

# HOT Chips 2024: AI Assisted Hardware Design

Will AI Elevate or Replace Hardware Engineers?

Bryan Chin (UCSD), Mark Ren (NVIDIA) , Stelios Diamantidis (Synopsys),  
Hanxian Huang (UCSD) , Jishen Zhao (UCSD)

# What is AI assisted hardware design?

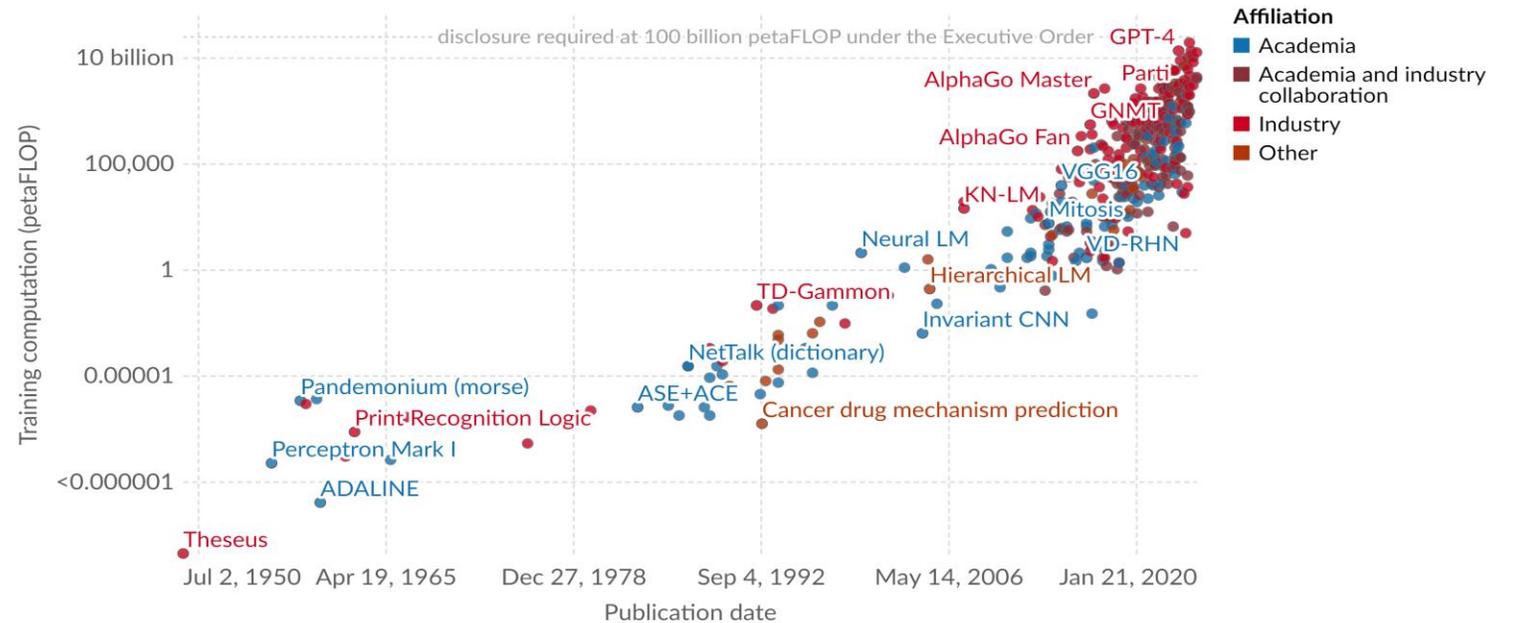


Our World in Data

Accelerating Pace of all things "AI" (training flops)

## Computation used to train notable AI systems, by affiliation of researchers

Computation is measured in total petaFLOP, which is  $10^{15}$  floating-point operations<sup>1</sup> estimated from AI literature, albeit with some uncertainty. Estimates are expected to be accurate within a factor of 2, or a factor of 5 for recent undisclosed models like GPT-4.



Data source: Epoch (2024)

OurWorldInData.org/artificial-intelligence | CC BY

Note: The Executive Order on AI refers to a directive issued by President Biden on October 30, 2023, aimed at establishing guidelines and standards for the responsible development and use of artificial intelligence within the United States.

1. Floating-point operation: A floating-point operation (FLOP) is a type of computer operation. One FLOP represents a single arithmetic operation involving floating-point numbers, such as addition, subtraction, multiplication, or division.

“Data Page: Computation used to train notable artificial intelligence systems”, part of the following publication: Charlie Gialino, Edouard Marnieu, Veronika Sambovska and Max Roser (2023) - “Artificial Intelligence”. Data adapted from Epoch. Retrieved from <https://ourworldindata.org/grapher/artificial-intelligence-training-computation> [online resource]

# Today's Tutorial

Introduction to AI for Chip Design

Mark Ren (NVIDIA)

8:30

- 
- AI-driven Optimization for Chip Design  
Stelios Diamantidis (Synopsys)
  - LLM and Retrieval Augmented Generation and Chip Design  
Hans Bouwmeester (primis.ai)

~10:30

- 
- Domain-adaptive LLM for Chip Design Tasks  
Hanxian Huang (UCSD)
  - LLM Agents for Chip Design  
Mark Ren (Nvidia)

~11:00

Q&A time permitting

12:15

12:30

# Takeaways

For which kinds of tasks is AI well suited today

What is likely to happen soon with AI and chip design

"Will AI Elevate or Replace Hardware Engineers?"

*what do you want to learn more about to make your own prediction*