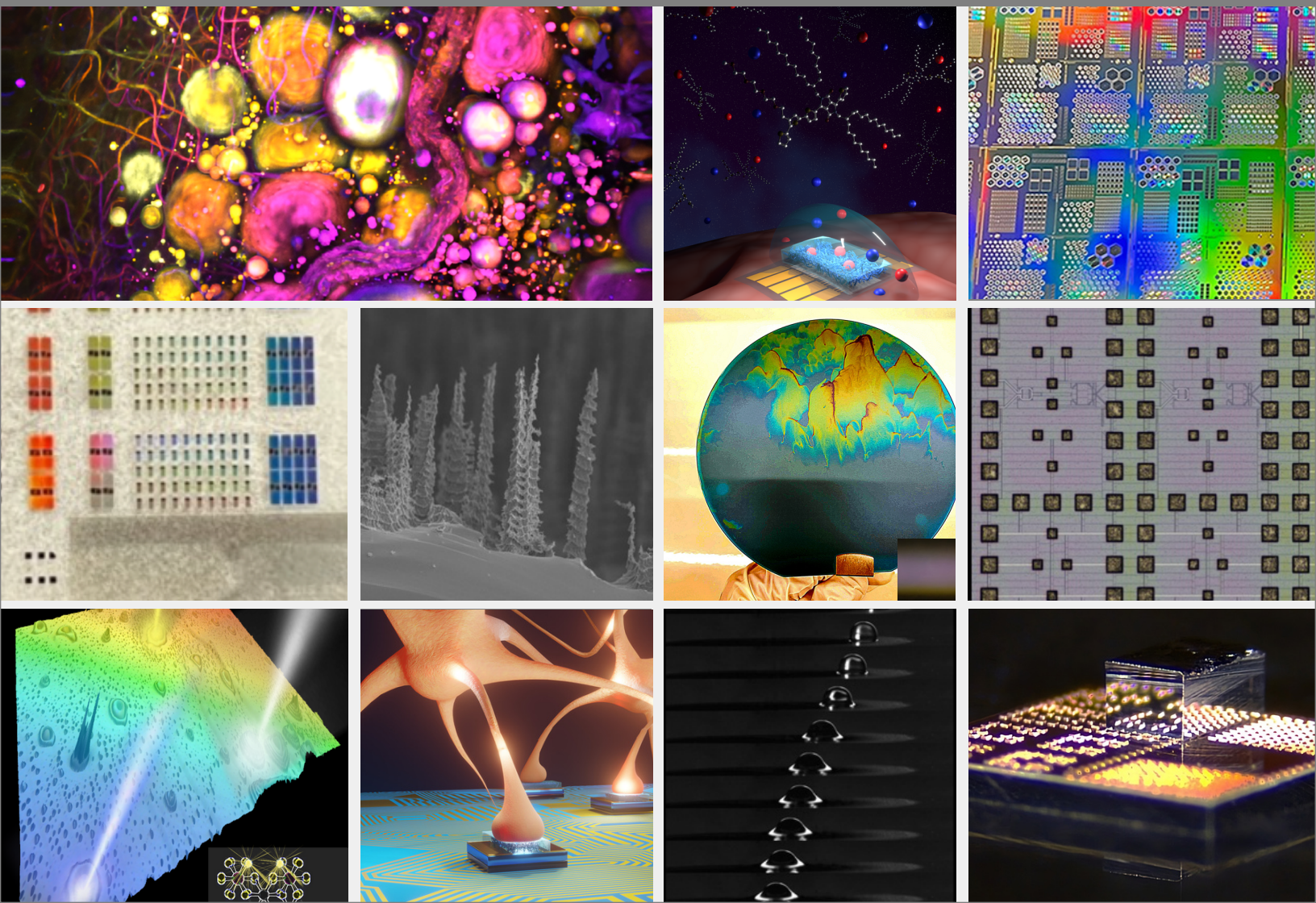


MICROSYSTEMS ANNUAL
RESEARCH
REPORT **2025**



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Front Cover Credits

1. "3D imaging of bacteria invading skin microenvironment in Lyme disease" submitted by Kunzan Liu.
2. "A Rocket Organic Electrochemical Transistor (OECT) lands on the 'planet Brain,' where the channel material, made of semiconducting polymer stars, begins communicating with the brain." submitted by Camille Cunin.
3. "GaN Power Transistors on 8" Si Wafers" submitted by Josh Perozek.
5. "Cross section of black silicon formed during DRIE, the "trees" are 5-15 microns tall" submitted by Gillian Mical.
6. "Mountains of silane on the backside of a wafer. Captured in MIT.nano (L6)" submitted by Camille Cunin.
7. "Intel 16 Si CMOS BEOL Chip for World's First GaN/Si CMOS 3D-mmWIC" submitted by Pradyot Yadav.
8. "PhD student Abhishek Mukherjee from Multifunctional Metamaterials research lab demonstrates how one can harness a combination of chemical and structural material defects to tune and enhance photoluminescence from AgScP2S6 – a new layered semiconductor material recently synthesized in the Air Force Research Lab" submitted by Svetlana Boriskina.
9. "Listening to Synaptic Potentials: Organic Electrochemical Transistors at the Brain-Machine Interface" submitted by Camille Cunin.
10. "Capillary Catapults: A high-speed timelapse capturing the inertio-capillary propulsion of a water drop on a nanoglass surface. The imbibition front of silicone oil, hemi-wicking through the (nano)structures, contacts the "foot" of the drop sitting atop the superhydrophobic surface. This triggers an immediate dynamic reconfiguration of the drop from a sphere to a hemisphere in milliseconds, as the oil cloaks the drop with a Van der Waals film (first four frames). The sudden change in surface energy induces strong lateral propulsion, with inertio-capillary speeds reaching up to 10 cm/s. This seemingly simple phenomenon arises from a complex interplay of capillarity, geometry, and inertia, forming the foundation for novel droplet transport (and removal) devices currently under development in our lab, in collaboration with Tal Joseph. The video was shot at 50,000 frames per second" submitted by Saurabh Nath.
11. "GaN"hattan submitted by Pradyot Yadav.

Microsystems Annual Research Report 2025

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