

HPCaP Offers real solutions to the toughest microfabrication challenges.

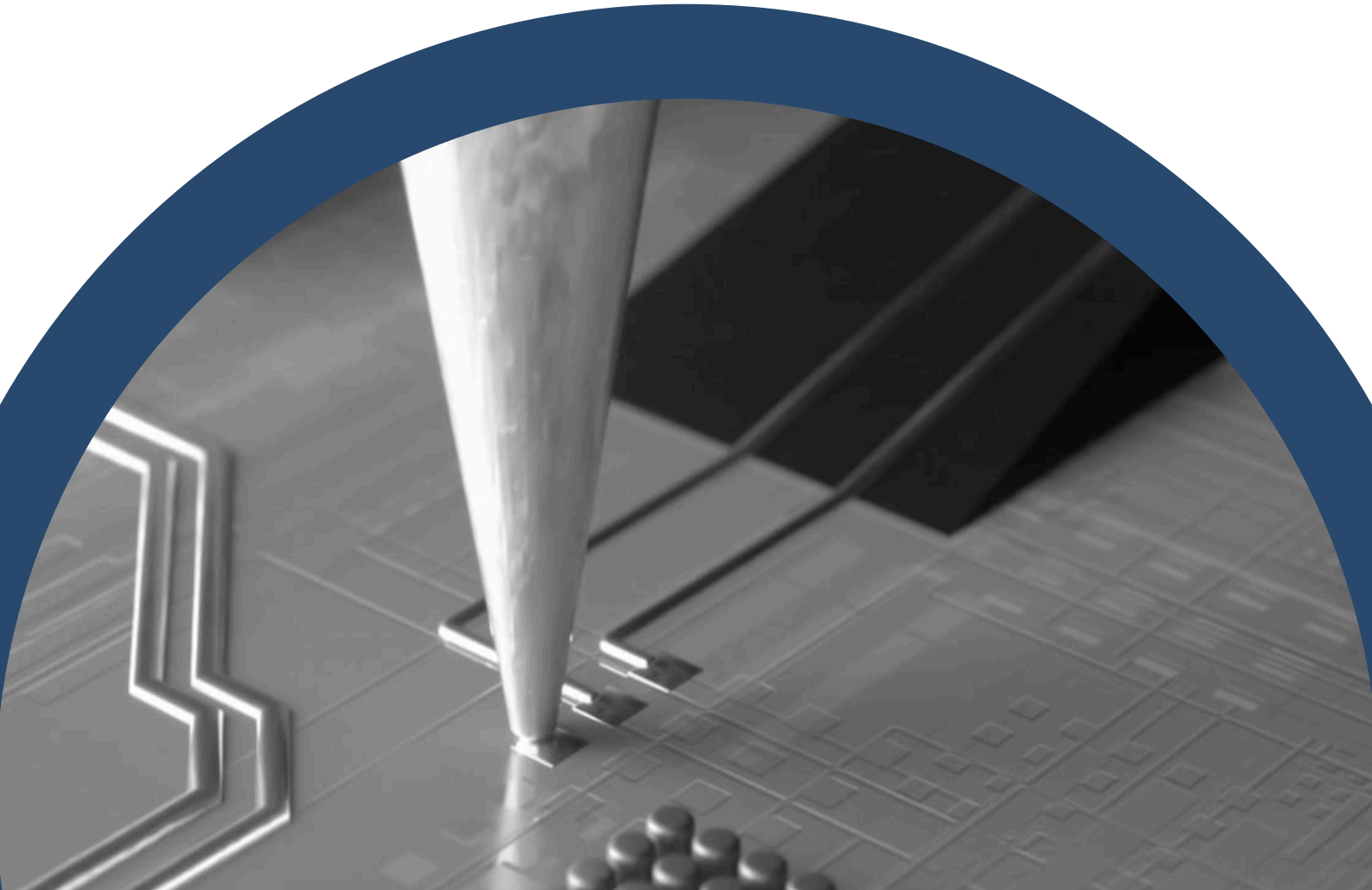
Introduction

High Precision Capillary Printing (HPCaP) by Hummink leverages capillary forces to deliver unprecedented resolution and precision in micronic and sub-micronic scale printing, revolutionizing microfabrication for research and industry.

HPCaP surpasses traditional limitations, reducing waste and enhancing precision on complex materials, making it an ideal choice for today's innovation-driven research environments.

Learn how HPCaP addresses the toughest challenges in microfabrication with real-world applications.

The following sections delve into how HPCaP tackles these challenges, delivering practical solutions for real-world applications.



Key Challenges In Microfabrication And How HPCaP Addresses Them

Problem 1: Resolution and Precision Limits in Microfabrication

Challenge:

The challenge in boosting a sensor's signal output lies in increasing the electrodes' surface area with printed microscale resolutions and microscale gaps.

Existing technologies often fail to meet the precision and resolution required for advanced microscale designs, often forcing researchers to rely on time-intensive methods like lithography. This leads to slower development cycles and higher costs.

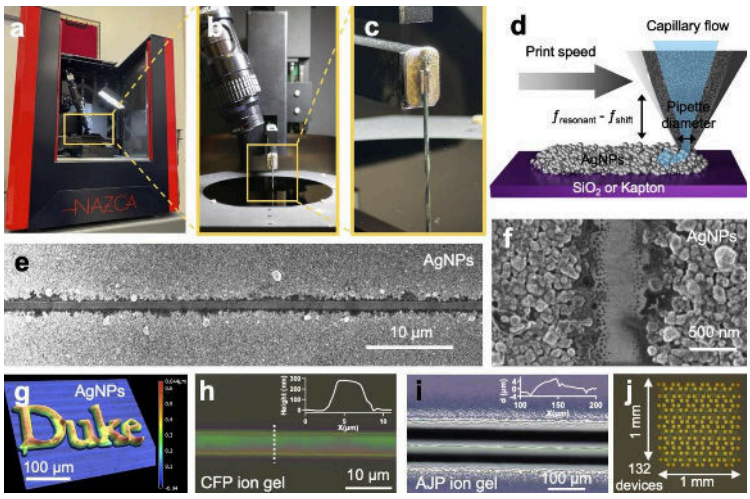
Solution:

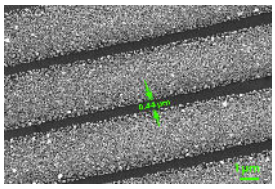
HPCaP achieves resolutions from 50 µm to as fine as a few hundred nanometers, allowing for precise microstructures without extensive lithography.

Use Case:

At Duke University, Dr. Aaron Franklin and his research team have harnessed the power of HPCaP to print silver electrodes with submicron gaps, achieving an impressive 500 nm separation for their carbon nanotube (CNT) transistors.

This level of precision is crucial for the development of high-performance bioelectronic devices.





Silver electrodes printed using Hummink's NAZCA printer.

Learn more about NAZCA

Problem 2: Defects in Display Panels

Challenge:

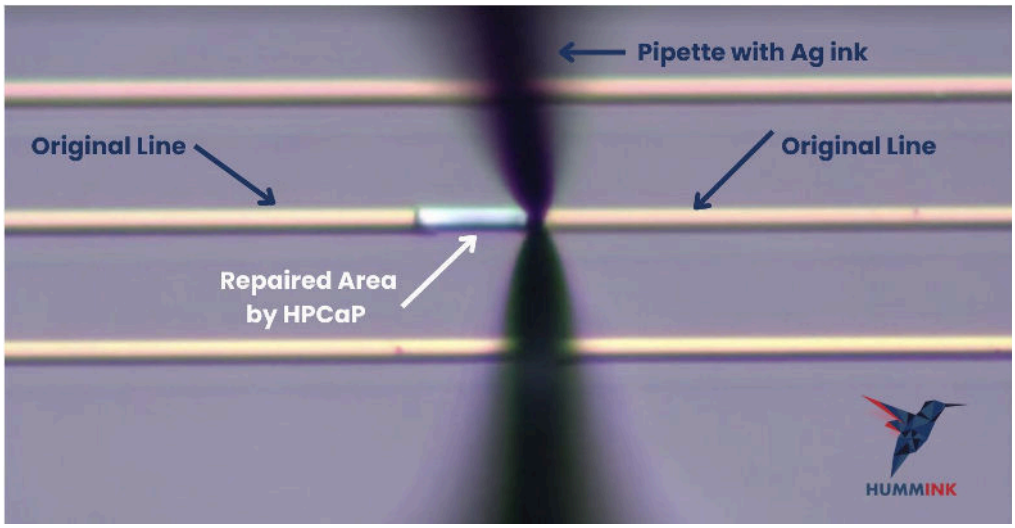
Display production faces up to 30% losses due to defects below 5 µm, which conventional methods such as inkjet and CVD fail to repair effectively.

Solution:

HPCaP's high-precision repair capability enables defect-free printing at scales below 5 µm, eliminating splashes and satellite drops.

Use Case:

HPCaP facilitated a smooth repair on a color converter, ensuring high-quality displays and reducing waste.



SCAN ME

Problem 3: Rising Costs in Semiconductor Manufacturing

Challenge:

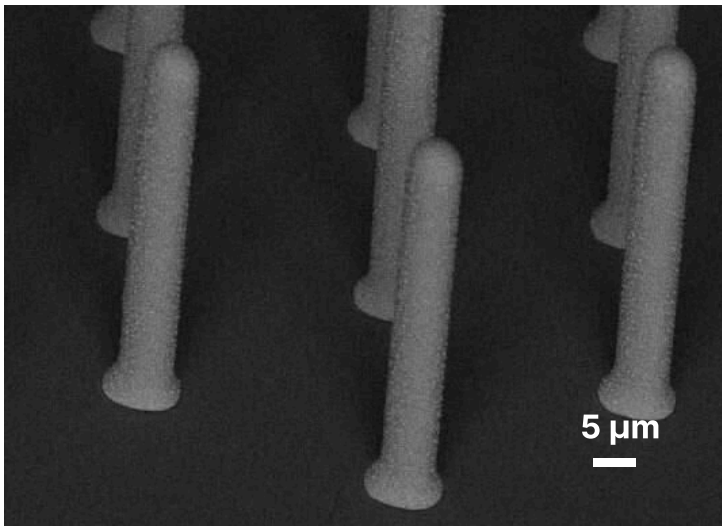
Increasing costs in semiconductor panel production prompt the need for effective defect repair at micro and sub-micro scales. However the conventional methods fail to repair open defects at such microscopic scales.

Solution:

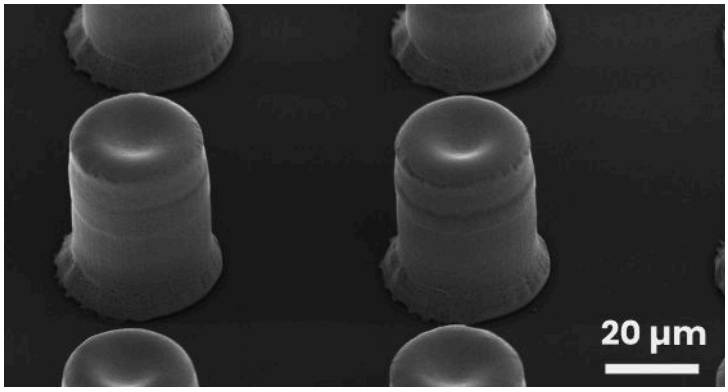
HPCaP allows printing of metal interconnections down to a few hundred nanometers and integrates microbumps creation and repair in one seamless step.

Use Case:

HPCaP successfully created silver microbumps in a single process, enhancing repair speed and precision in semiconductor manufacturing.



1:8 high aspect ratio silver pillars



Problem 4: Intricate Designs in Luxury Watchmaking

Challenge:

Creating detailed and durable designs on fragile materials, such as sapphire, requires a high degree of precision unattainable by conventional methods.

Solution:

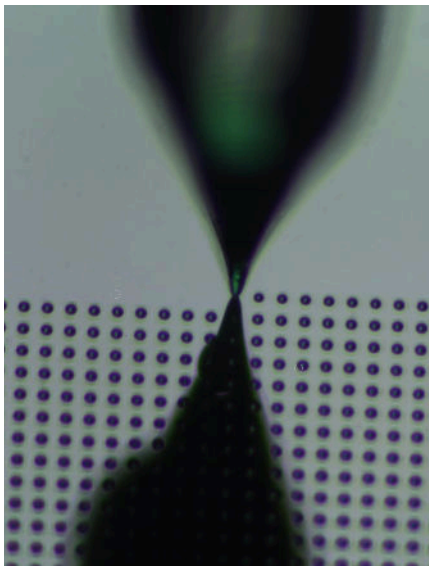
HPCaP's controlled deposition ensures delicate detailing on sensitive substrates, enabling high-end applications for watches.

Additionally, HPCaP can use a wide range of inks, including high viscosity (up to 100,000 cP) and polymer-based chemistries, with a continuous adaptation to substrate topography.

Use Case:

The word 'Hummink' printed by HPCaP on a watch dial as part of its decoration.





Printing bicomponent epoxy glue



" My team was amazed by how easy the Nazca tool is to use! Usually, a system with as many options as the Naza has would take several printing sessions to enable someone to successfully print on their own; for Nazca, it only took one training. We are looking forward to exploring manyuncharted paths to direct-printed electronics using this system! "

Pr Aaron Franklin,
Professor at Duke University

Conclusion

HPCaP by Hummink is redefining what's possible in high-resolution printing. From semiconductors to luxury goods, HPCaP's innovative approach aligns with the precision demands of today's industries, supporting scalable solutions in display and semiconductor repair.

By minimizing waste and expanding substrate compatibility, HPCaP by Hummink represents a groundbreaking advancement in microfabrication, positioning Hummink as a leader in next-generation printing solutions.

About Us:

Hummink is the leading developer and supplier of HPCaP, a revolutionary microprinting technology for the display, semiconductors and printed electronics industries. Spun-off from world-renowned research institutes, the company is based in France, with representatives all over the world (USA, Taiwan, Korea, Japan, Europe).

Contact Information:

contact@hummink.com

+33 1 59 06 89 75

hummink.com

www.linkedin.com/company/hummink