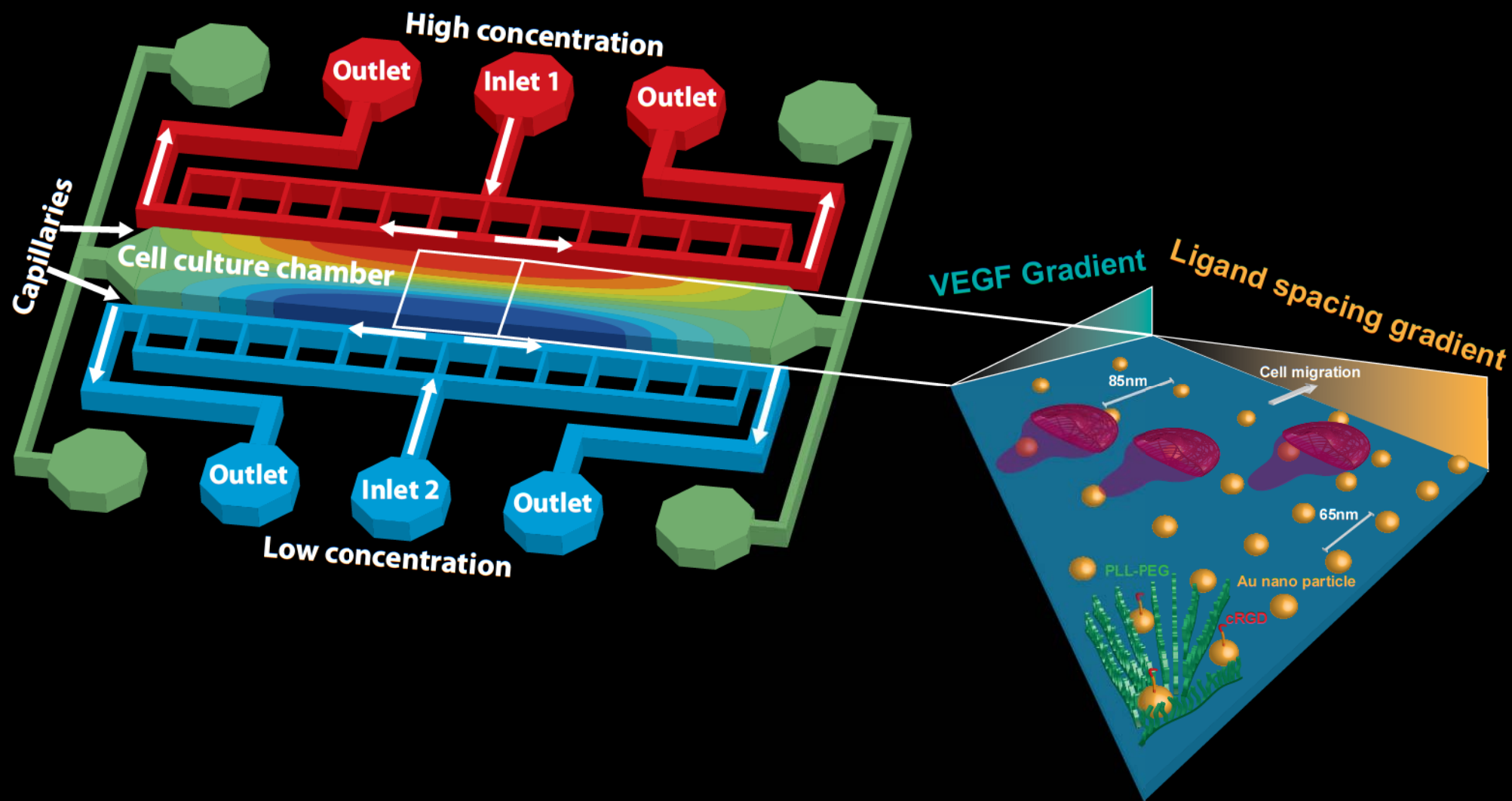
Dept. Applied Physics  
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**COMSOL  
CONFERENCE  
EUROPE  
2012**

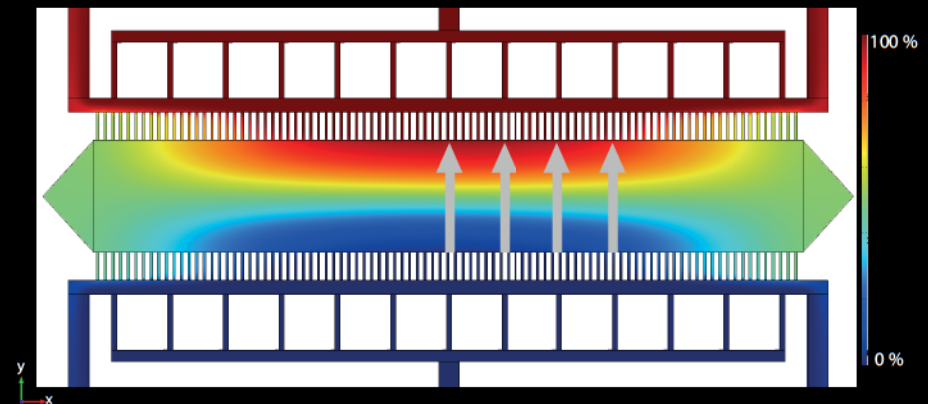
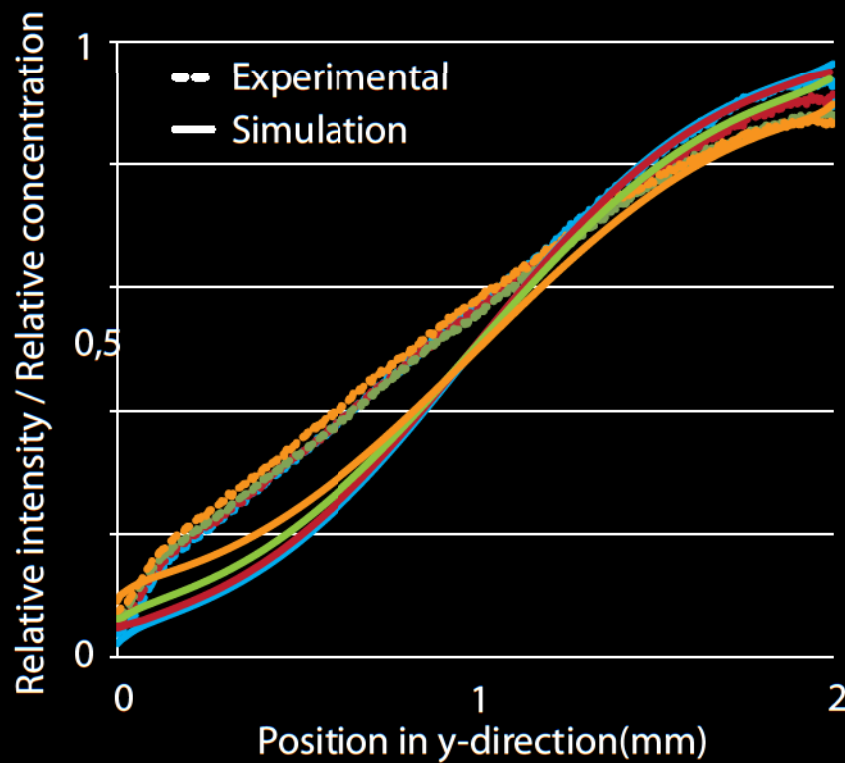
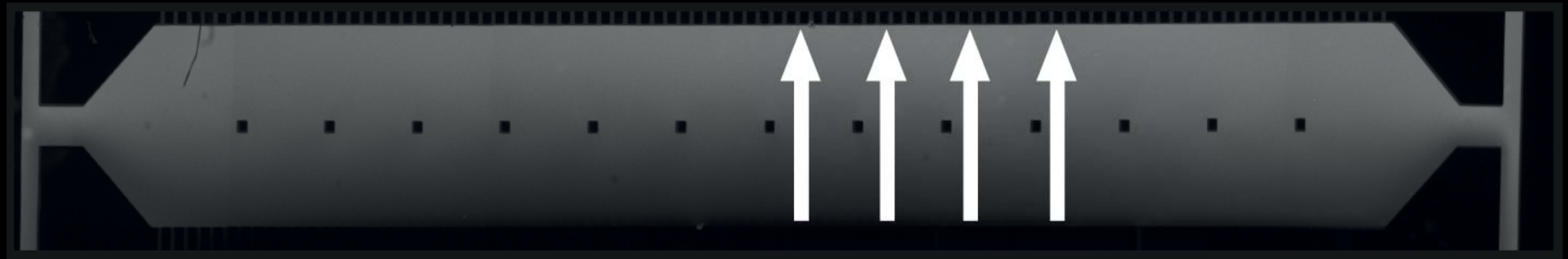
# Angiogenesis



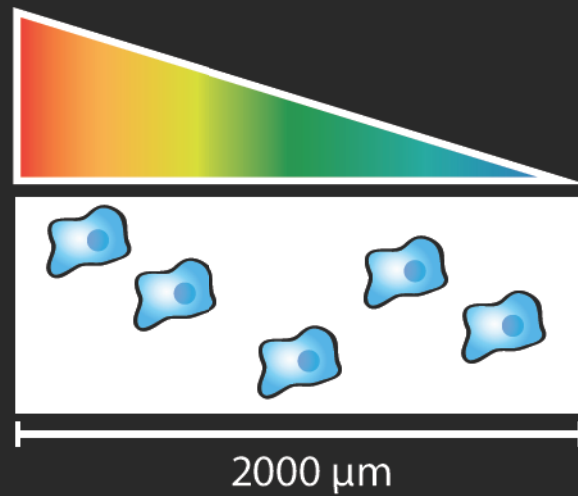
# Model System



# Gradient characterization



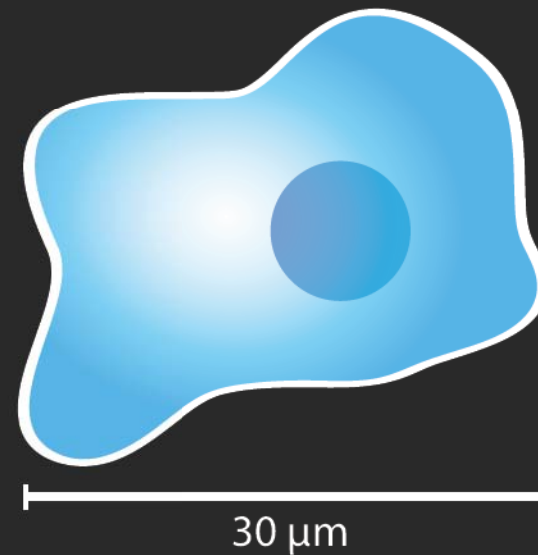
## Molecular gradient in microfluidic chamber



## Molecular gradient above a cell

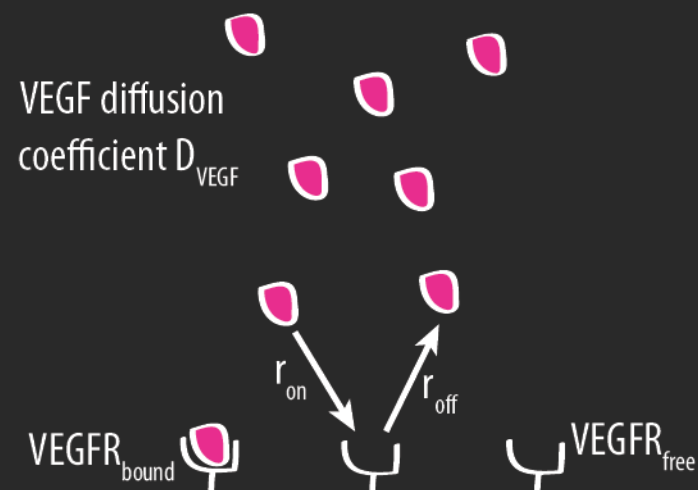
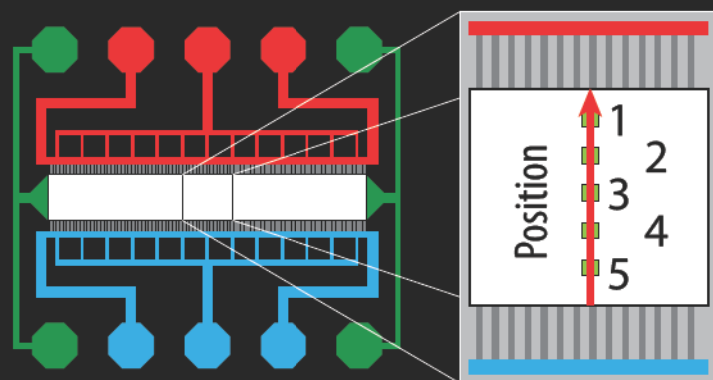
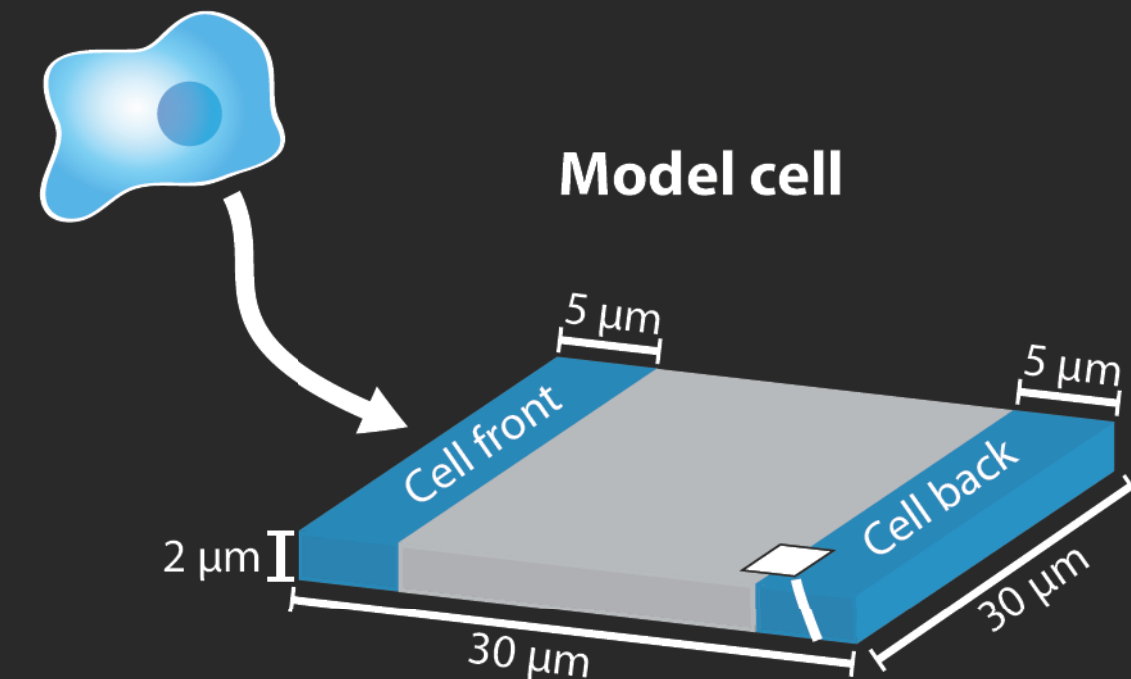


## Gradient sensed by a cell





## Model cell

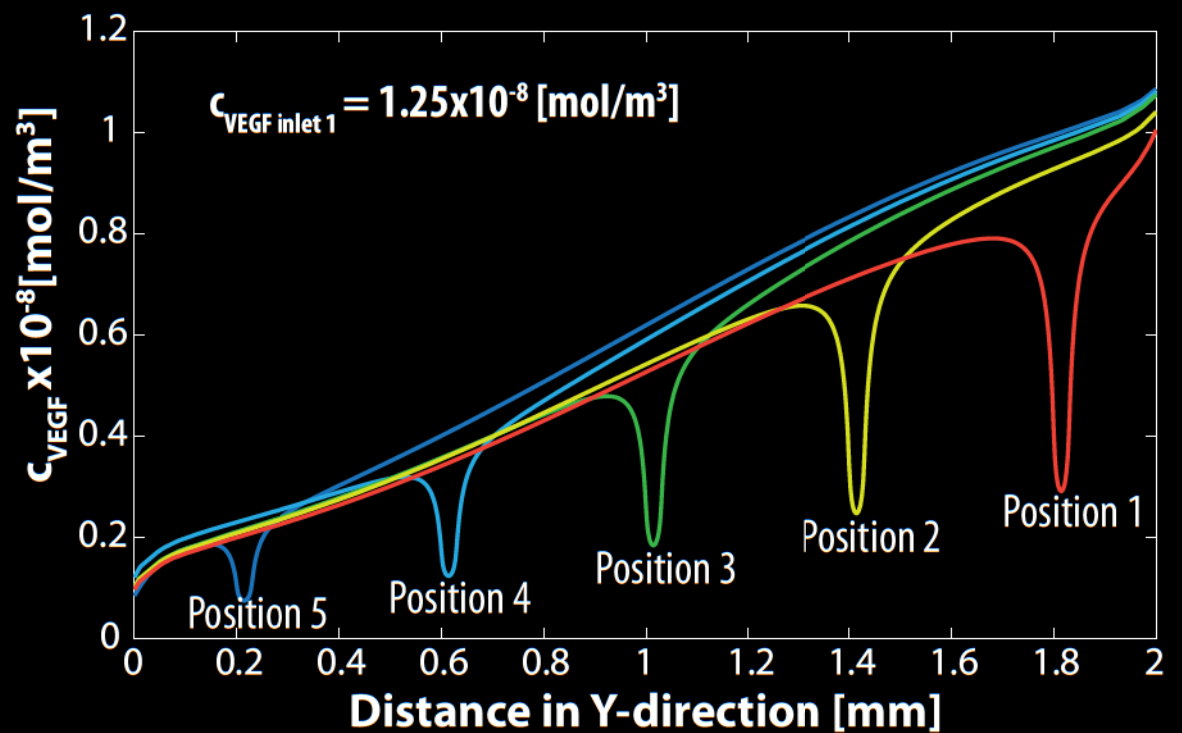
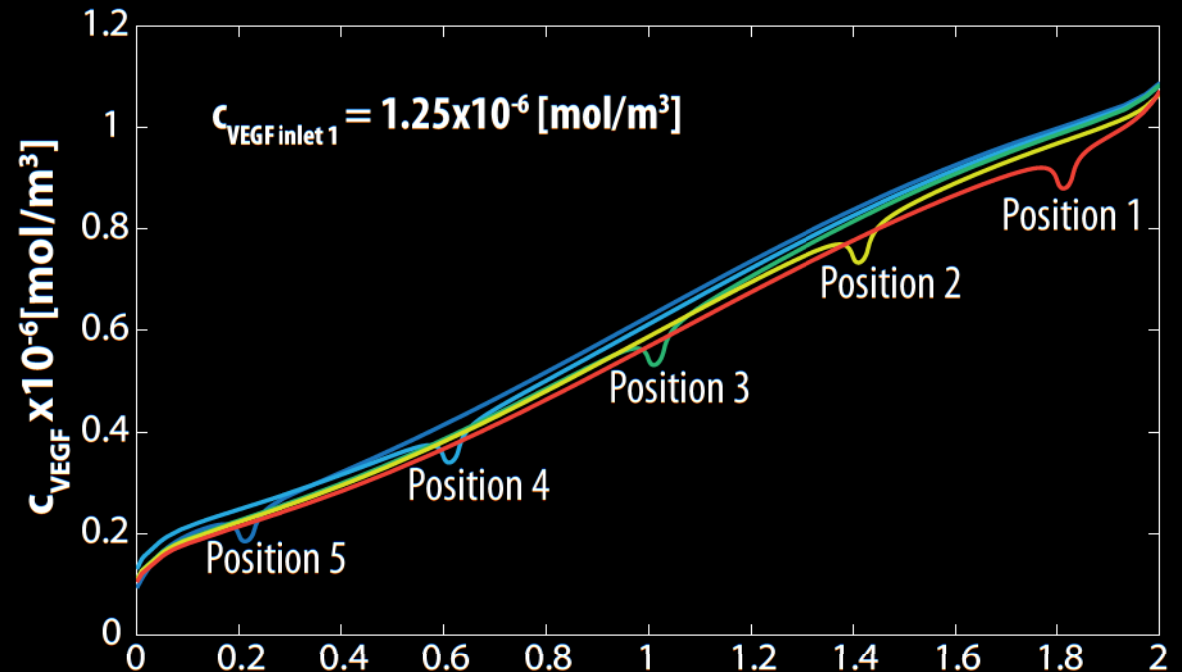
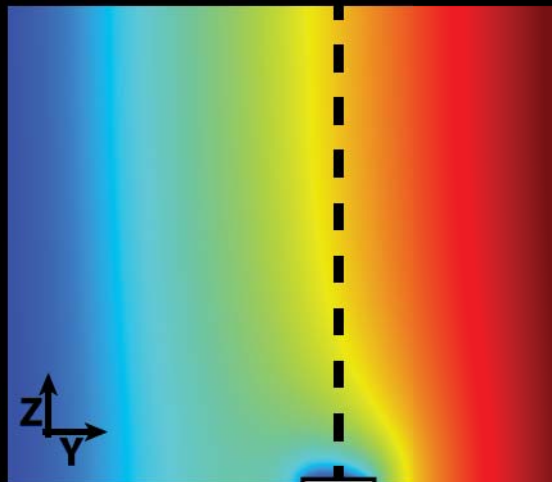
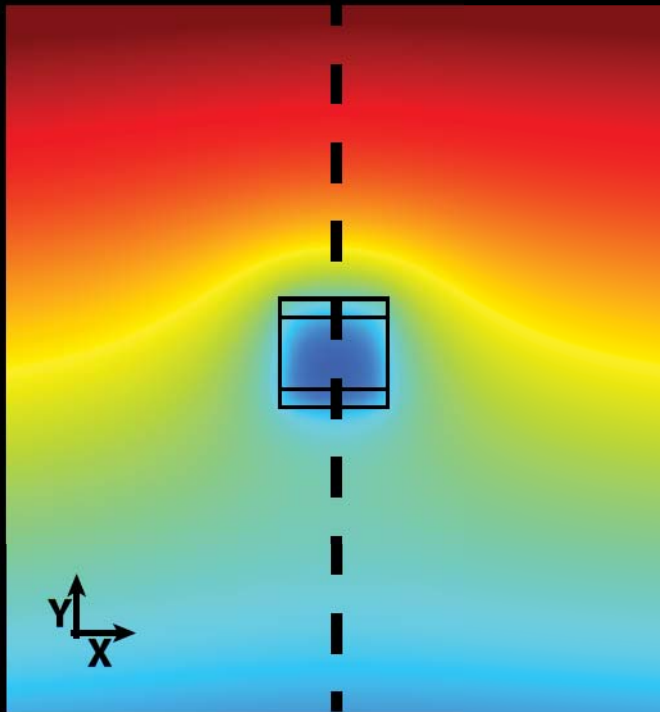


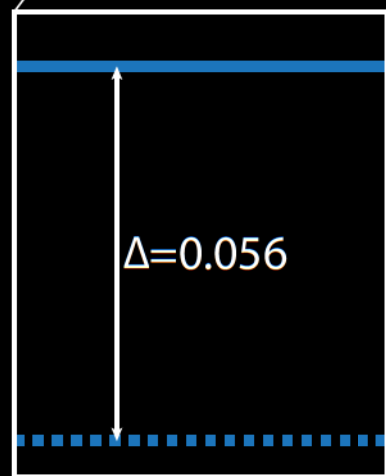
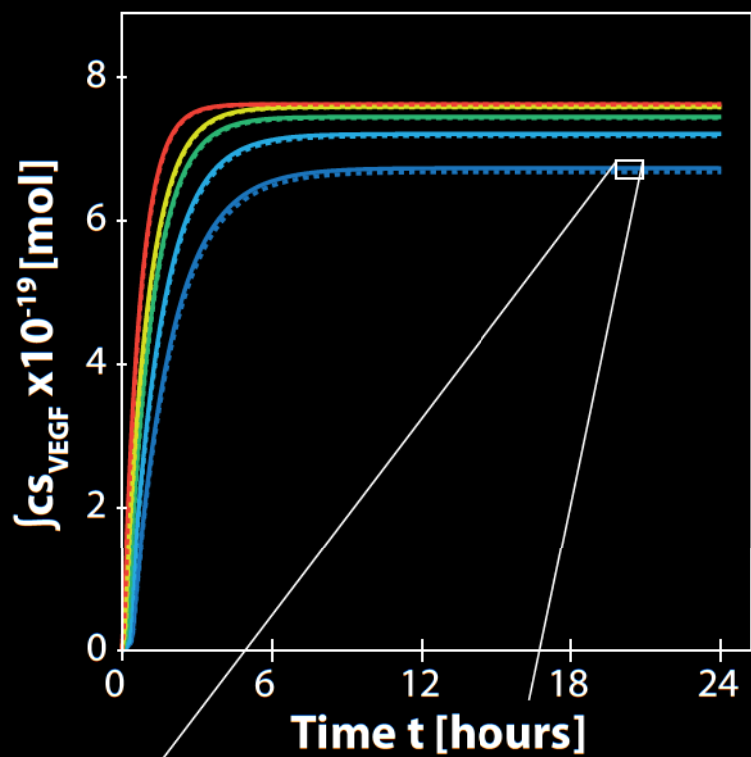
Cell surface with binding  
site density  $\text{VEGFR}_{\text{density}}$

$$r_{\text{on}} = k_{\text{on}} c_{\text{VEGF}} \text{VEGFR}_{\text{free}} \text{VEGFR}_{\text{density}}$$

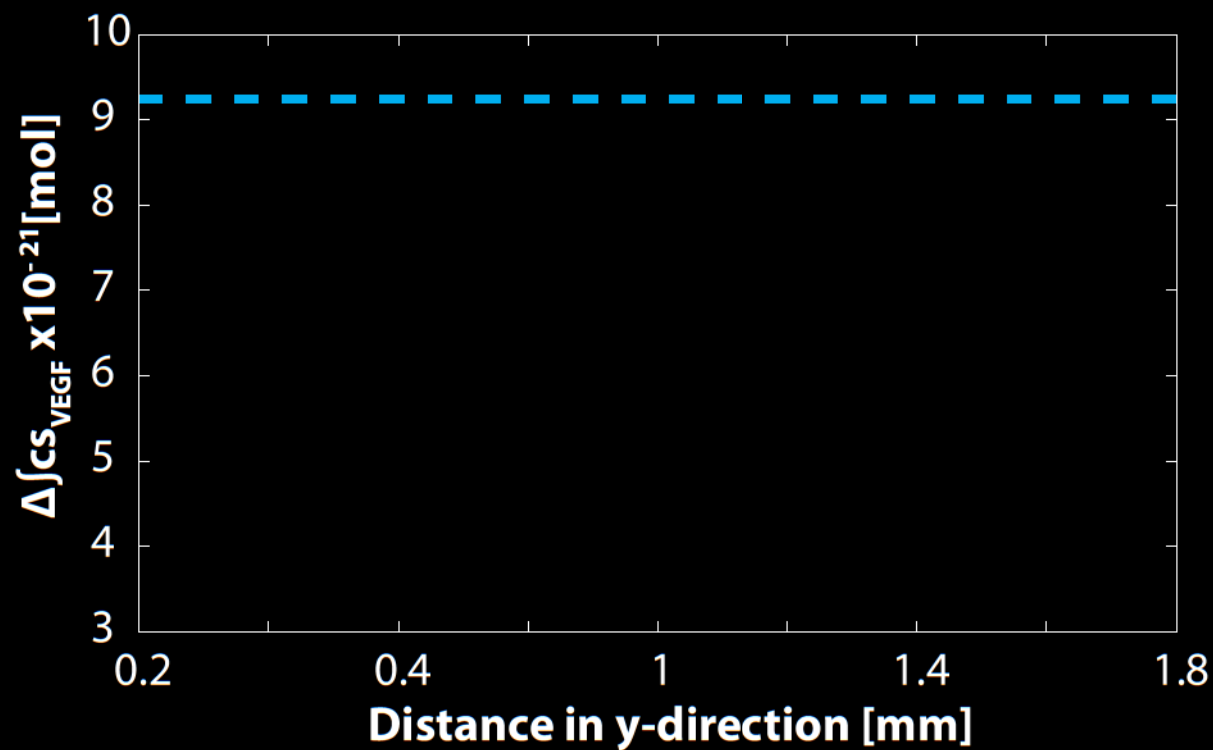
$$r_{\text{off}} = k_{\text{off}} \text{VEGFR}_{\text{bound}} \text{VEGFR}_{\text{density}}$$

## Local depletion

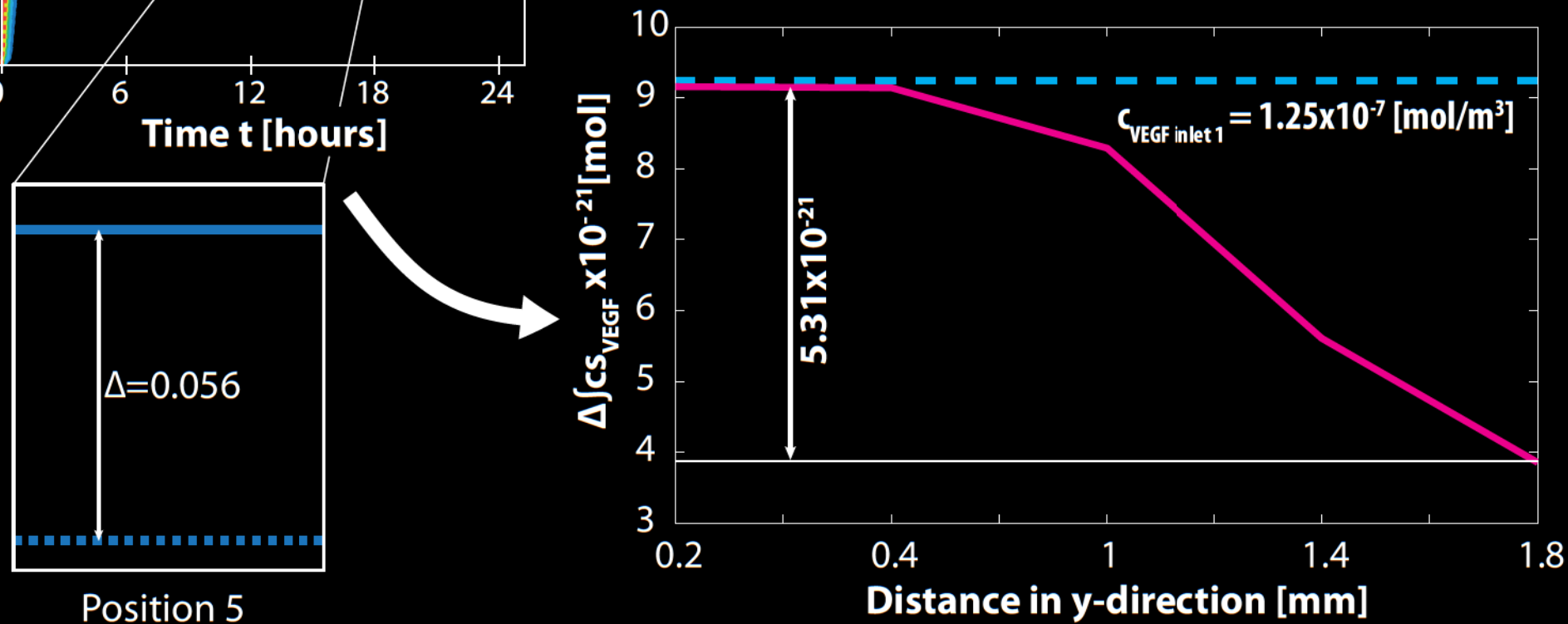
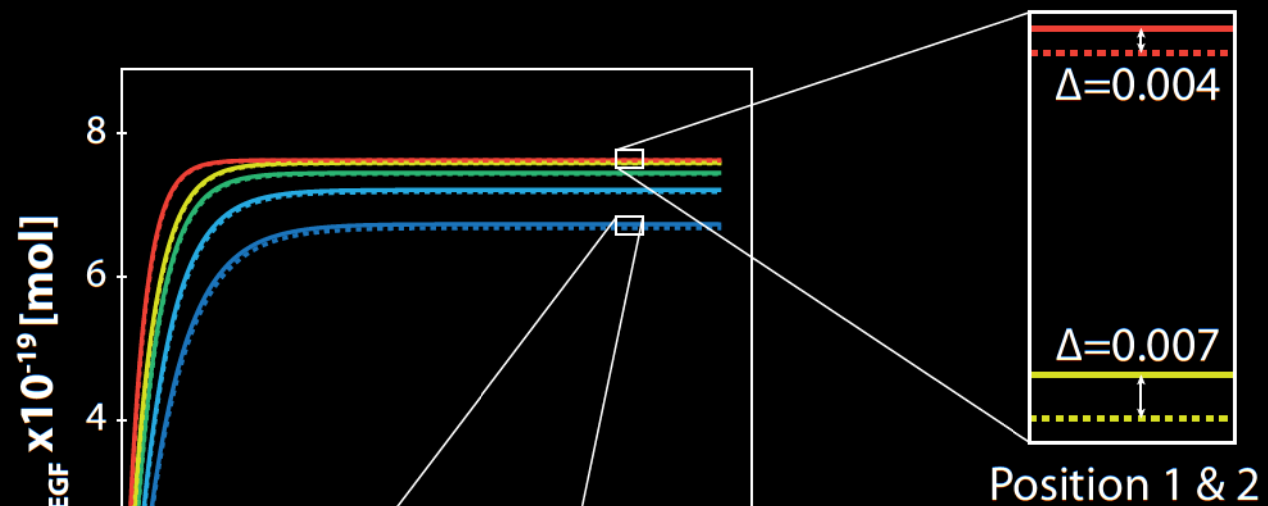




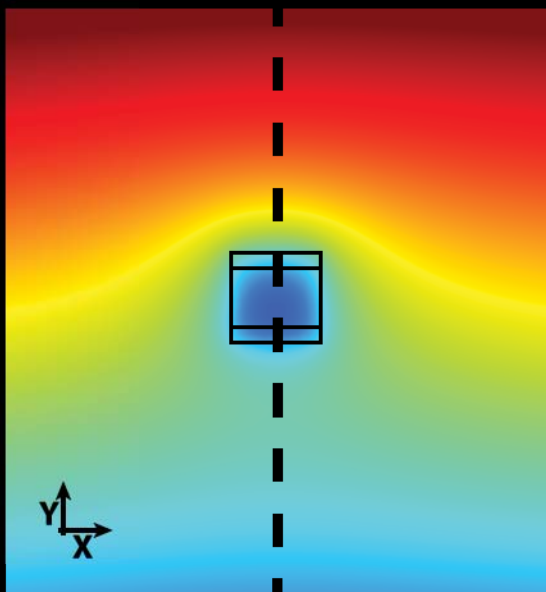
Position 5



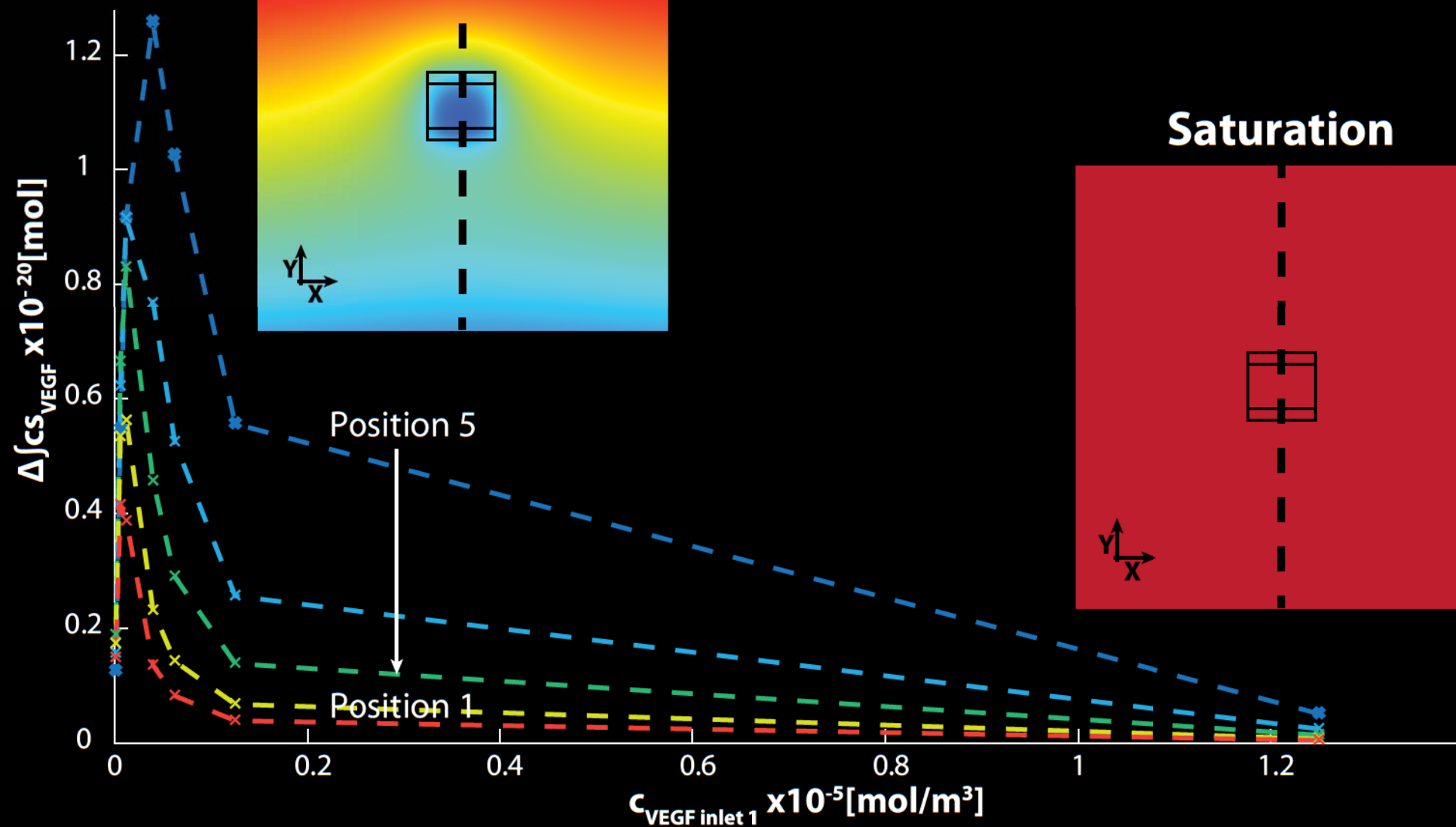
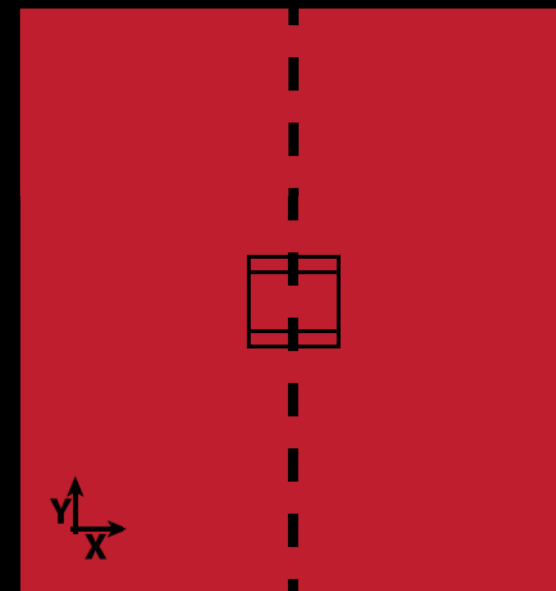




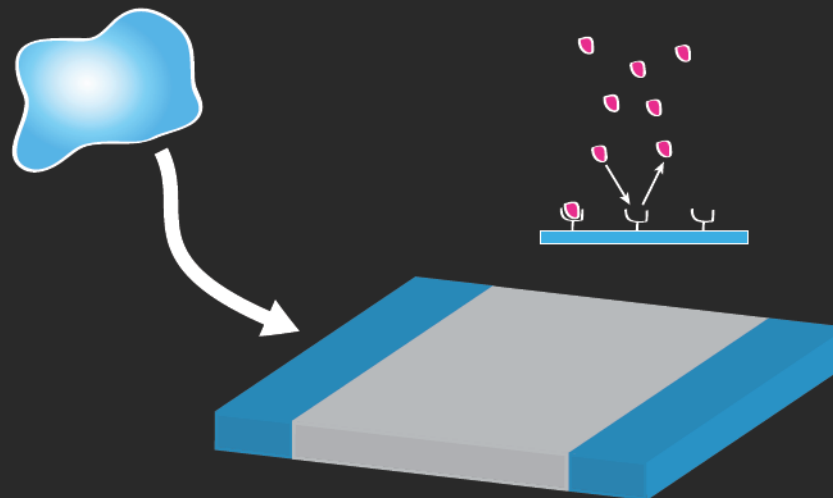
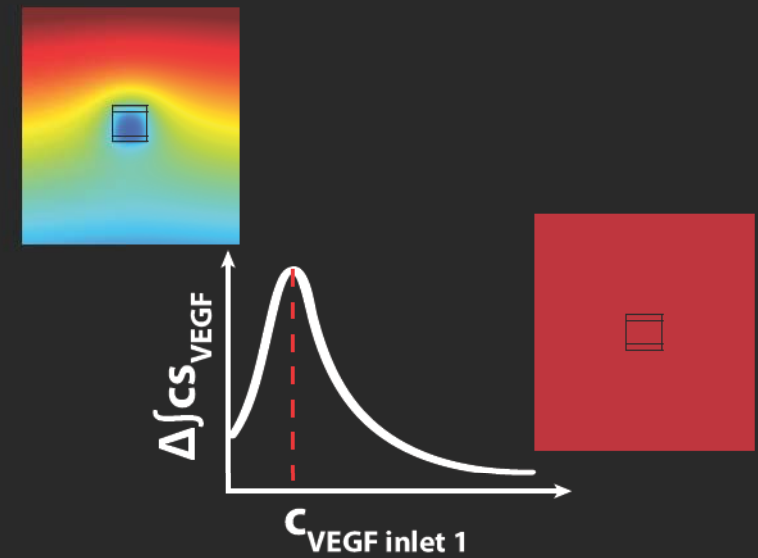
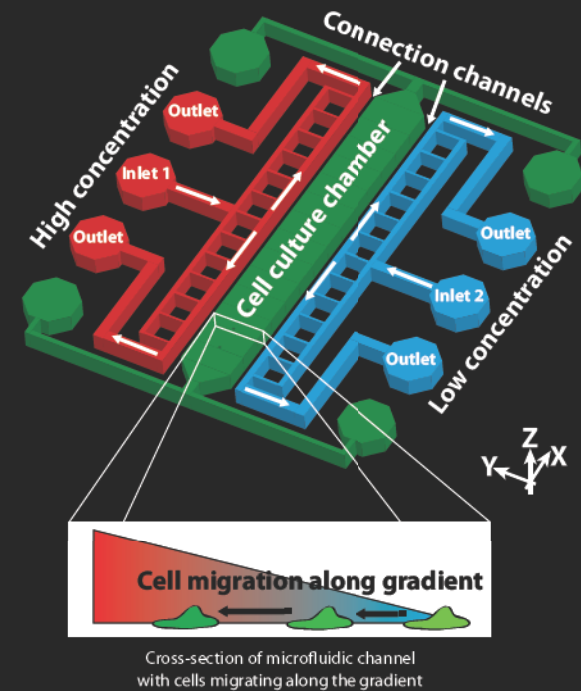
## Depletion



## Saturation



# Conclusions



**Julie Gold**  
**Elin Bernson**

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# THANK YOU