OUR SOLUTION: AN AUTOMATED LOCATION SYSTEM FOR NANOMATERIALS

THE NANOMATERIAL SCALABILITY CHALLENGE

TRANSISTORS CANNOT GET ANY SMALLER

Until now, the demand for more powerful chips has been met by increasing the density of transistors

NANOMATERIALS ARE THE SOLUTION

• 1000x smaller than a human hair
• 200x faster than conventional electronics
• Increase chip power while maintaining size

INDUSTRY CURRENTLY CANNOT USE NANOMATERIALS

• Grown nanomaterials are randomly distributed on substrates
• Finding them is manually-intensive and time-consuming
• Currently unscalable for industrial manufacturing

OUR SOLUTION: AN AUTOMATED LOCATION SYSTEM FOR NANOMATERIALS

STAGE 1: LITHOTAG™ MARKER

• Novel coordinate system for locating nanomaterials
• Reproducible at nanoscales

STAGE 2: COMPUTER-VISION

Identification of nanomaterials from microscope images

STAGE 3: CIRCUIT ROUTING

Automated manufacturing of circuits around identified nanomaterials

AUTOMATED FABRICATION OF NANOWIRE TRANSISTORS

Using our method we automatically manufactured over 200 nanowire transistors (Potocnik et al. ACS Nano. 2022)

NANOMATERIAL-BASED CHIPS IN EVERYDAY ELECTRONICS

• 12,000x faster manufacture of nanomaterial-based chips
• Unlocks use of nanomaterials in commercial electronics

• Nanomaterial-based chips use less energy
• Reducing dependence on rare earths increases the resilience of the semiconductor supply chain