AUTOMATED NAVIGATION OF NANOPARTICLES THROUGH MAZES
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PROBLEM: NAVIGATION
- Drug carriers passively flow along blood vessels until some reach target area
- Inefficient: large quantity -> only some reach target
- Can we navigate carriers to their targets?
- Yes! Optical tweezers: trap/manipulate particles remotely

PROBLEM: AUTOMATION
- But manually navigating drug carriers is not practical
- Blood vessel networks are complex
- Can we automate the navigation?
- Yes! Design holograms to perform the manipulation

RESULT

EXPERIMENT
- Use maze to model microfluidic env (fluid in narrow channels)
- Finds shortest path in maze using breadth-first search
- Convert path to hologram
- Drive particles along path using holographic optical tweezers

FUTURE
- Use 3D maze to better represent real-world microfluidic env
- Navigate nanoparticles through actual microfluidic channels
- Navigate nanoparticles in vivo: unicellular organism, tissue extract