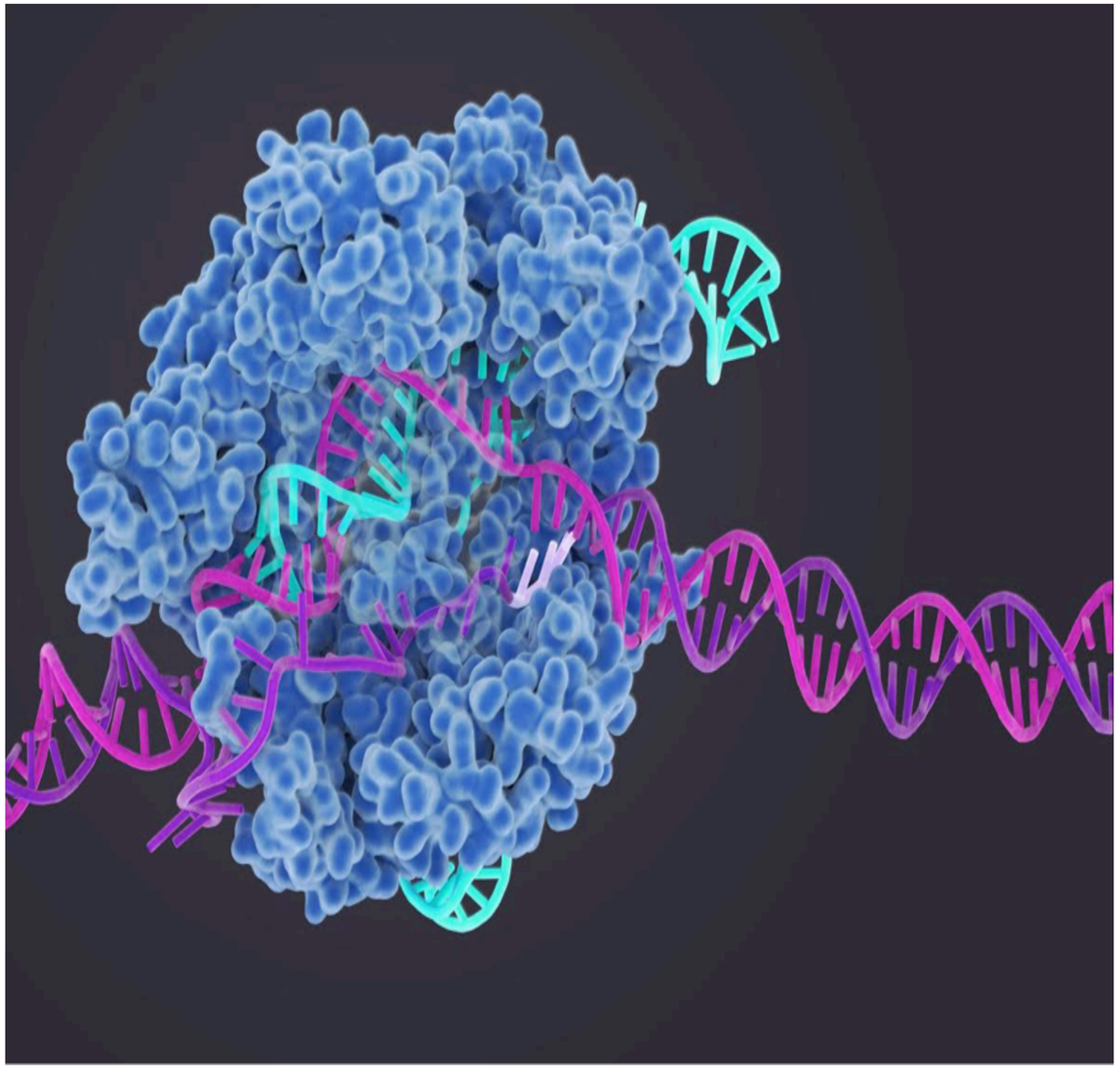
Laser-activated thermoplasmonic substrates for intracellular delivery

Syed Nabeel Shah | Marinna Madrid | Eric Mazur

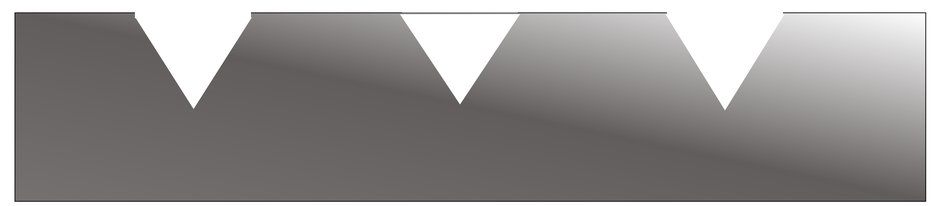
Problem / Question

Need: safe and cost-effective device
for delivering CRISPR-Cas9 to HSCs

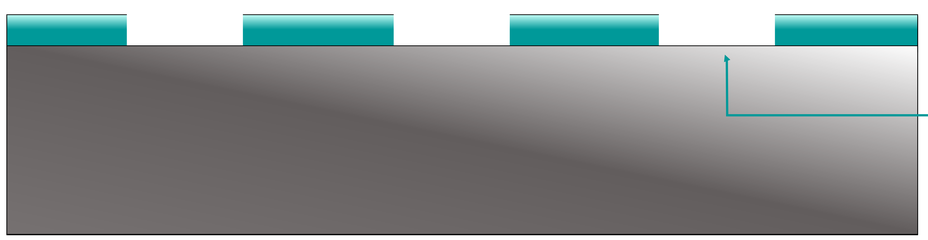


Fabrication

Chromium depositio

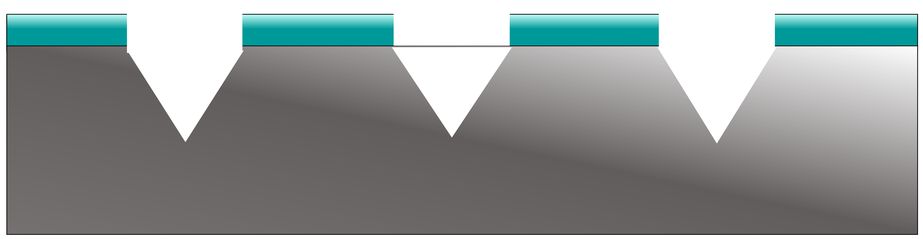


Chromium etch



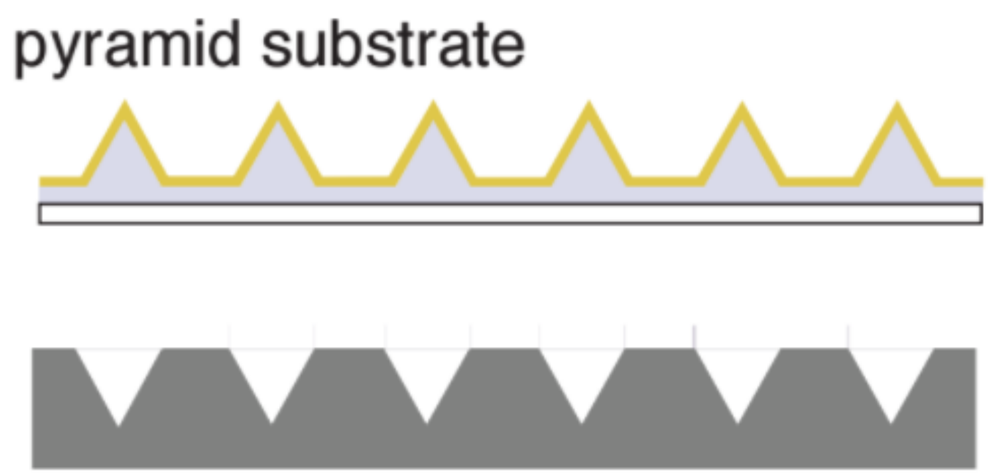
Negative squares of Cr thin films

E-beam lithography



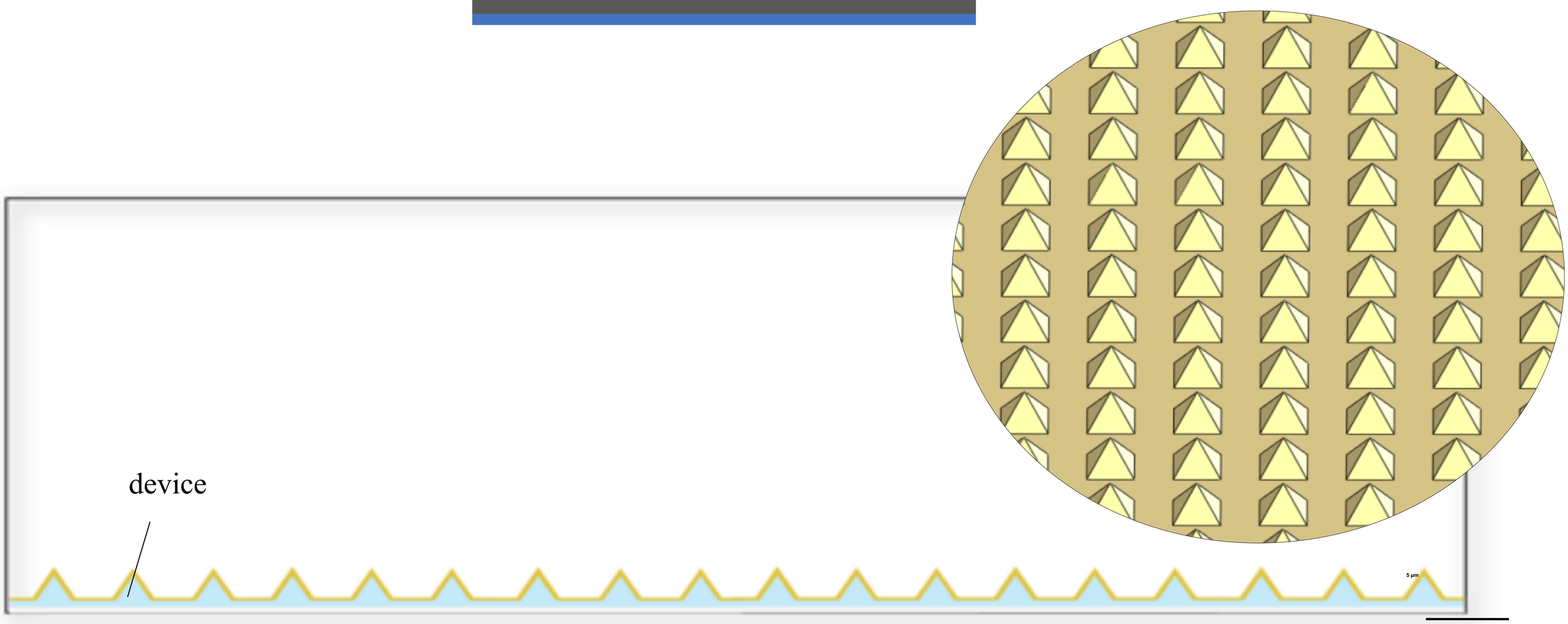
KOH Anisotropic etching

Template

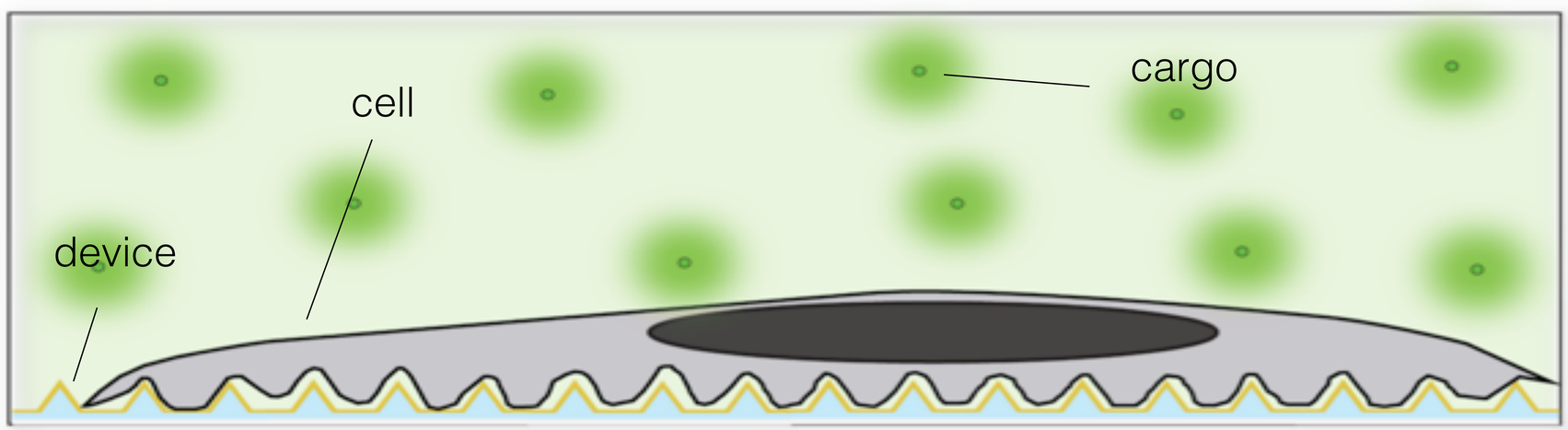


Inverted pyramids

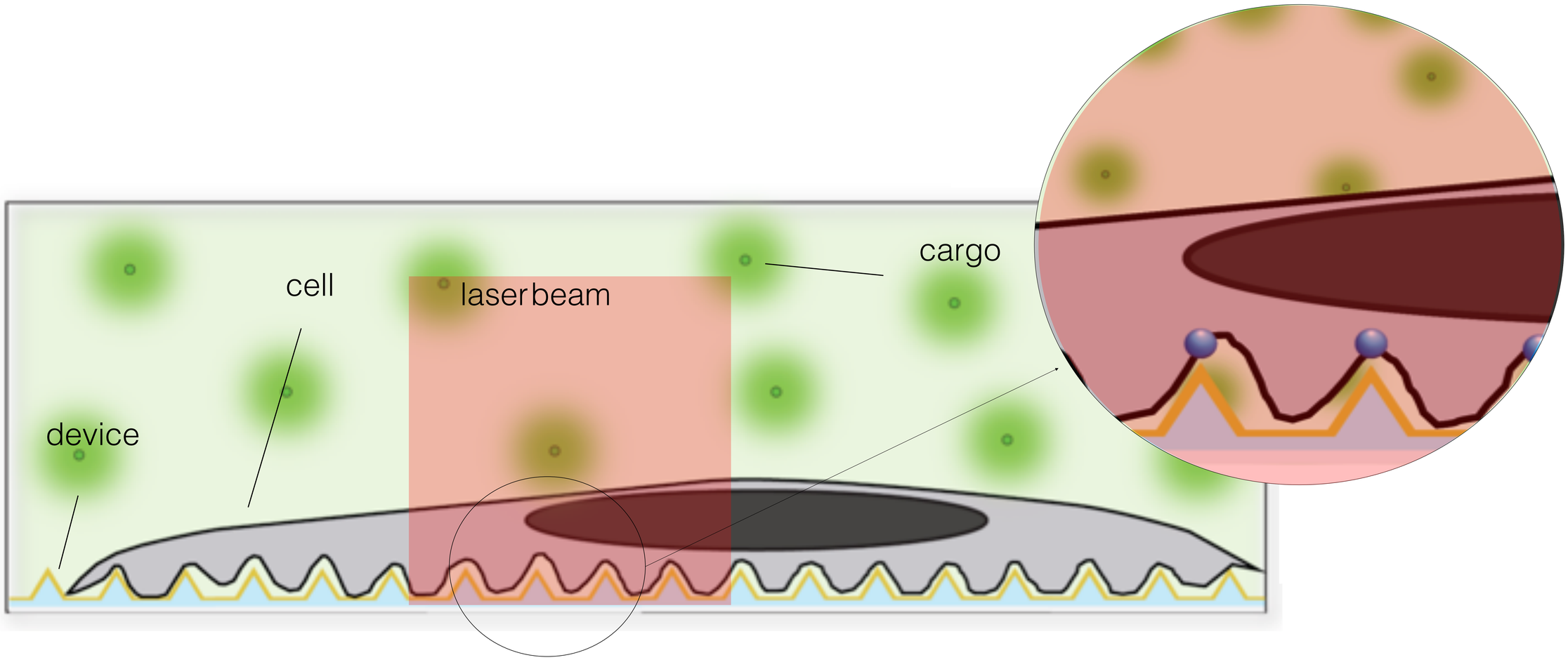
Device

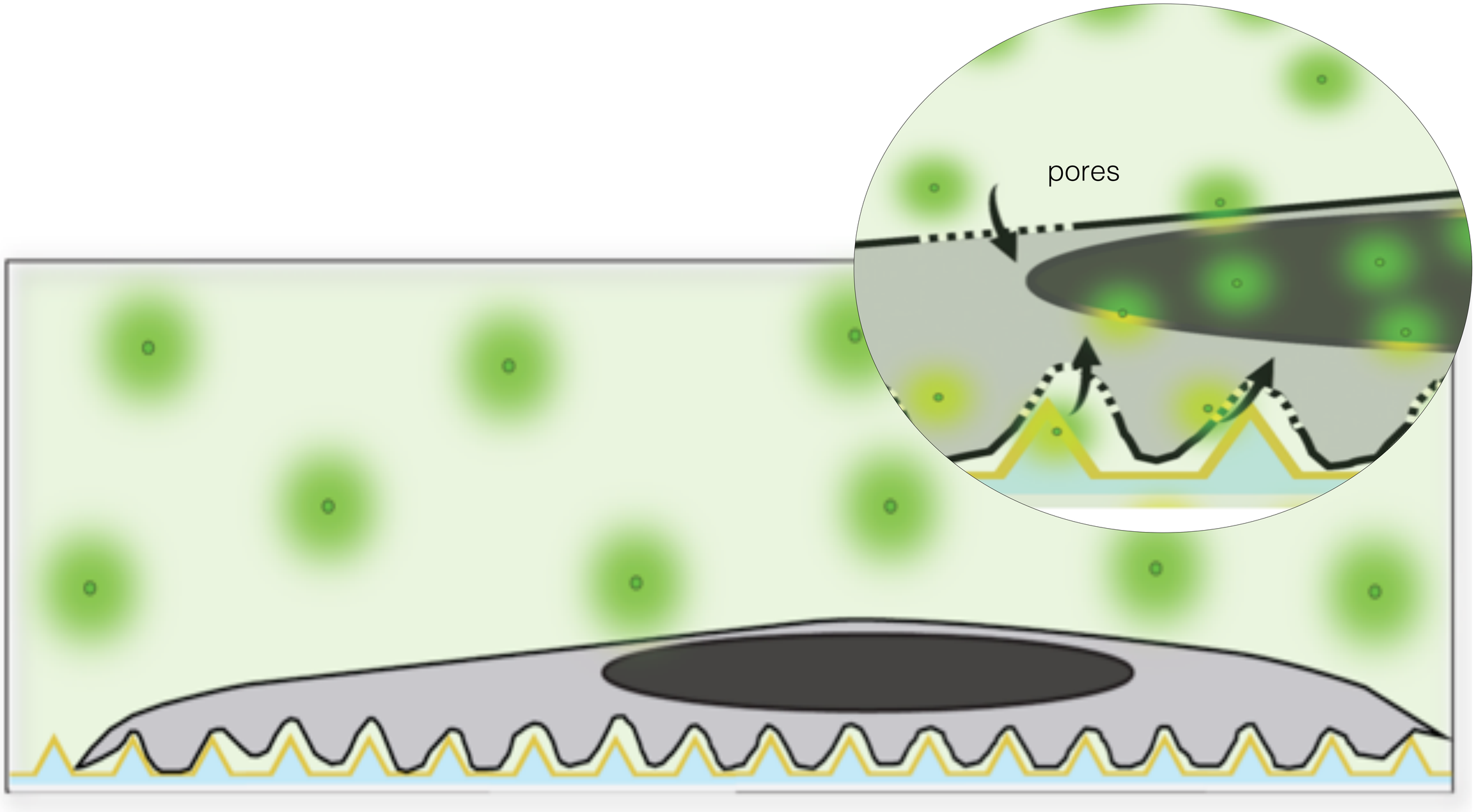


Using inverted nano-pyramids we evaporate 50 nm of gold, then using UV glue strip the pyramids right side up on a glass cover slip.

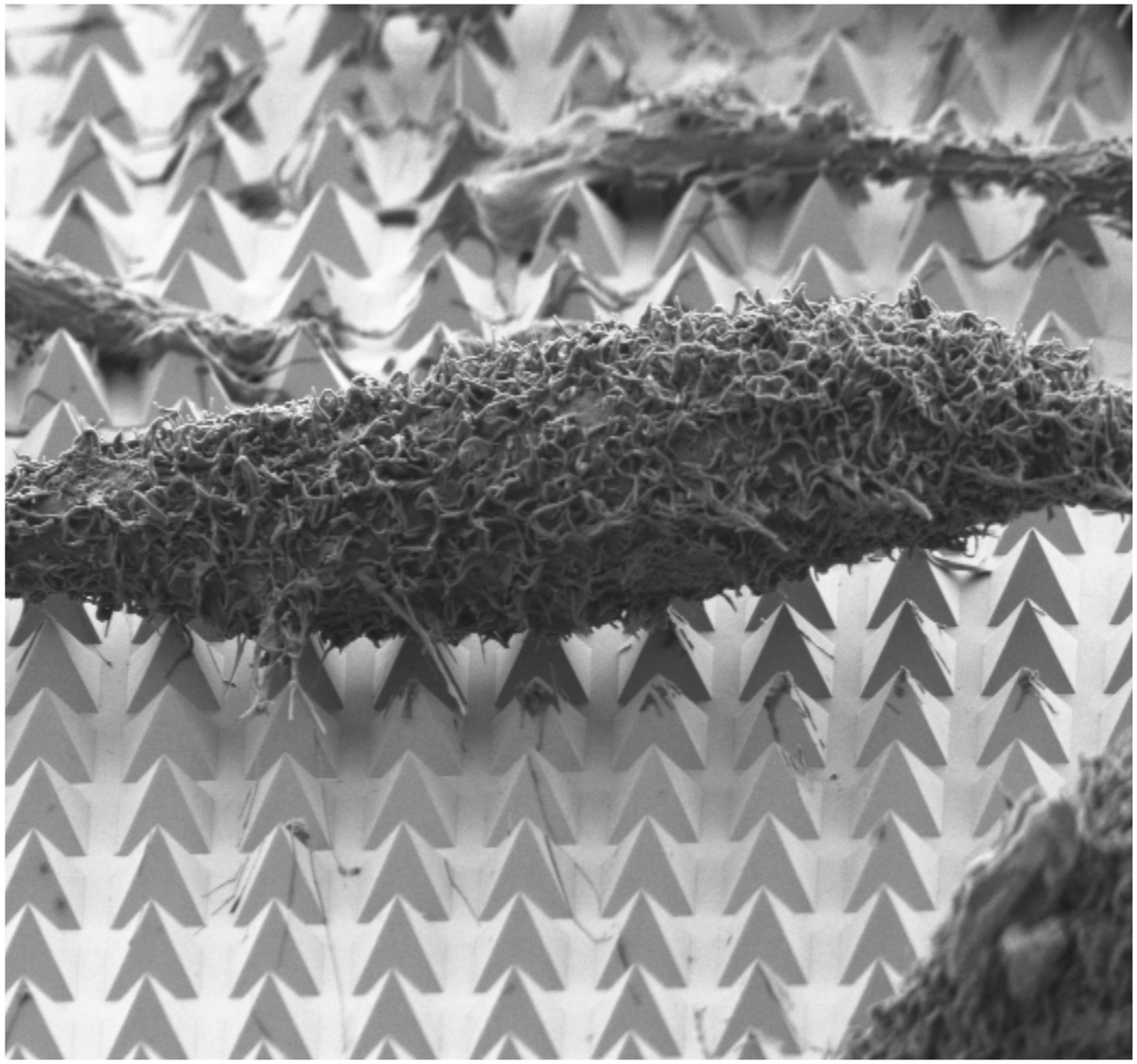


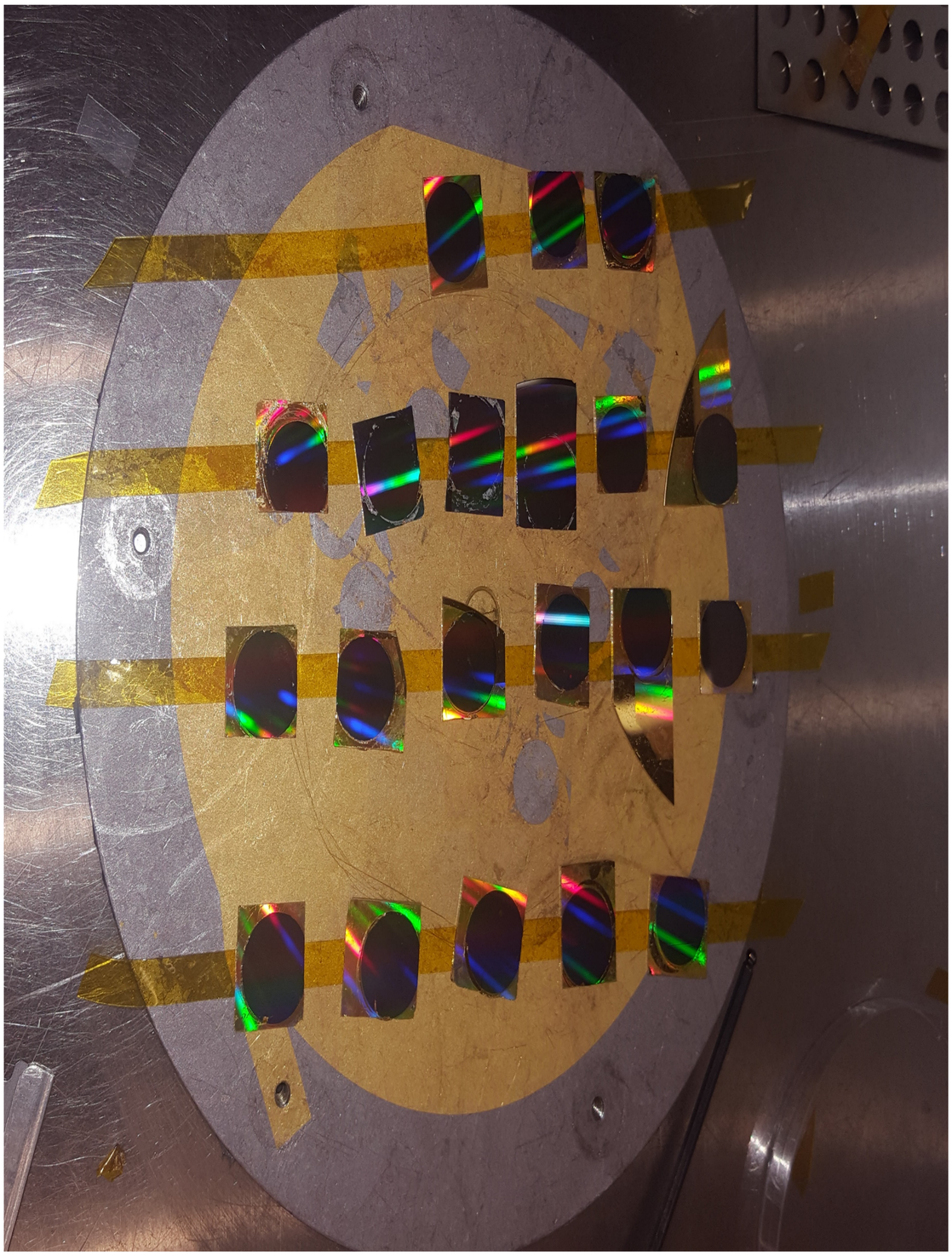
The glass cover slips with the nano-pyramids are then put in petri dishes in a solution with water and the intended cargo material.


cargo
cell
laser beam
device

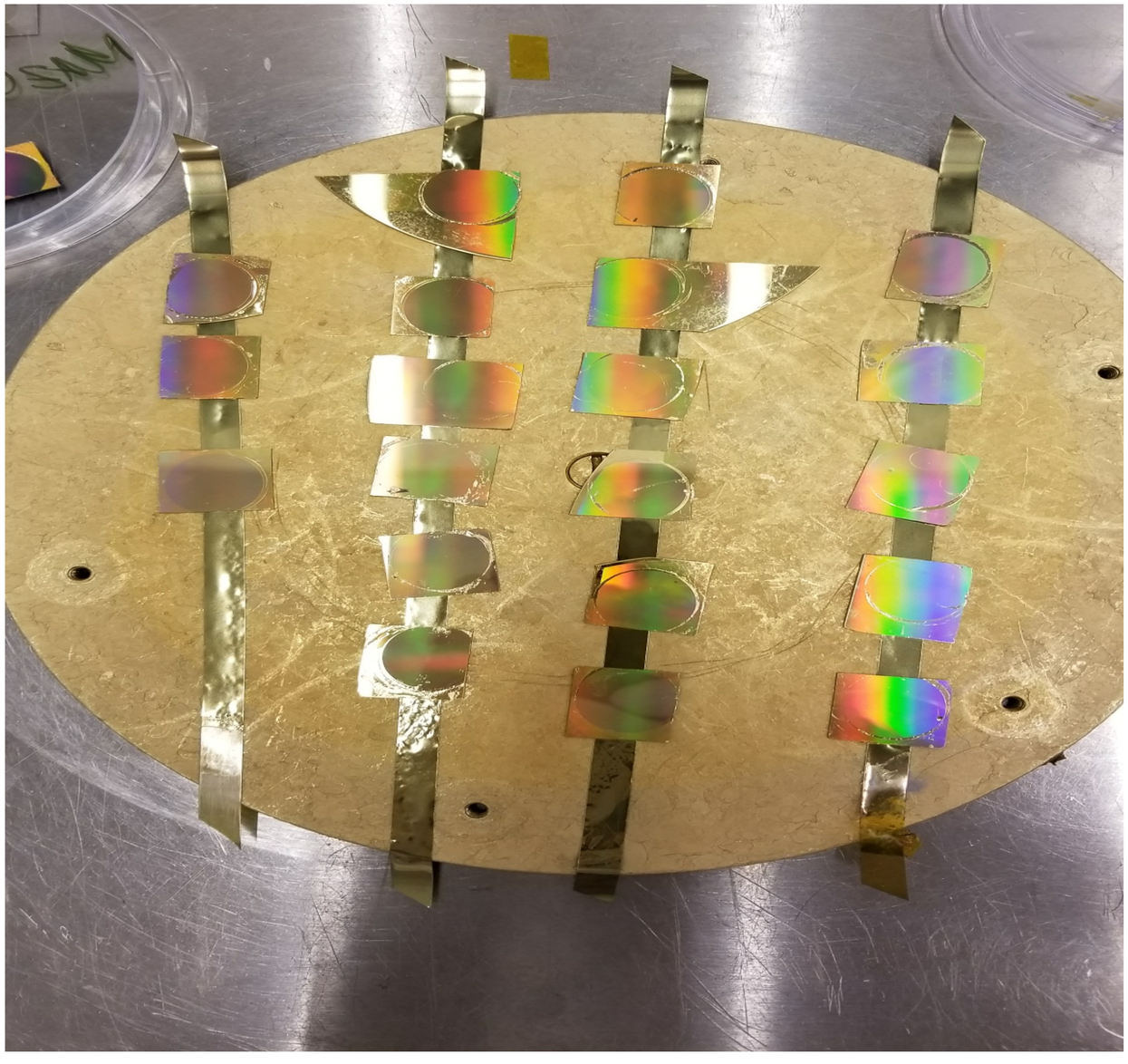


The bubbles burst causing a perforation in the cell membrane allowing for the entry of the intended cargo.



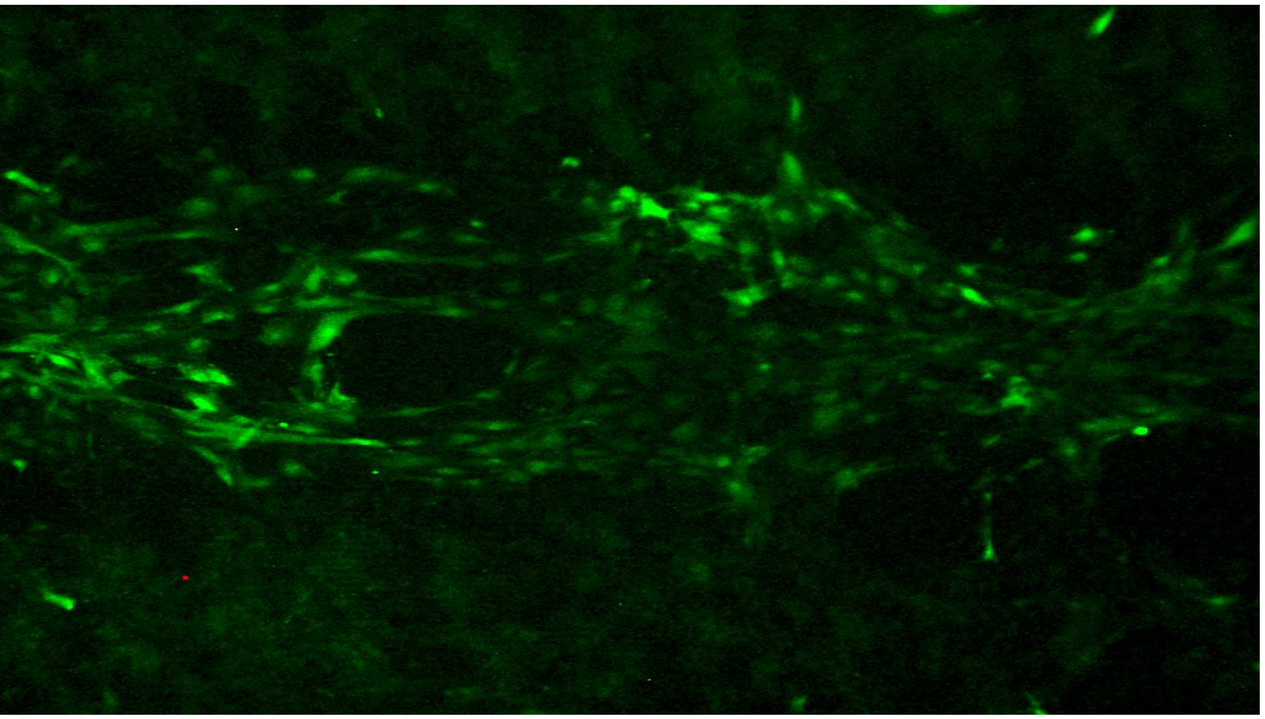


DEVICE

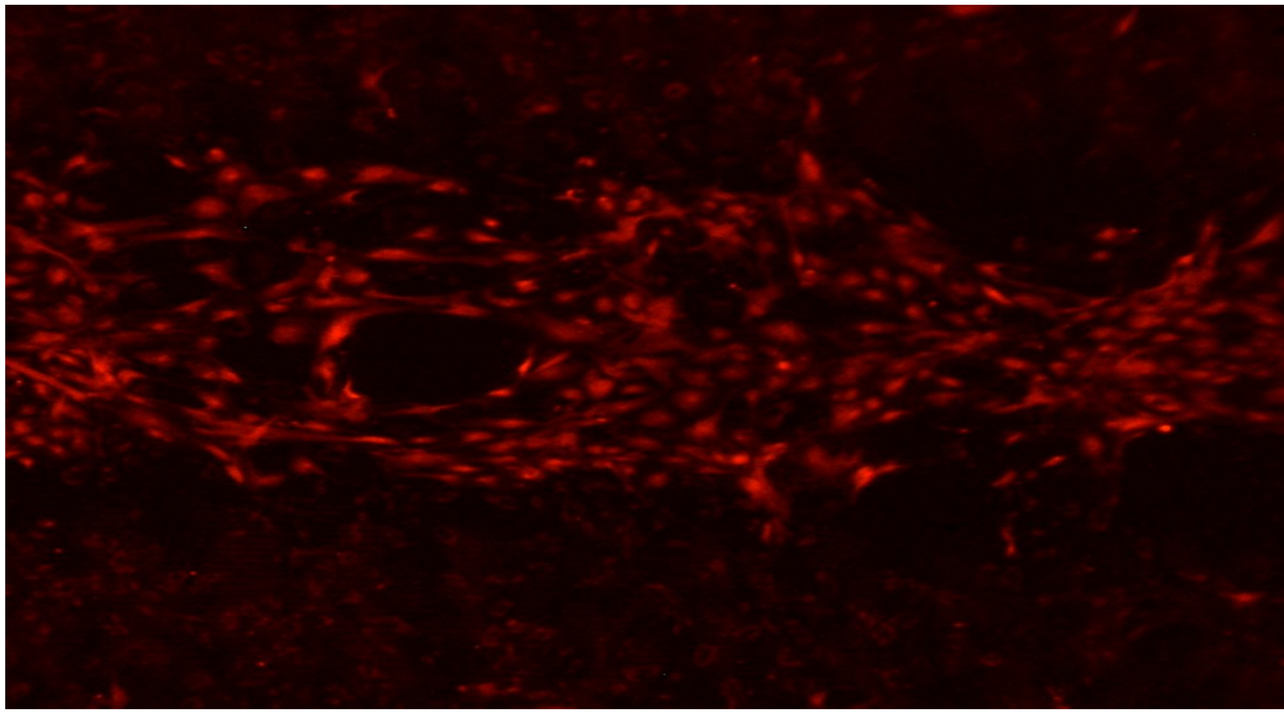


RESULTS

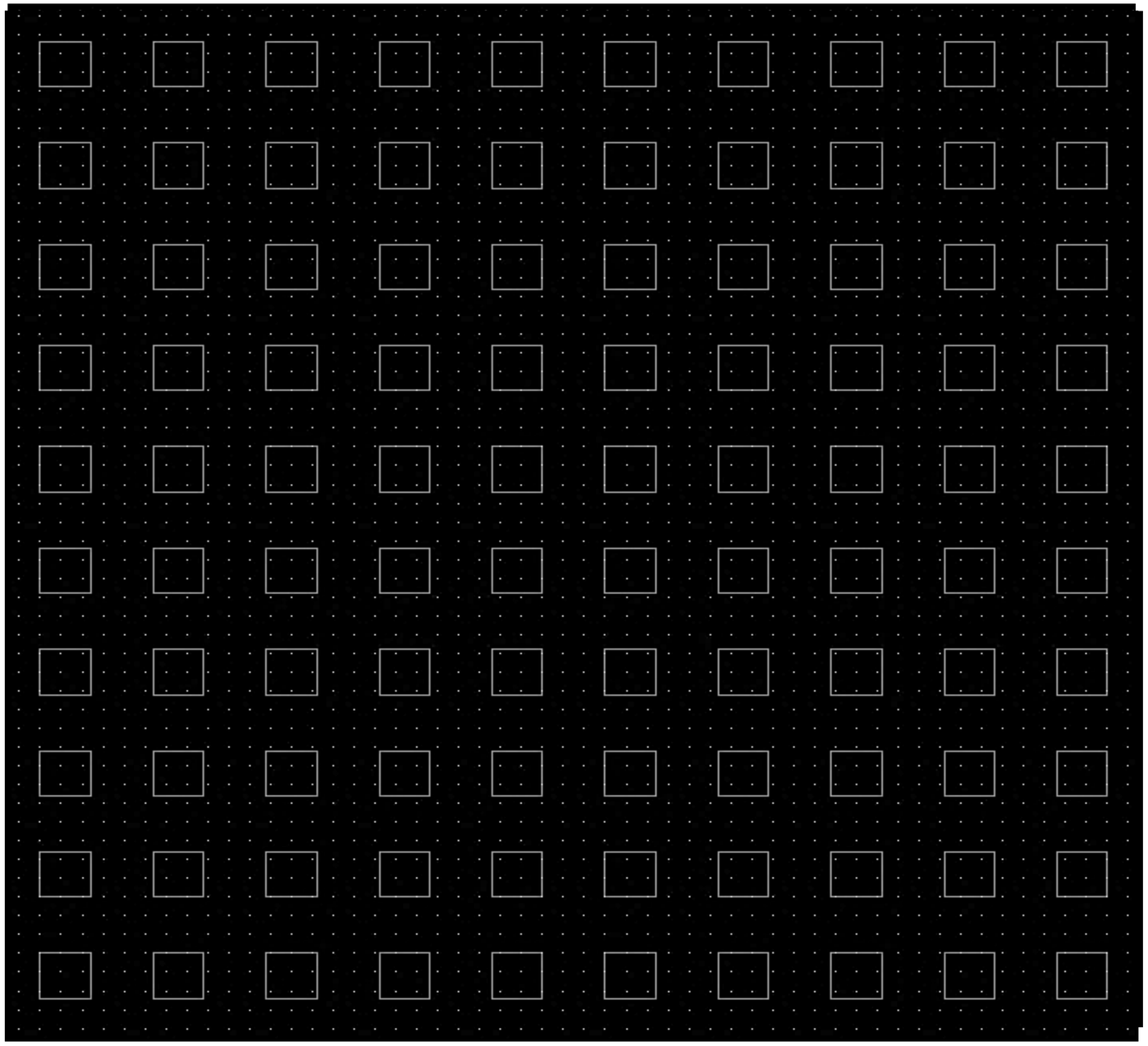
Efficiency



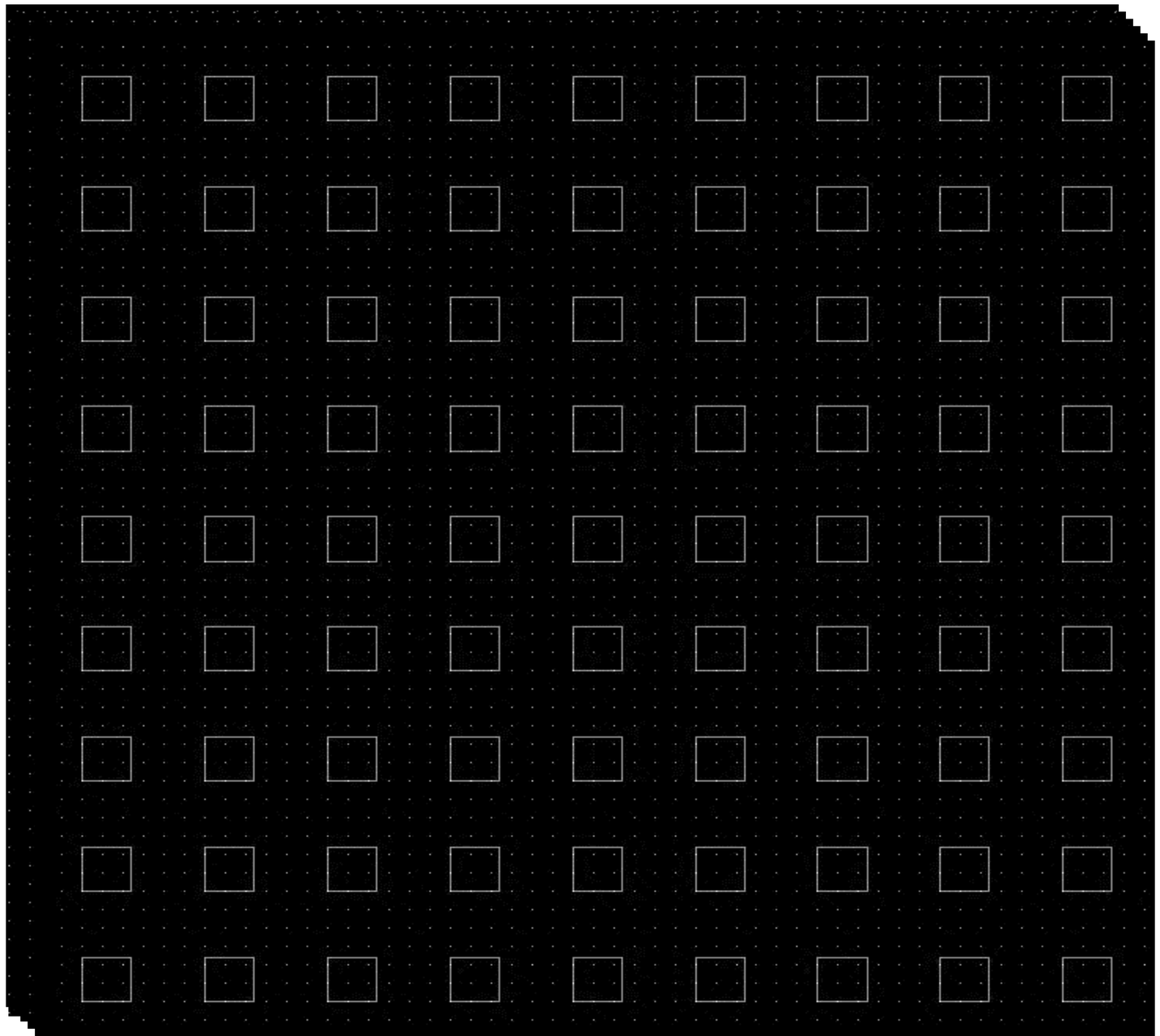
Viability



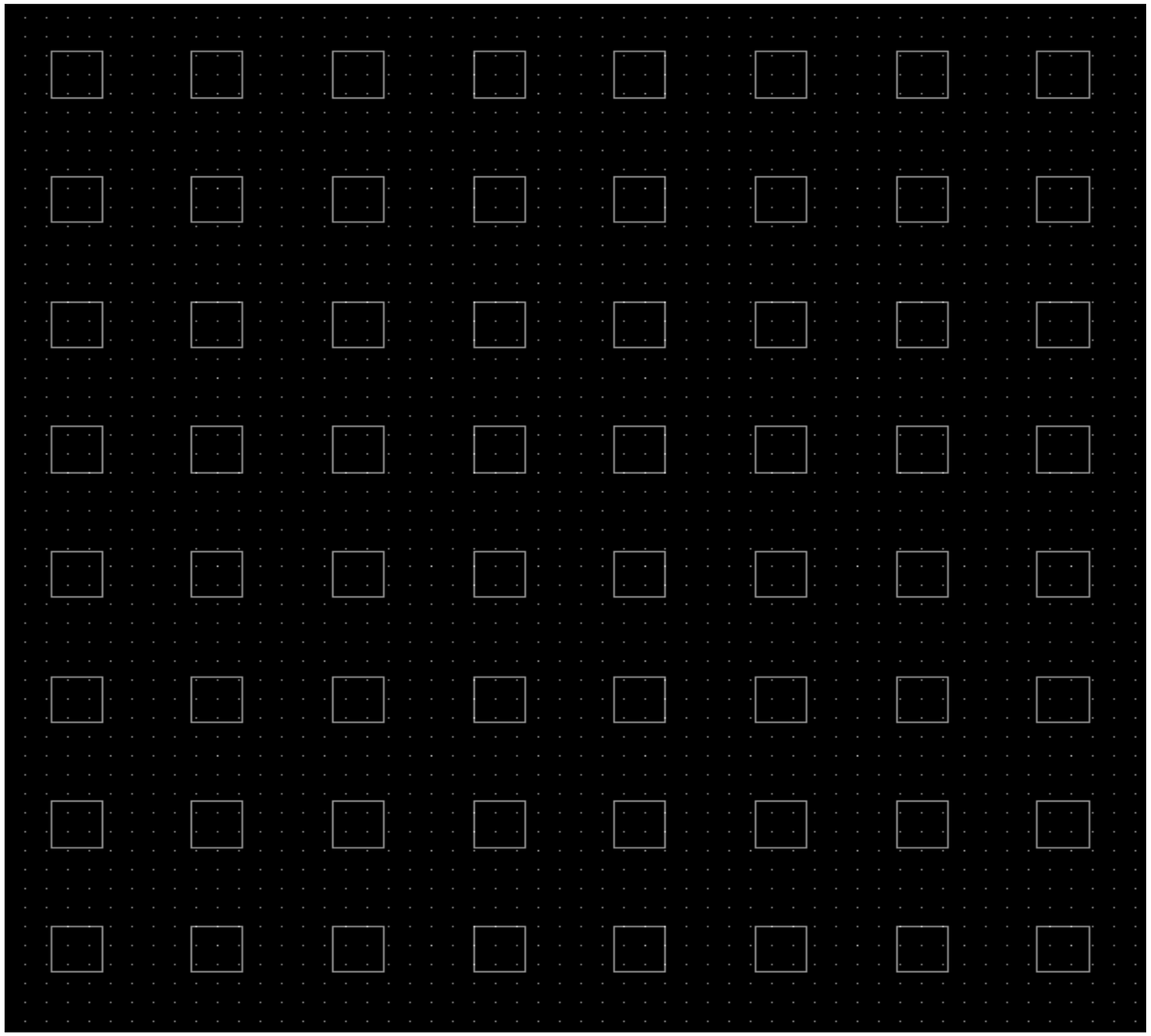
NEXT STEPS



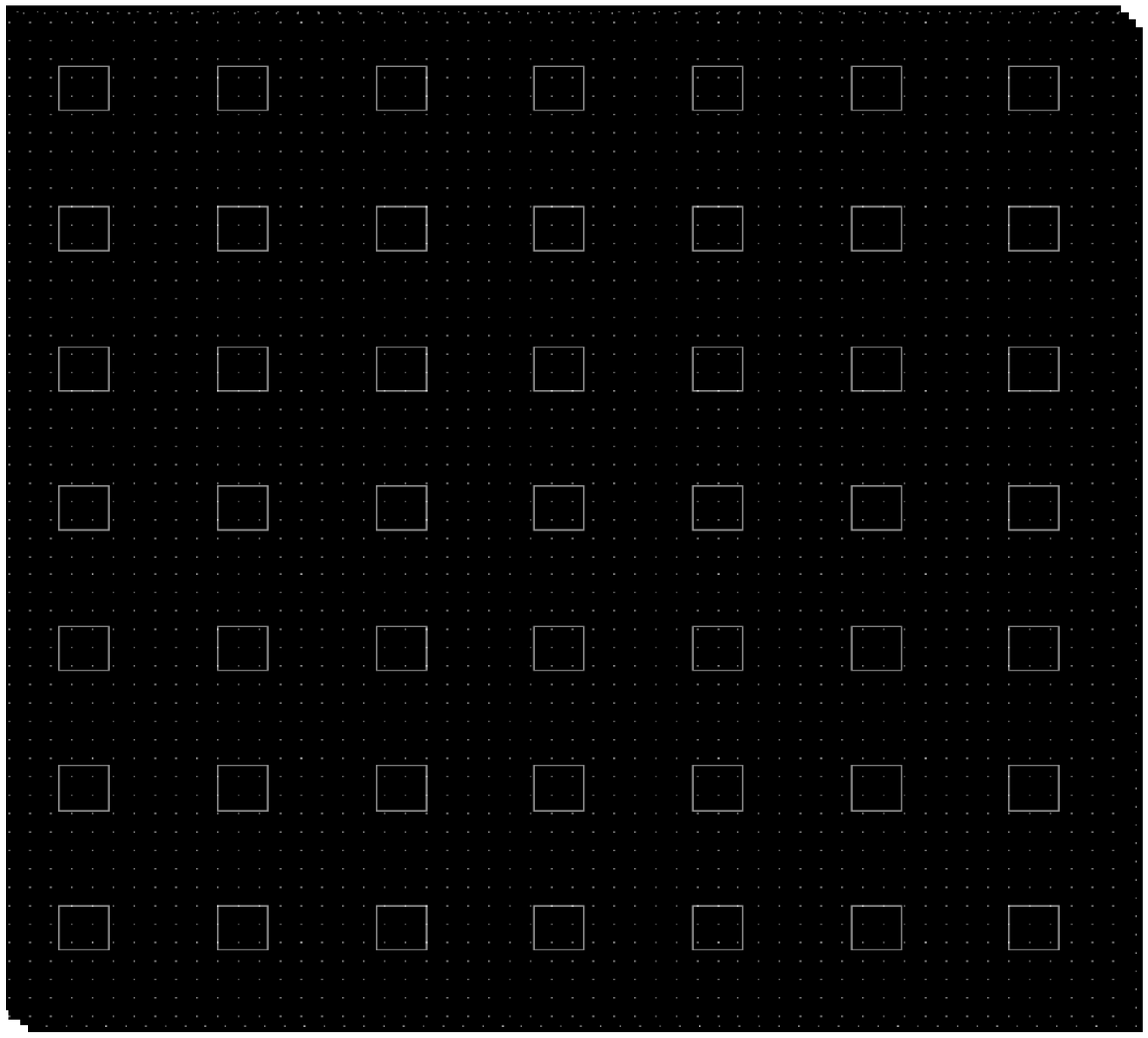
NEXT STEPS



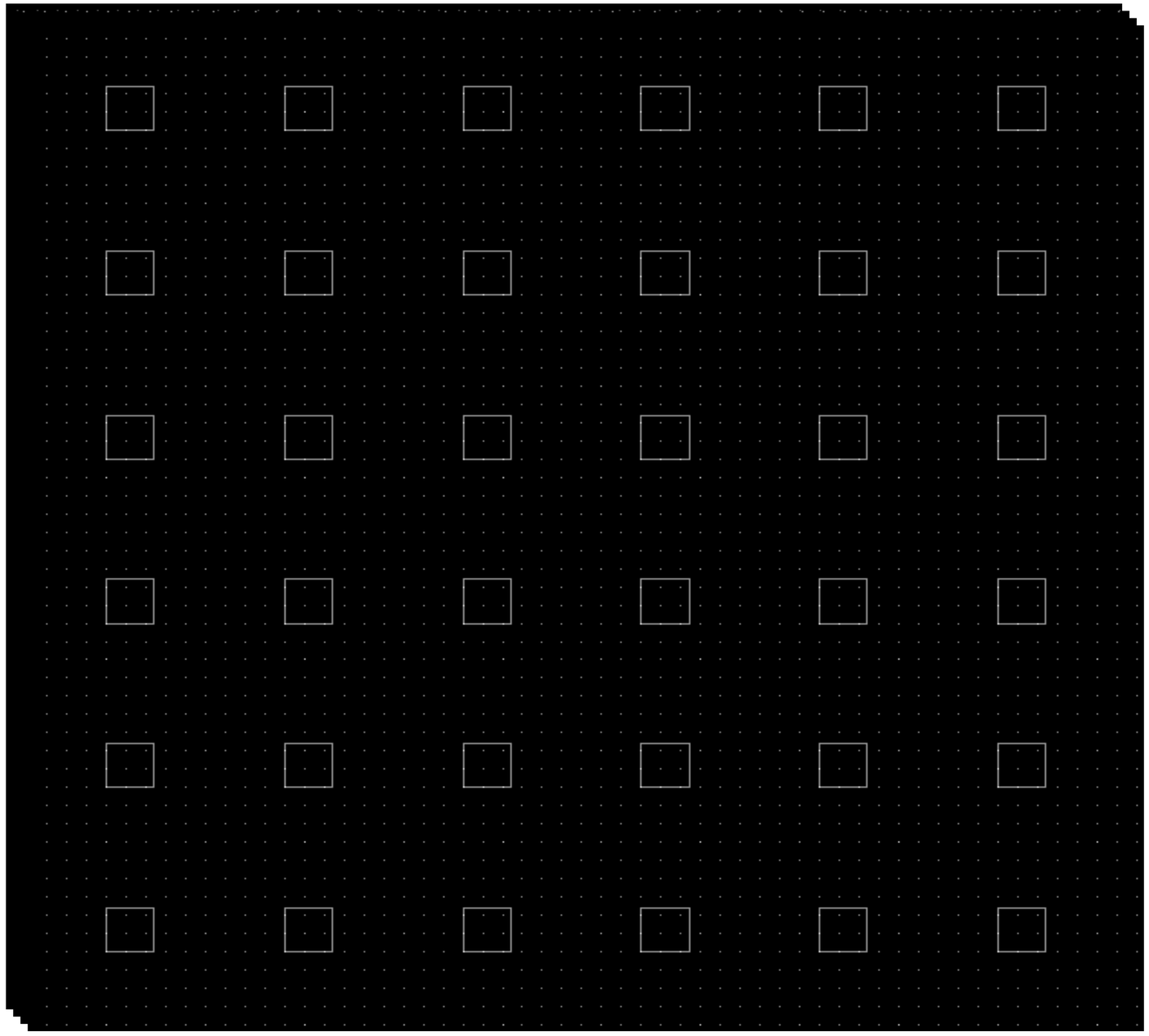
NEXT STEPS



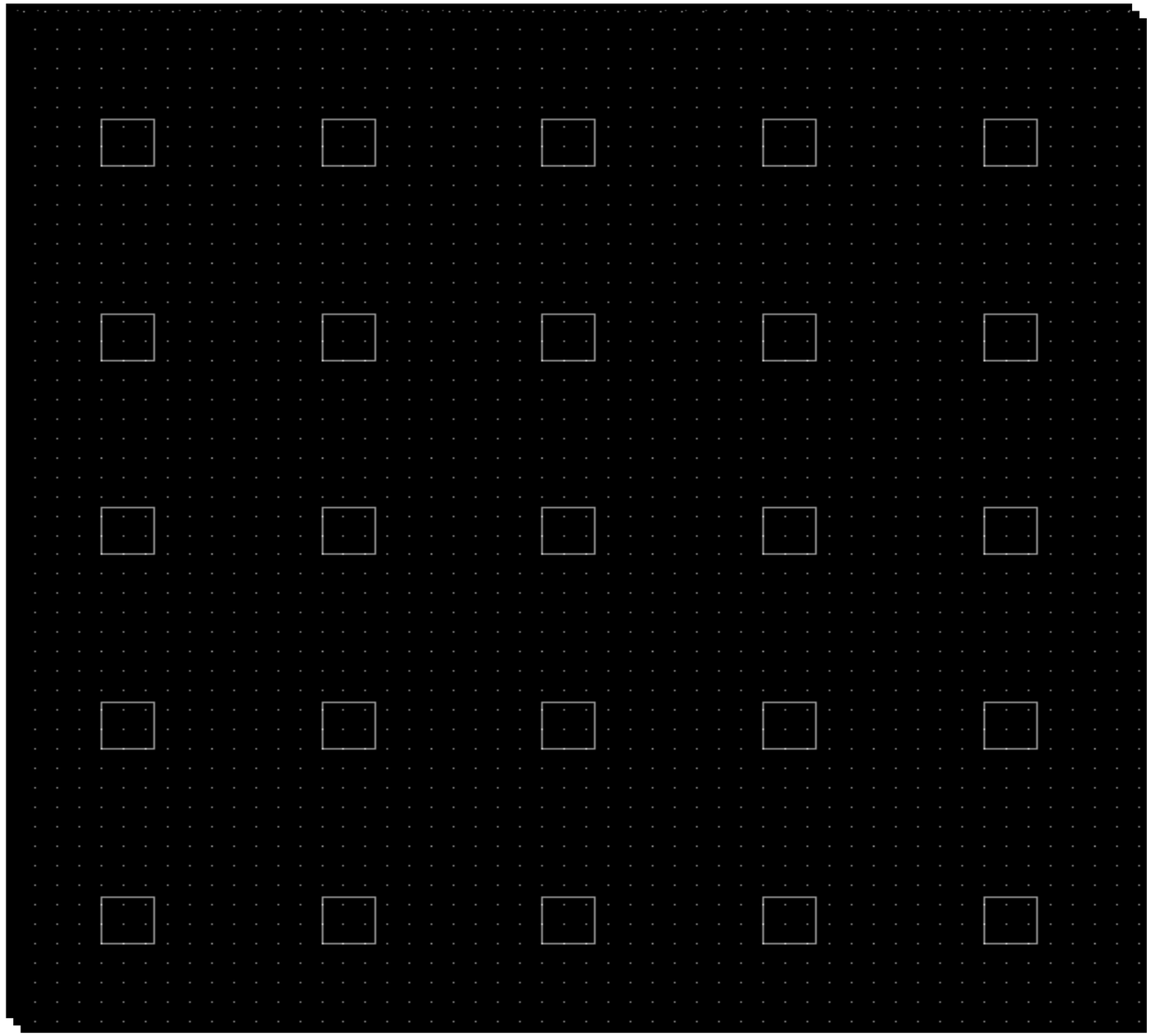
NEXT STEPS



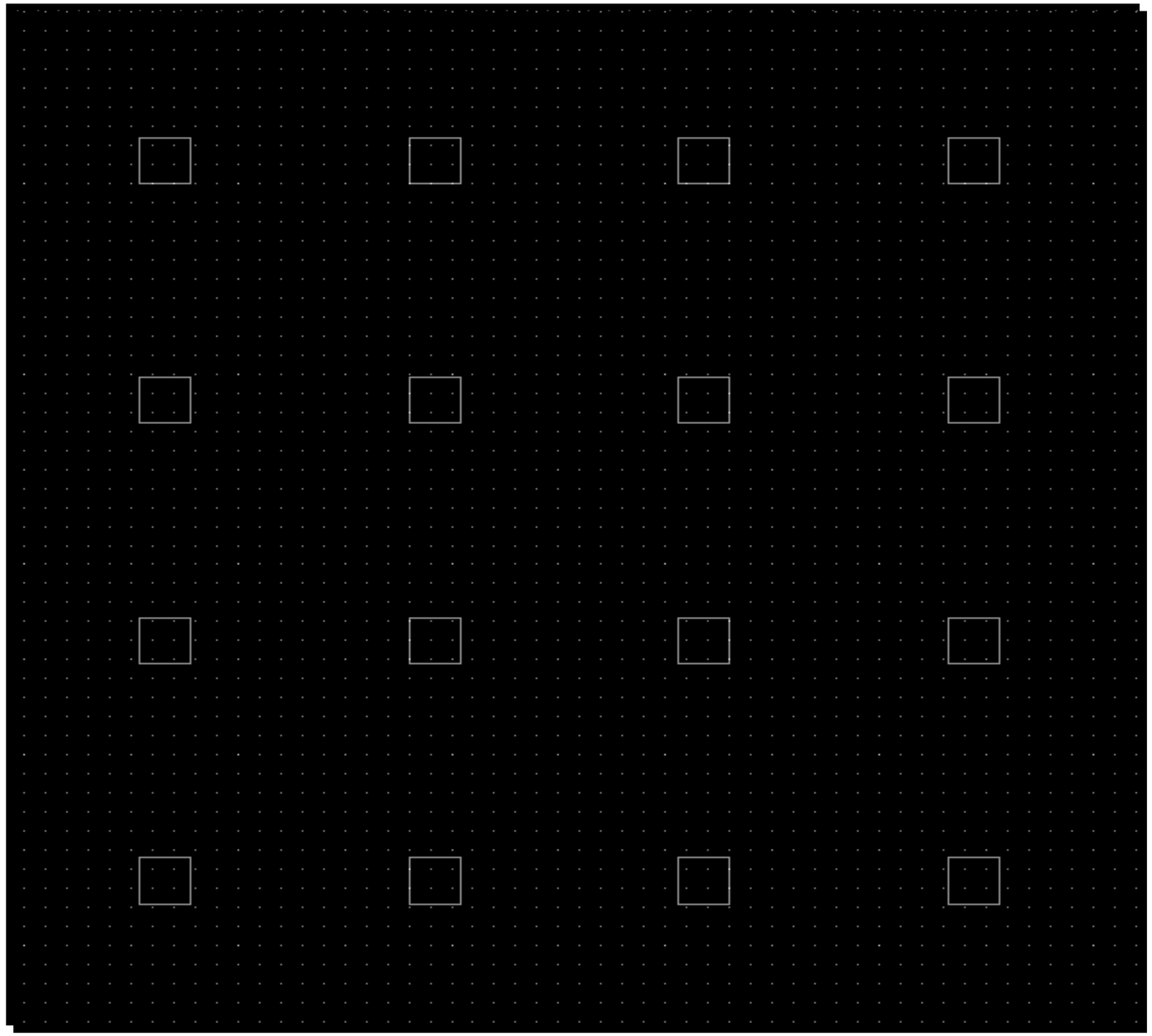
NEXT STEPS



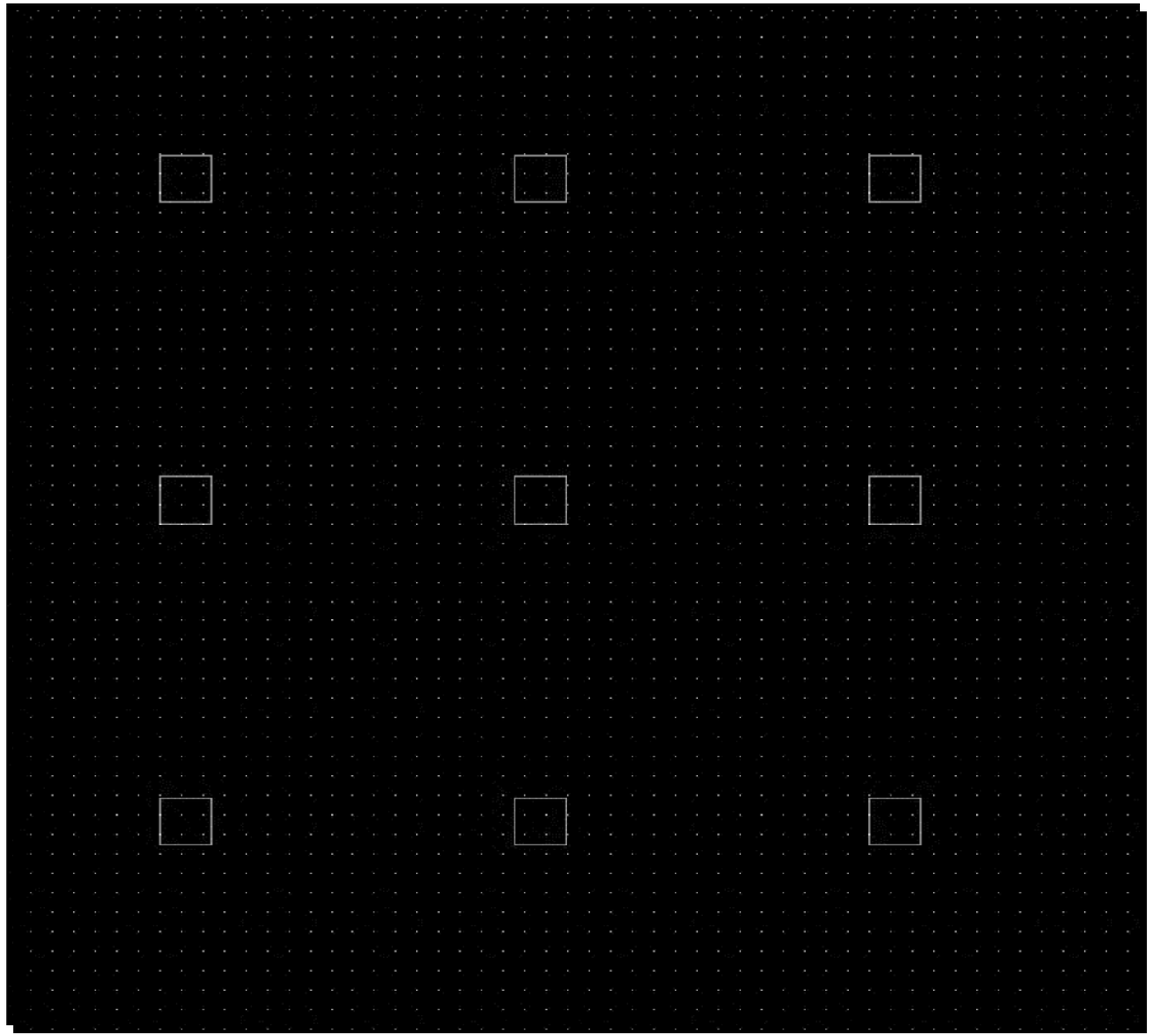
NEXT STEPS



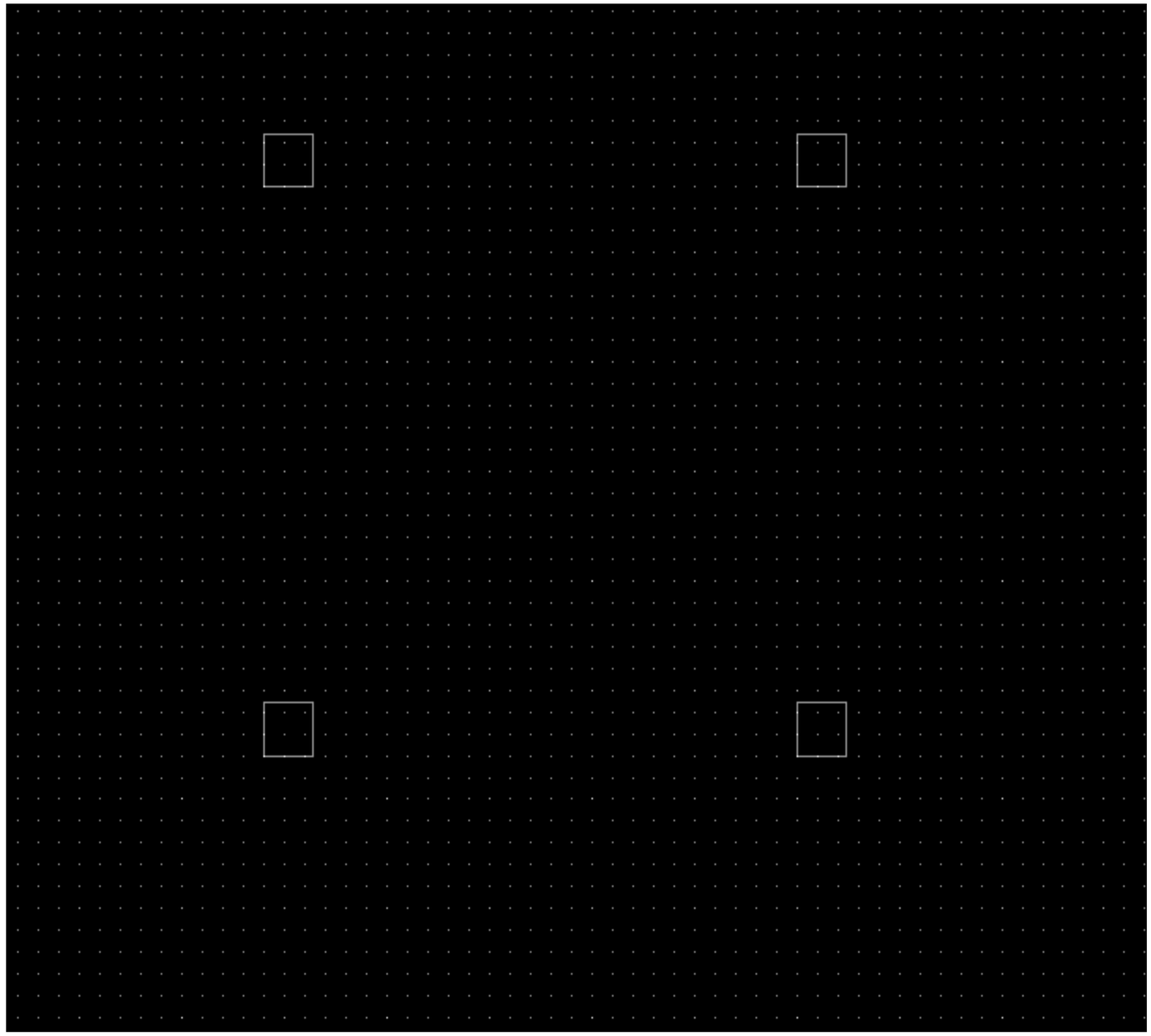
NEXT STEPS



NEXT STEPS



NEXT STEPS



Acknowledgements

HARVARD
John A. Paulson
School of Engineering
and Applied Sciences

Center for
Nanoscale
Systems
Harvard University

NSF

National
Nanotechnology
Coordinated
Infrastructure

MAZUR GROUP

QUESTIONS/COMMENTS