



Accelerate | Automate | Innovate

Cloud-Based Freeform Mask Correction Platform

Next-Generation GPU-Accelerated OPC for Semiconductor & Photonics

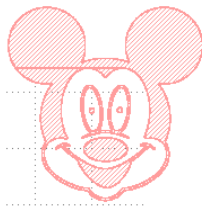
Breaking the Barriers of Traditional OPC

50× faster correction • Zero hardware investment • Universal accessibility • Freeform pattern support

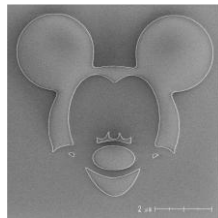
Target

(Mask Without Correction)

Mask Layout



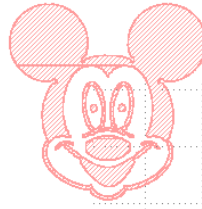
Wafer Image



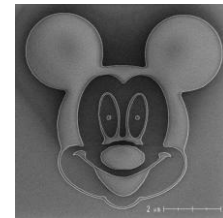
OPC Mask

(Mask With Correction)

Mask Layout



Wafer Image



The Challenge

Traditional optical proximity correction (OPC) tools face critical limitations: expensive licensing, complex setup, slow CPU-based processing, and inability to handle emerging freeform patterns in photonic integrated circuits. As semiconductor and photonics industries push toward advanced nodes and novel geometries, accessibility and speed become bottlenecks for innovation.

The OPC+ Solution

OPC+ democratizes advanced mask correction through a cloud-native, GPU-accelerated platform that delivers professional-grade results with unprecedented ease and speed. Our platform eliminates traditional barriers while extending OPC capabilities to cutting-edge applications in photonics and advanced semiconductor nodes.

Key Features & Advantages

GPU Acceleration	Cloud Accessibility	Freeform Capability
50× faster than CPU-based approaches Scalable with heterogeneous GPU resources Full-mask inverse lithography	Zero hardware investment required Access from anywhere globally Flexible deployment: public, private, or hybrid cloud	Supports curvilinear patterns for photonics Handles meta-lenses, gratings, resonators General purpose for any process node

Complete Correction Workflow

OPC+ integrates three essential modules into a seamless, user-friendly pipeline:

1. OPC Correction (Mask Correction)

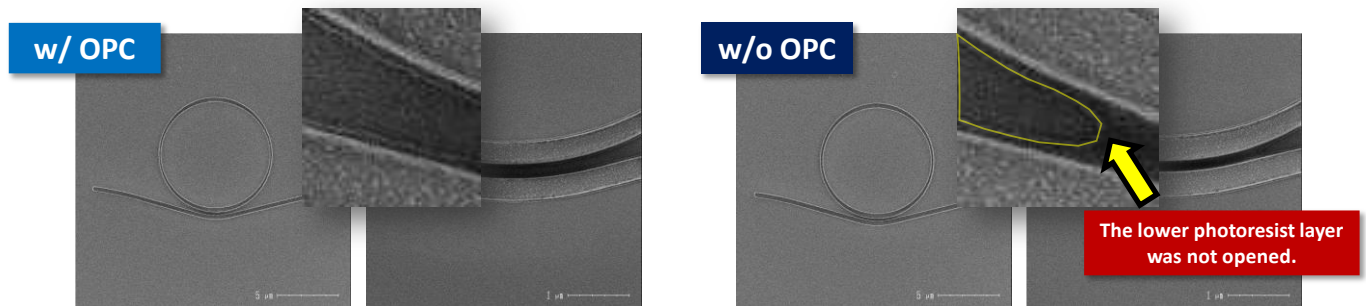
Advanced inverse lithography with contour-based L2 optimization for superior overall pattern fidelity compared to traditional gauge-based EPE correction. Achieves full-mask correction with holistic optimization.

2. Aerial Image Simulation (Computational Lithography)

High-fidelity imaging simulation incorporating user-defined scanner parameters, including wavelength, numerical aperture (NA), spatial resolution, and illumination source configurations.

3. Physical Model Calibration

Fit analytical imaging models to actual lithography processes using CD-SEM data. Accounts for scanner-specific, resist, and process variations to ensure accurate predictive modeling tailored to your fab environment.



Designed for Everyone

Simple GUI • Intuitive Workflow • No OPC Expertise Required

Upload your target layout (GDS/OASIS) and scanner parameters through our web interface. Optionally submit CD-SEM calibration data. Receive corrected mask layouts (GDS/OASIS) ready for manufacturing. Whether you're an experienced OPC engineer or a researcher exploring new photonics designs, OPC+ makes advanced mask correction accessible to all.

Target Applications

Semiconductor Manufacturing	Photonic Integrated Circuits
<ul style="list-style-type: none">• Semiconductor foundries• Fabless design houses• Mask shops• Advanced node development	<ul style="list-style-type: none">• Apodized grating couplers• Metasurfaces and Metalenses• Ring resonators• Curvilinear photonics patterns

Flexible Cloud Infrastructure

Kubernetes-managed hybrid GPU cloud architecture with intelligent job scheduling across heterogeneous resources. Choose your deployment model:

Public Cloud	Private Cloud	Hybrid Model
Access our 12+ GPU cluster with optimal job scheduling	Custom on-premise deployment for maximum IP security	Combine public resources with private infrastructure

Industry Partnerships & Validation

OPC+ is developed by the National Yang Ming Chiao Tung University (NYCU) research team and validated through collaborations with leading institutions:

- Taiwan Semiconductor Research Institute (TSRI)
- University of Southampton, UK
- Cornerstone Research

OPC+ vs Traditional OPC: A Complete Comparison

See how OPC+ Cloud delivers superior performance, flexibility, and business value across every dimension:

Category	Traditional OPC	OPC+ Cloud	Business Benefit
Mask Geometry Support	Manhattan-based (rectilinear only)	Native curvilinear and free-form masks	Preserves optical phase and device performance
Design Conversion	Requires polygon fracturing / Manhattanization	No geometry approximation required	Eliminates layout-induced performance loss
Optimization Method	Local rule-based or windowed optimization	Global inverse optimization	Higher pattern fidelity and CD uniformity
GPU Utilization	Limited or static GPU assignment	Cost-performance-aware GPU allocation	Optimal cost vs. throughput tradeoff
Parallelism	Limited job-level parallelism	CUDA Multi-Stream image-level parallelism	Faster processing of large layouts
Workload Scheduling	Static or FIFO	Two-tier dynamic scheduling	Balanced execution across heterogeneous GPUs
Turnaround Time Predictability	Variable, bottleneck-prone	<2% execution imbalance across nodes	Reliable delivery schedules
Deployment Model	On-prem only	Public, private, or hybrid cloud	Fits foundry security and IT policies
Manufacturing Validation	Logic-centric benchmarks	Validated on photonics and metasurfaces	Proven beyond digital CMOS
Future Readiness	Limited for curvilinear CMOS	Ready for next-generation curvilinear nodes	Enables new process offerings

Start Your Free Trial Today

Experience the power of GPU-accelerated mask correction

🌐 **Platform Access:** <https://nycu-opcplatform.ddns.net/>

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