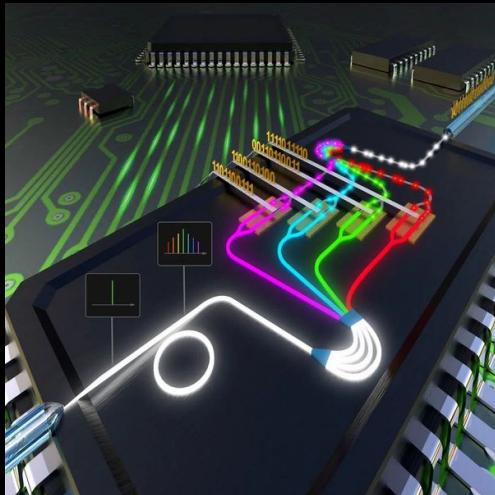


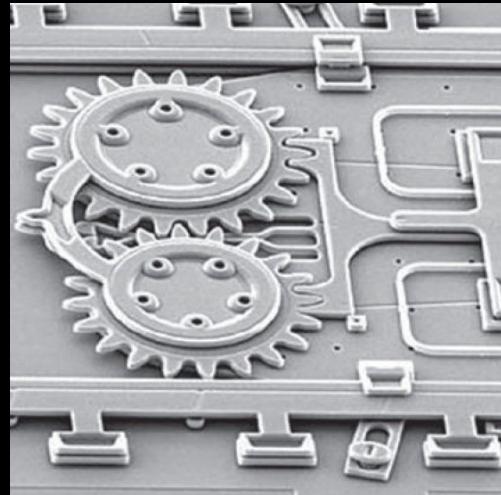
GDS FACTORY



**Photonics**



**Quantum**



**MEMS**



Joaquin Matres



 PsiQuantum

Google

## GDS FACTORY

+2M

Downloads

+80

Developers

+500K

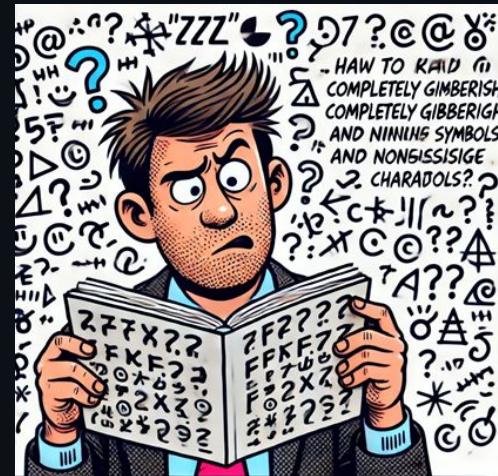
Download growth rate  
(last 5 months)

+15 years experience designing photonic and quantum circuits.

- Transceivers
- Quantum computers
- Free space optical communications

## Why we created GDS Factory

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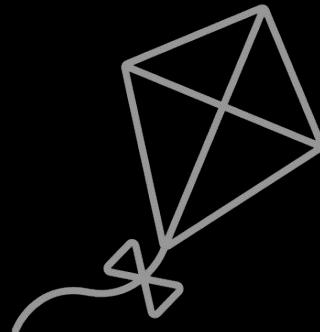
Existing tools did not do  
what we needed

Vendors were slow to  
adapt

Difficult to work in  
proprietary languages and  
ecosystem

## Vision

---



**Make the chip design  
process accessible to  
everyone**

## Overview

---

**+2M**

Downloads

**+80**

Developers

**+500K**

Download growth rate  
(last 5 months)

# Google

# ∞ Meta



**black**  
semiconductor

**M** UNIVERSITY OF  
MICHIGAN

UNIVERSITY OF  
MARYLAND

**Ψ** PsiQuantum

**AIM**  
PHOTONICS



**SRI International®**

**Mit**

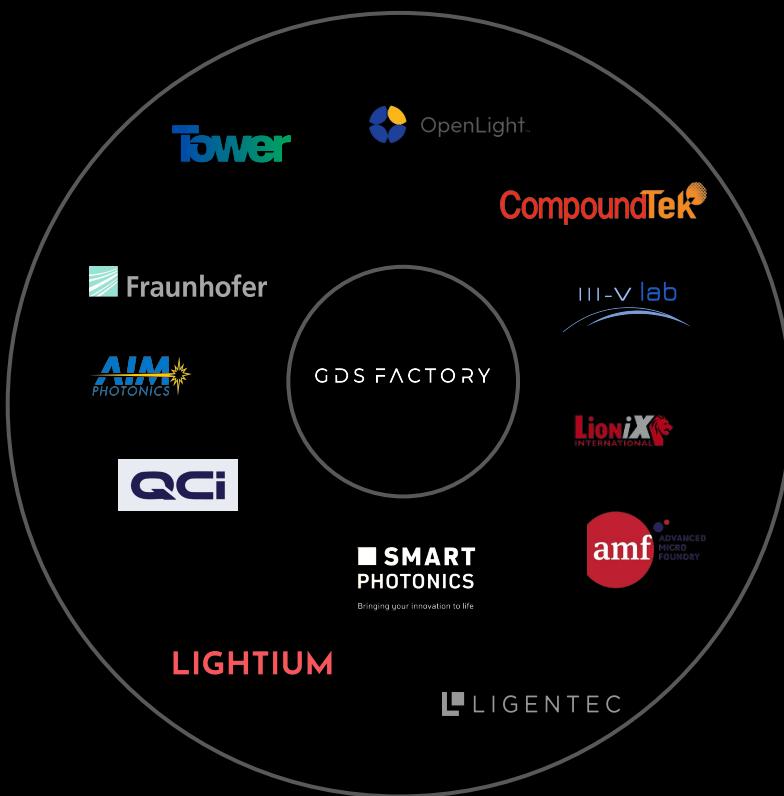
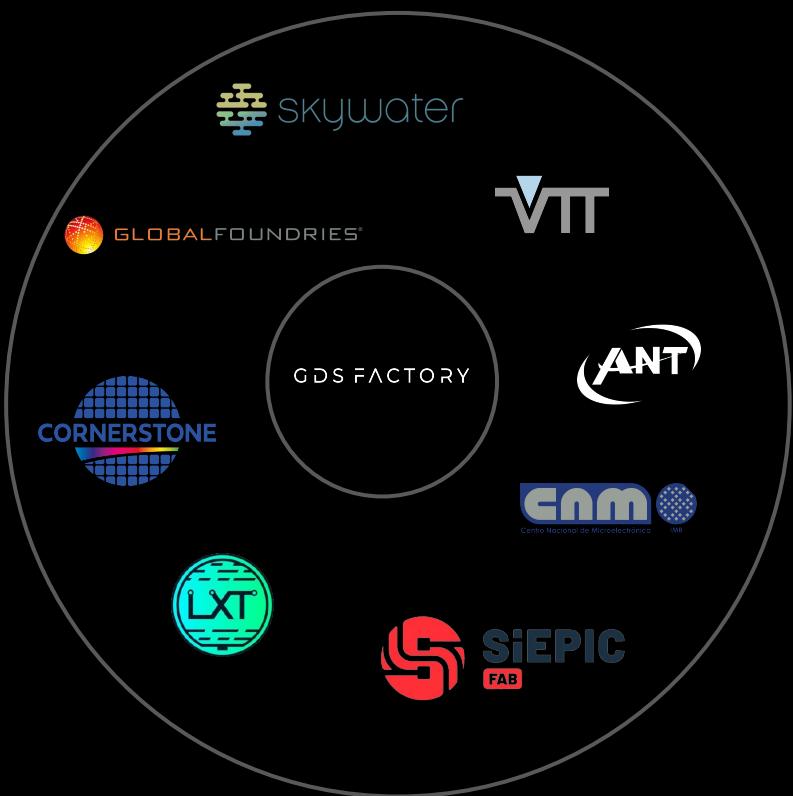
University of  
BRISTOL  
Wolfson Bioimaging Facility

PRINCETON  
UNIVERSITY

Queen's  
UNIVERSITY

# 8 Open Source

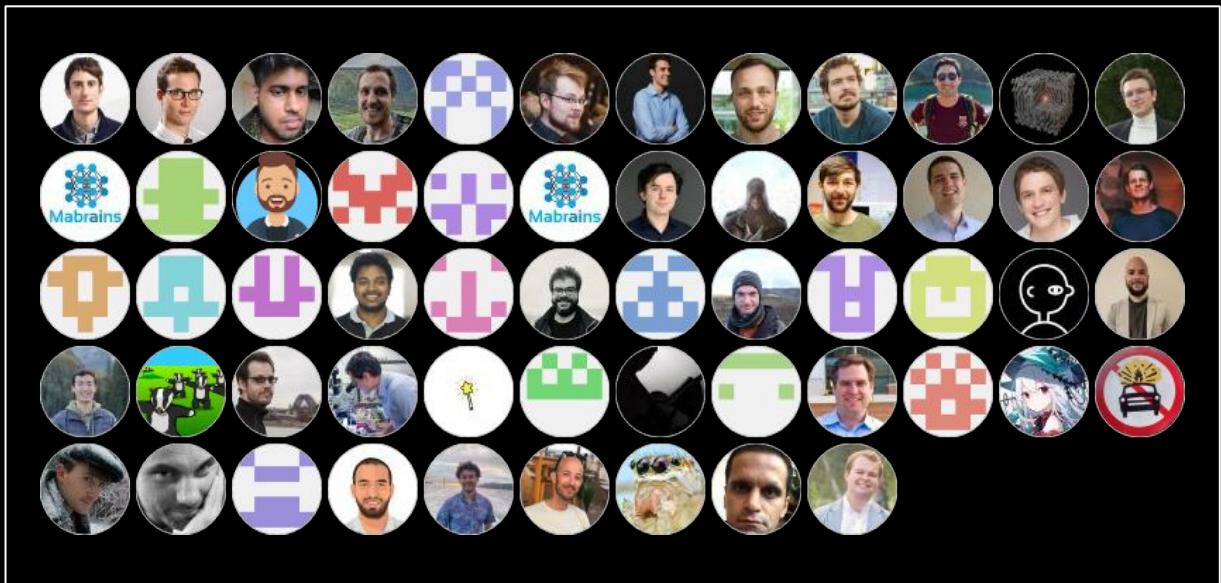
# 12 Under NDA



## Community

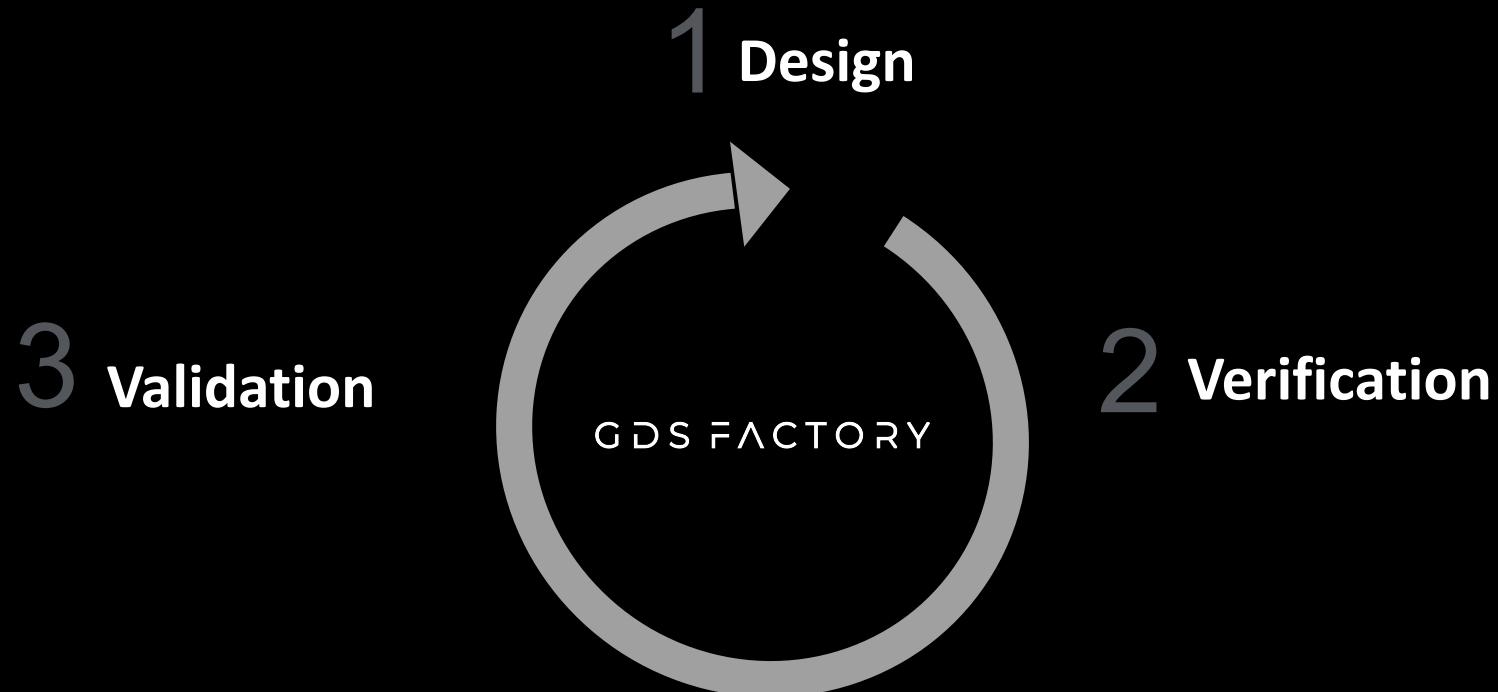
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+80  
Contributors



## Process Overview

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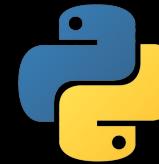
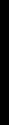


## Performance

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Benchmark	Gdspy	GDS Factory	Speed improvement
10k_rectangles	80.2 ms	4.87 ms	17x
Boolean-offset	187 µs	44.7 µs	4x
Bounding_box	36.7 ms	170 µs	216x
flatten	465 µs	8.17 µs	57x
Read_gds	2.68 ms	94 µs	29x

GDS FACTORY



# Tech

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## 1. Run Python Code

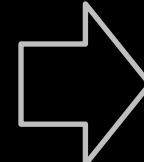
```
import gdsfactory as gf

c = gf.Component()

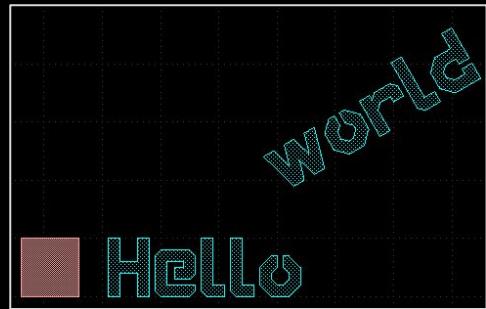
ref1 = c.add_ref(gf.components.rectangle(size=(10, 10), layer=(1, 0)))
ref2 = c.add_ref(gf.components.text("Hello", size=10, layer=(2, 0)))
ref3 = c.add_ref(gf.components.text("world", size=10, layer=(2, 0)))

ref1.xmax = ref2.xmin - 5

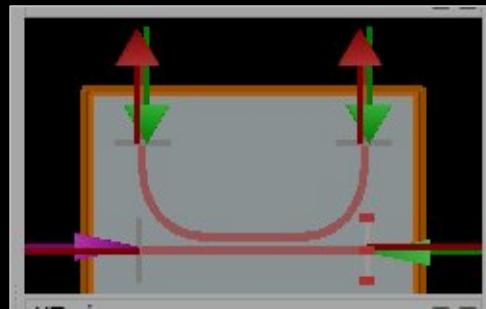
ref3.xmin = ref2.xmax + 2
ref3.rotate(30)
c.show()
```



## 2. Write CAD (GDS, OASIS, STL, GERBER)



## 3. Run simulations

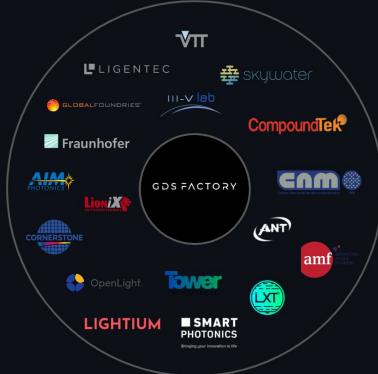


UP TO  
**200X FASTER**

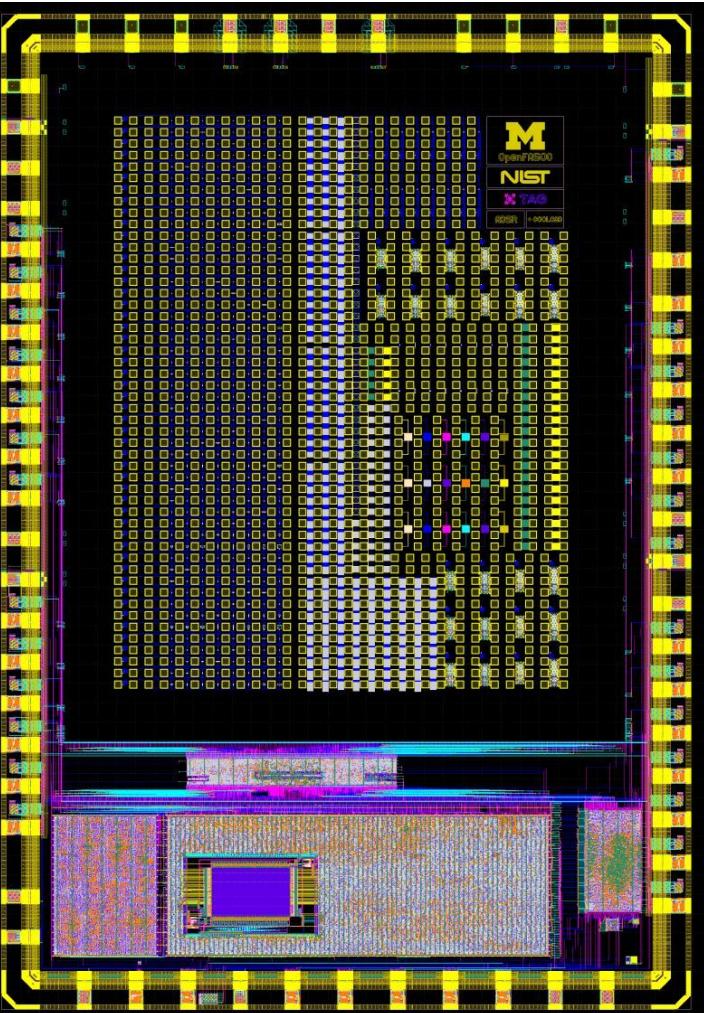


**247 READY-TO-USE  
COMPONENTS**

**20+ FOUNDRY  
PDKS AVAILABLE**



SEAMLESS INTEGRATION WITH  
**20+ TOOLS**



Tuohang Zeng • 1st

MS ECE student at the University of Michigan  
6mo • Edited •

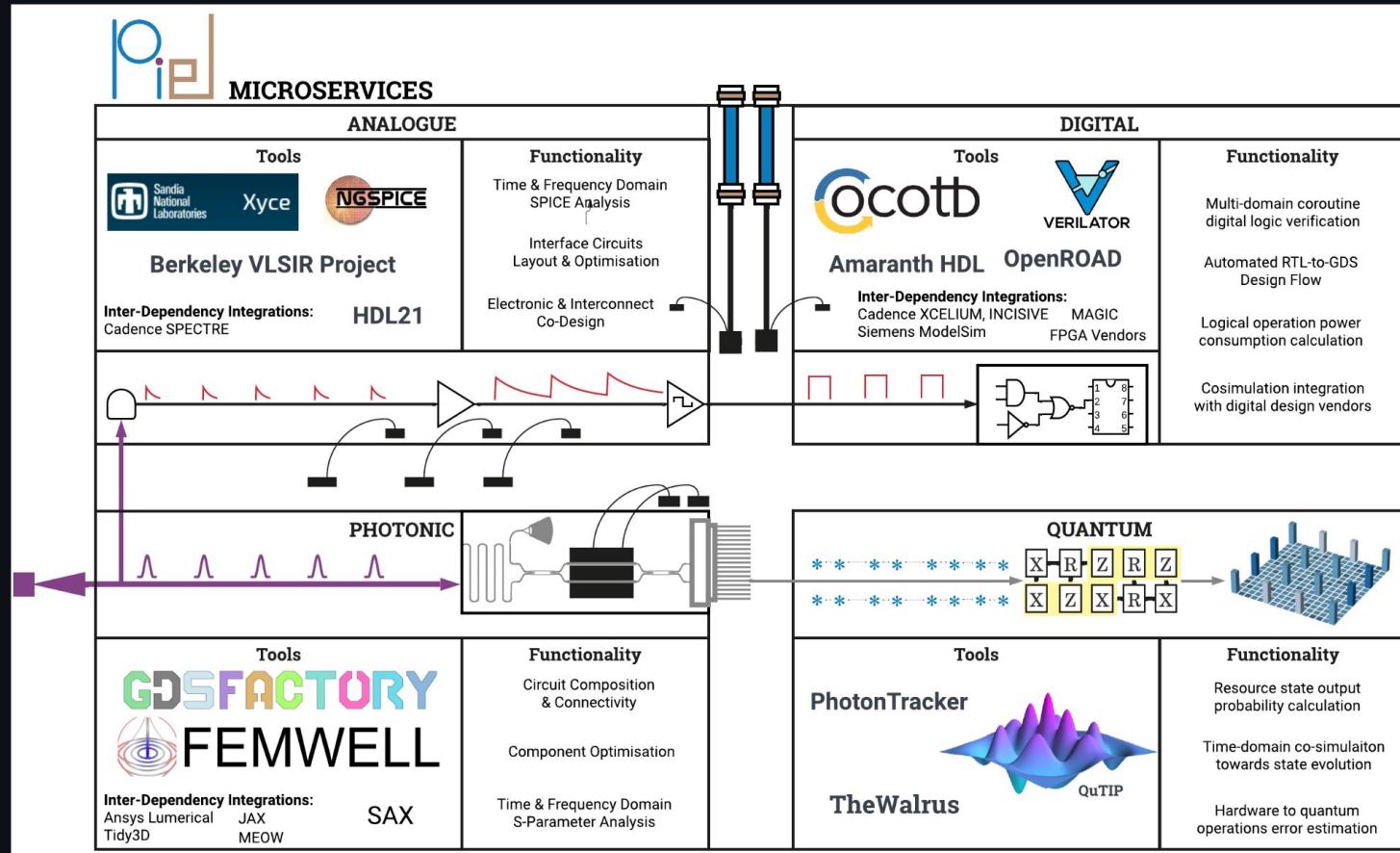
Tape-out submitted! I am excited to complete my first tape-out with [Mehdi Saligane](#) as my advisor at the [University of Michigan](#). This work was done in collaboration with [Brian Hoskins](#) at the [National Institute of Standards and Technology \(NIST\)](#), [David Fleischer](#) at [ADSR, Ltd.](#), and [Akin Akturk](#) at [CoolCAD Electronics LLC](#). Special thanks to [Tim Ansell](#) and [Google](#) for sponsoring the [SkyWater Technology Foundry](#), [Google](#), [Efabless Corporation](#) MPW program!

Our design consists of test structures on the open-source SKY130 PDK. Few stats to highlight:

- ~1400 bare pads
- 400+ transistor test structures
- 30 capacitor test structures
- 24 Ring Oscillators, built on 12 standard cell libraries using OpenFASOC
- 18 line resistance and via chain test structures
- ...

We completed our designs using open-source tools like Magic and KLayout, and heavily used automated flows like OpenFASOC, sitting on top of OpenROAD, and gdsfactory. The goal is to create open-source models at cryogenic temperature and enhance the existing SKY130 models, especially for high-end analog design.

Open-source hardware/EDA has enabled a new level of collaboration in IC design, and we are excited about what open-source PDKs and tools will empower us to do in the future!

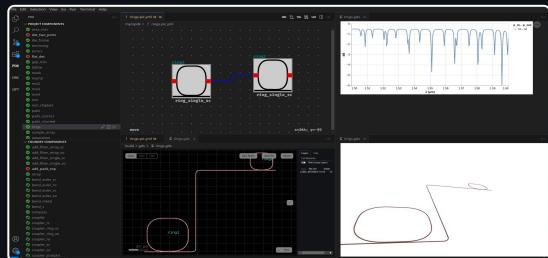


# GDS FACTORY +

# DO DATA

## GUI for Design

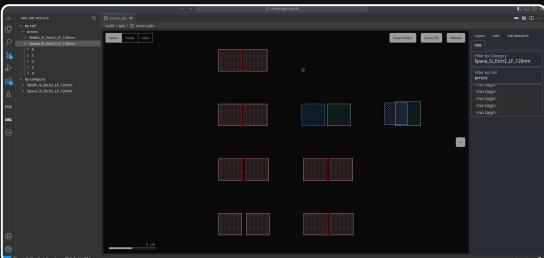
(Simulations, schematics, Layout)



- Up to 200x Faster than other tools.
- **Schematic-Driven Layout:** Effortlessly convert schematics into layouts.
- **Fast Simulations:** Simulate over 1,000 circuit elements in under 10 seconds.

## GUI for Verification

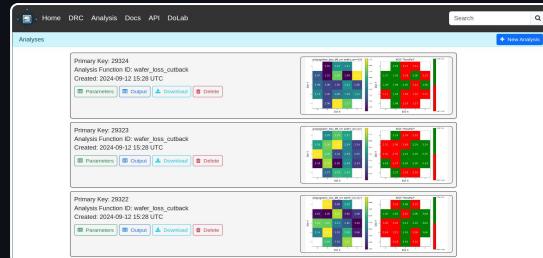
(DRC, LVS)



- **Effortless Setup:** Skip complex IT configurations.
- Run **locally** or leverage the **cloud** for enhanced scalability and efficiency.
- Review DRC and LVS errors in the same interface

## Validation

(Data analysis)



- Build statistical models
- Device, die, wafer, lot analysis
- Store and visualize measurements and simulations

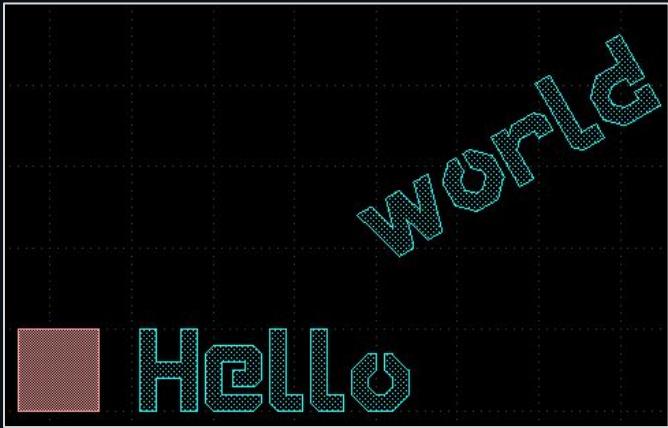
Questions?

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# Demo!

## Demo Overview

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Challenge:

Design an optical filter @ 1550 nm

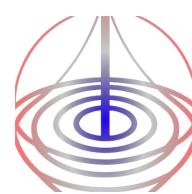
Broadband input



RF/Optical filter

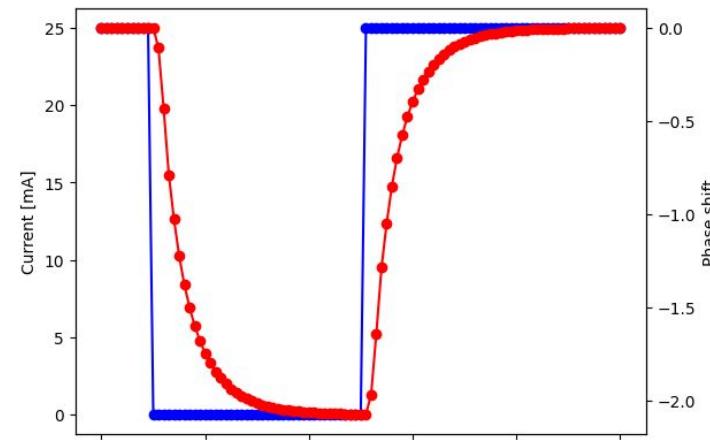
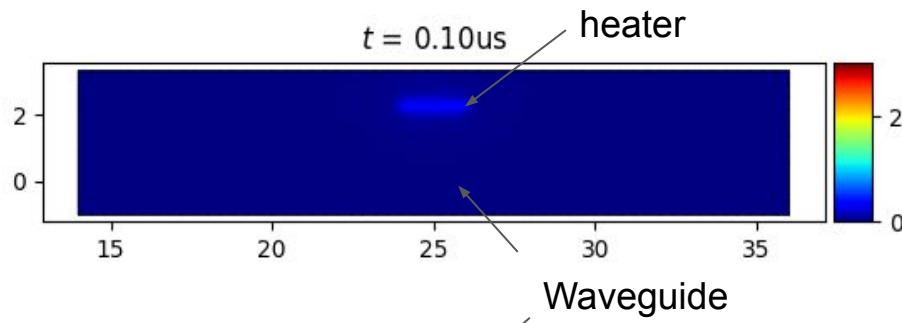
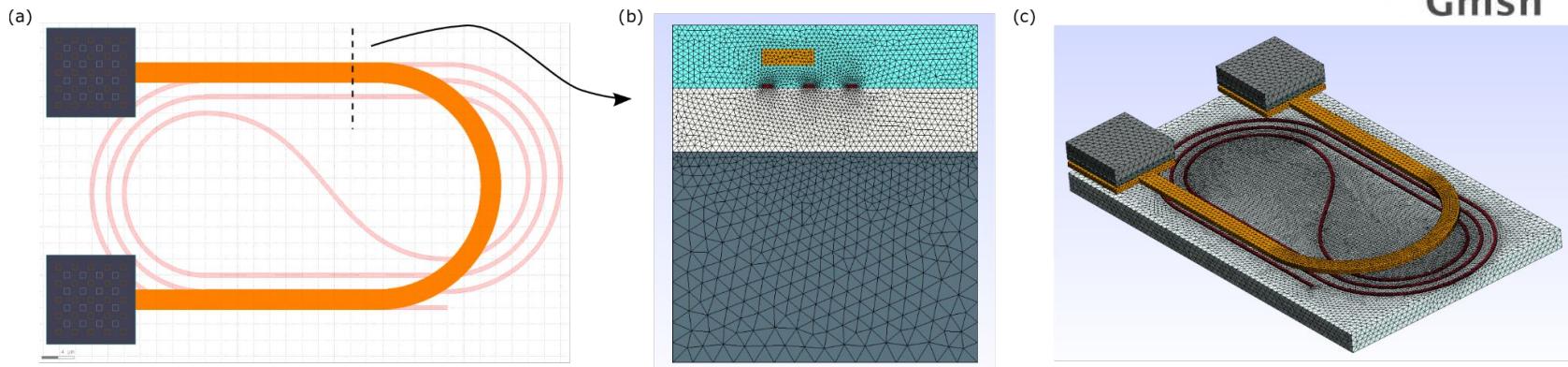
Output @ 1550 nm





# FEMWELL

Multi-physics FEM solver



**Questions?**

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# CONTACT US

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[Contact@gdsfactory.com](mailto:Contact@gdsfactory.com)