Intelligent Infrastructure Powering the Intelligence Revolution

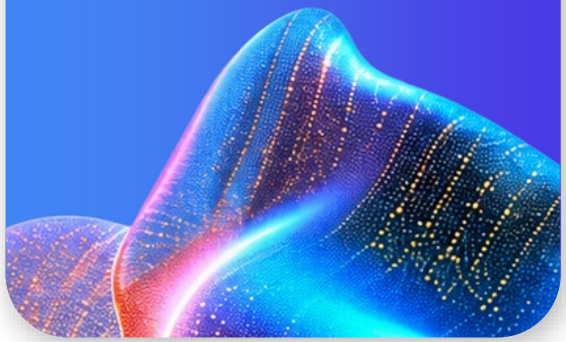
Partha Ranganathan



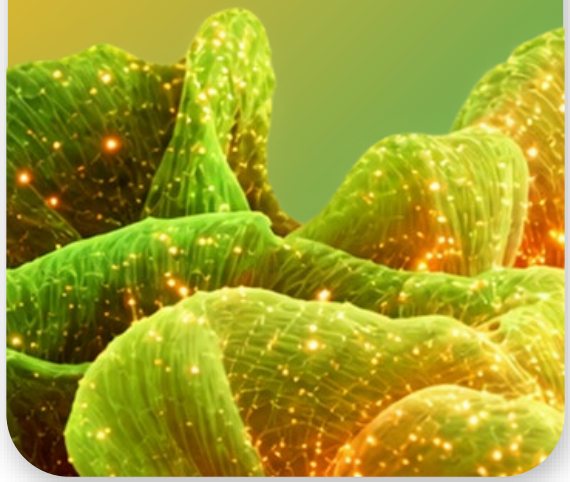
OCP GLOBAL SUMMIT

October 12-15, 2026
San Jose, California

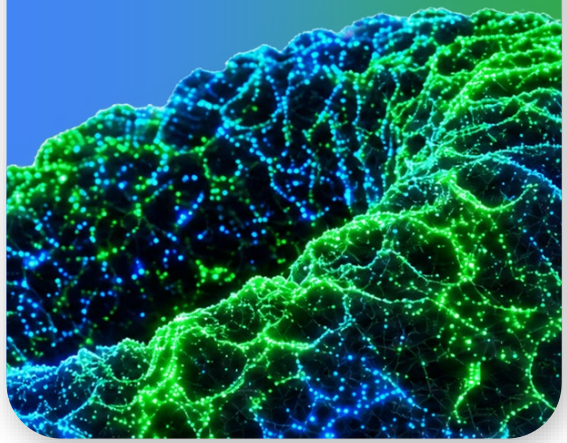
Intelligence



Infrastructure for Intelligence



Intelligent Infrastructure for Intelligence



Industry Innovation for Intelligent Infrastructure



We are in extraordinary times - the intelligence era

Artificial intelligence is transforming all aspects of our life
health, software, engineering, education, productivity, creativity, entertainment...



Google Cloud


“If AI researchers are space explorers discovering new worlds, we are the ones building the rockets”
Extraordinary advances need extraordinary infrastructure

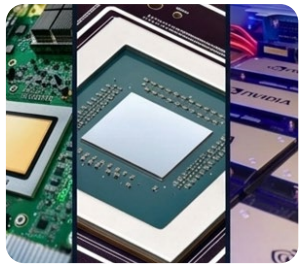
Computing, reimagined across the full AI stack



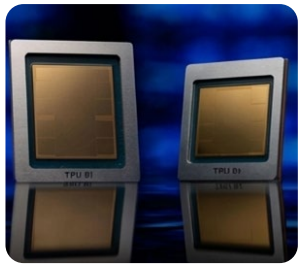
Radical AI System Innovations



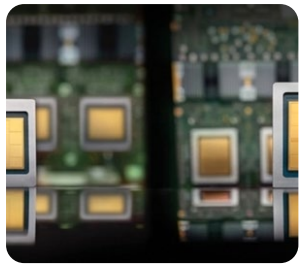
Circa 2003



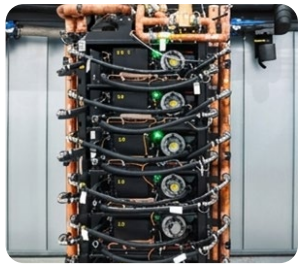
Silicon accelerators
TPUs, Axion & GPUs



HBM
288GB co-packaged



Vertical power
Through-substrate BGA



Liquid cooling
Deschutes CDU loops



ICI
Multi-TB/s torus fabric



Optics
Palomar MEMS OCS



Densification
100kW+ 3D pods

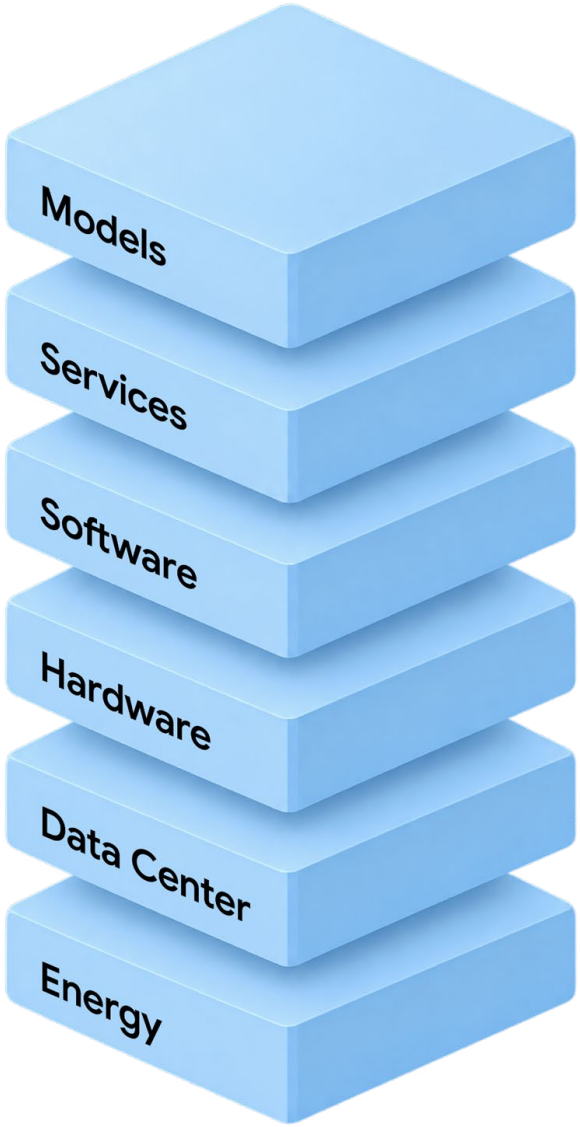


3P data centers
1P & 3P GW campuses

10x

100x

System Efficiency
(perf, power, cost
across generations)



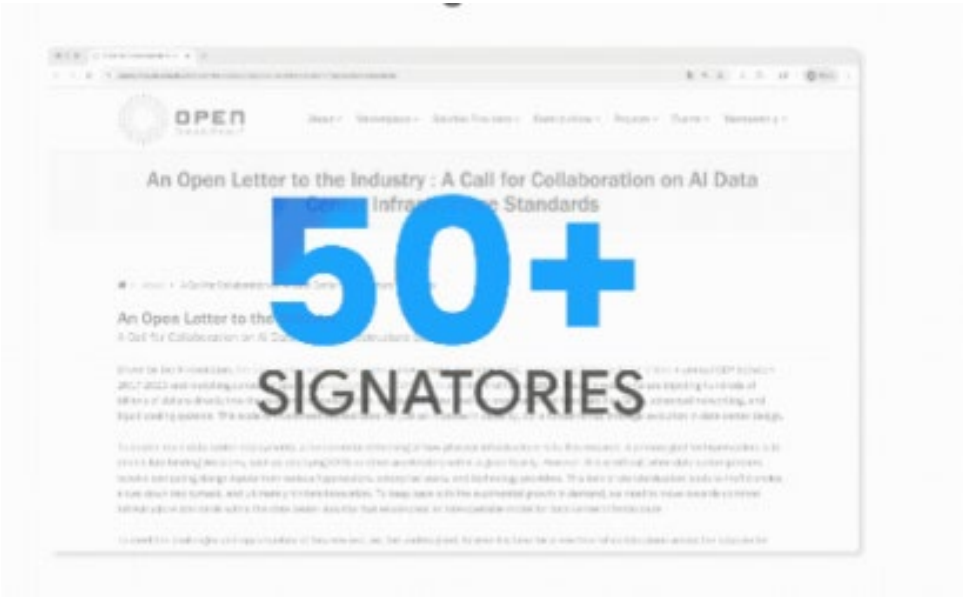
From ability to agility

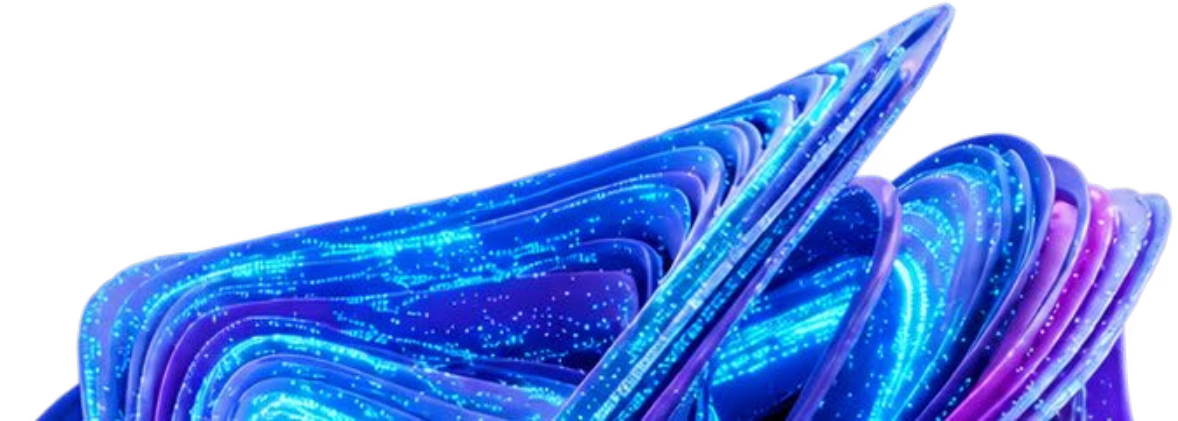
Last year, we called on the community to do more...

Agile fungible systems for AI



And the ecosystem stepped up...



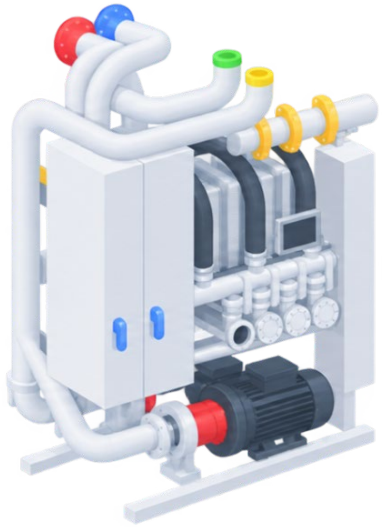


From Atoms to Bytes:
Open Data Centers and Systems



Diablo 400V Disaggregated Power

Google · Meta · Microsoft



Project Deschutes CDU Cooling

Google



Falcon Networking

Google · NVIDIA

Sustainable open data centers:
Water and Power Grid Frameworks

Net Positive Replenishment

Community Infrastructure Funding

Public Transparency

Alternative Water Sources

Context-Driven Cooling

Responsible water stewardship commitments



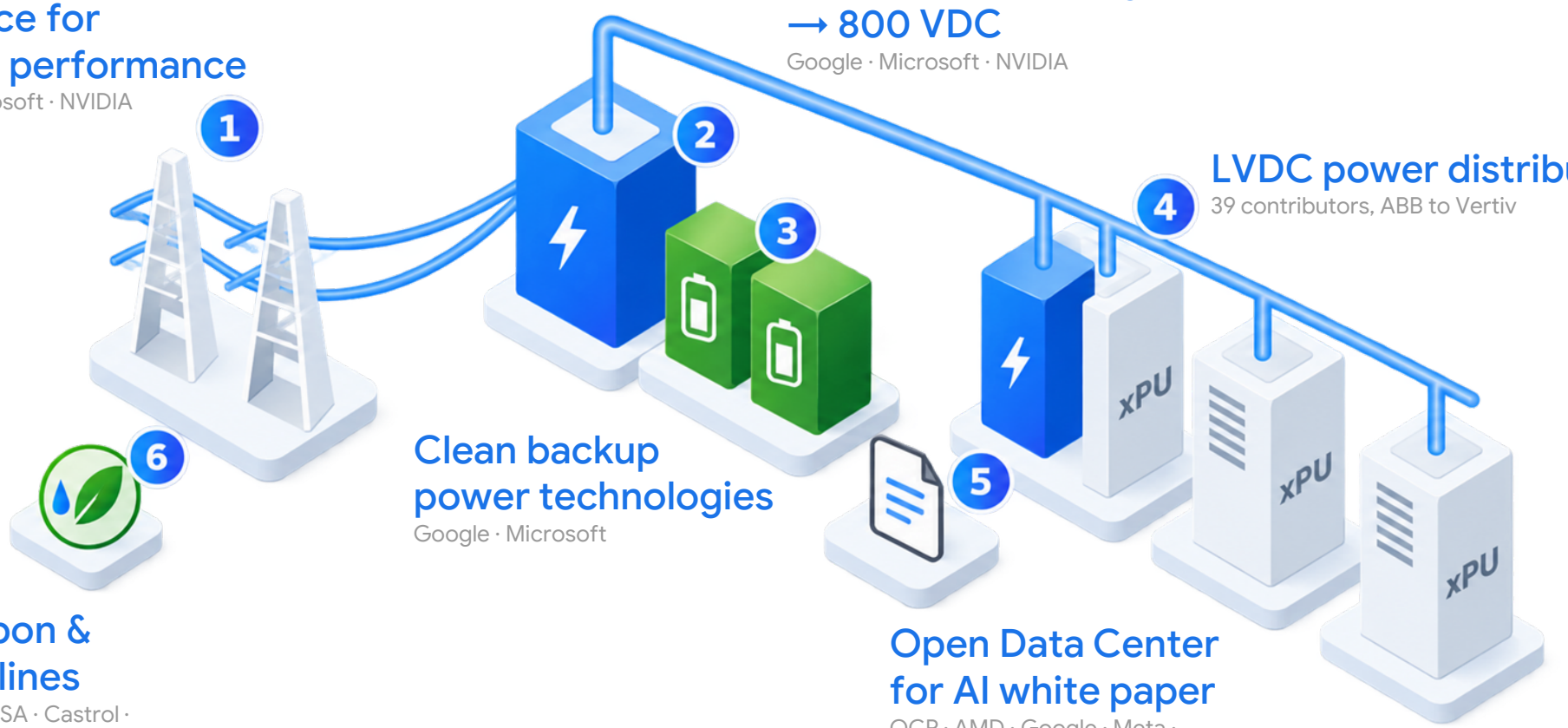
Demand response with utilities/grids

And many many more...

Grid interface for disturbance performance
Google · Meta · Microsoft · NVIDIA

SST: medium voltage → 800 VDC
Google · Microsoft · NVIDIA

LVDC power distribution
39 contributors, ABB to Vertiv



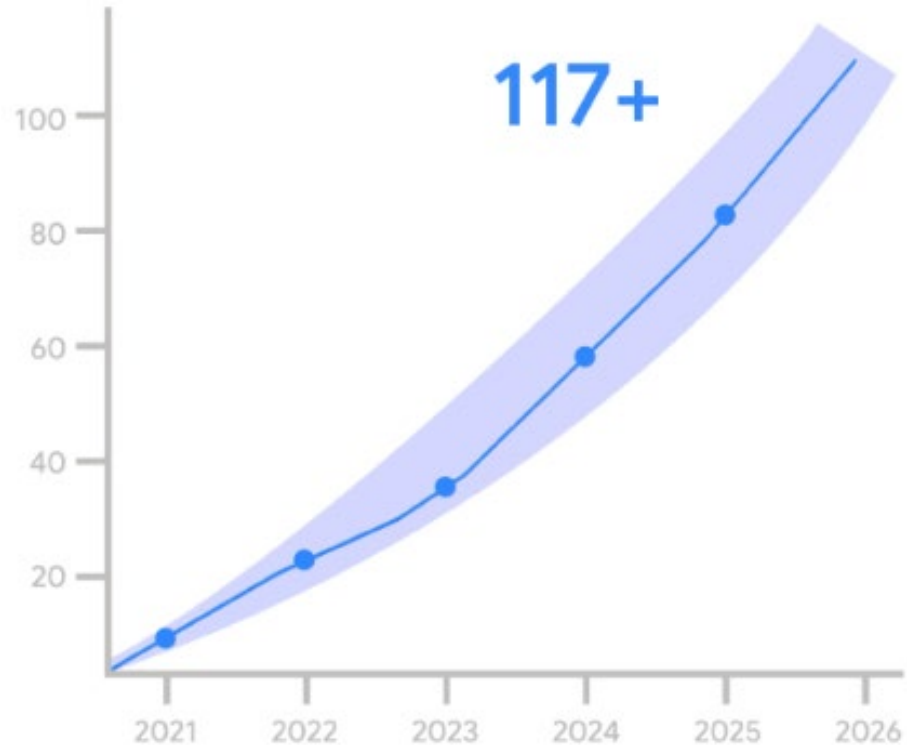
Clean backup power technologies
Google · Microsoft

Energy, carbon & water guidelines
Villanova · Google · GSA · Castrol · LiquidCool · Submer · Hscale

Open Data Center for AI white paper
OCP · AMD · Google · Meta · Microsoft · NVIDIA · Oracle

Google

OPEN
Compute Project ®



Looking ahead to

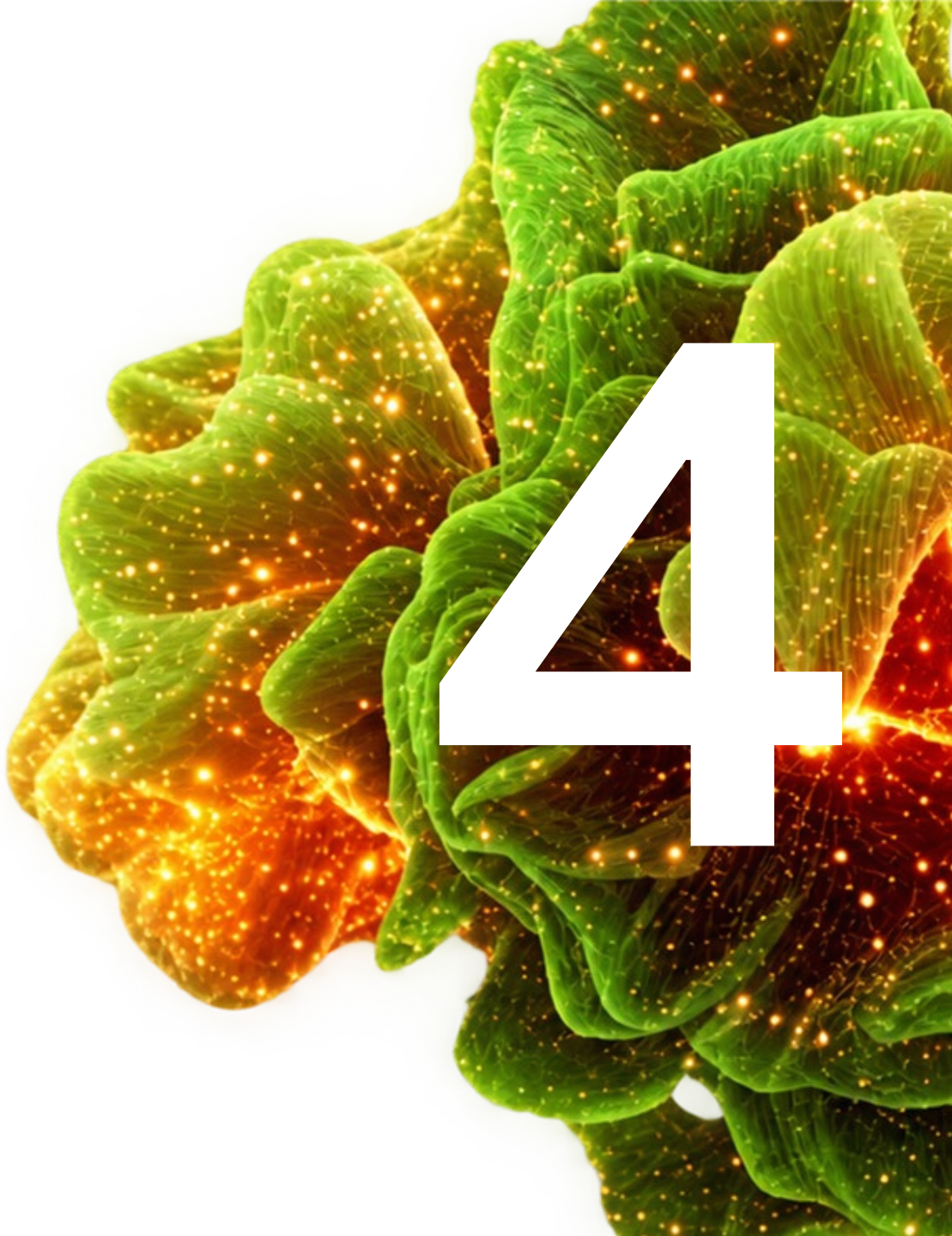
The next big inflection intelligent infrastructure



From “systems for AI” to “AI for systems”

Four vignettes from across the stack

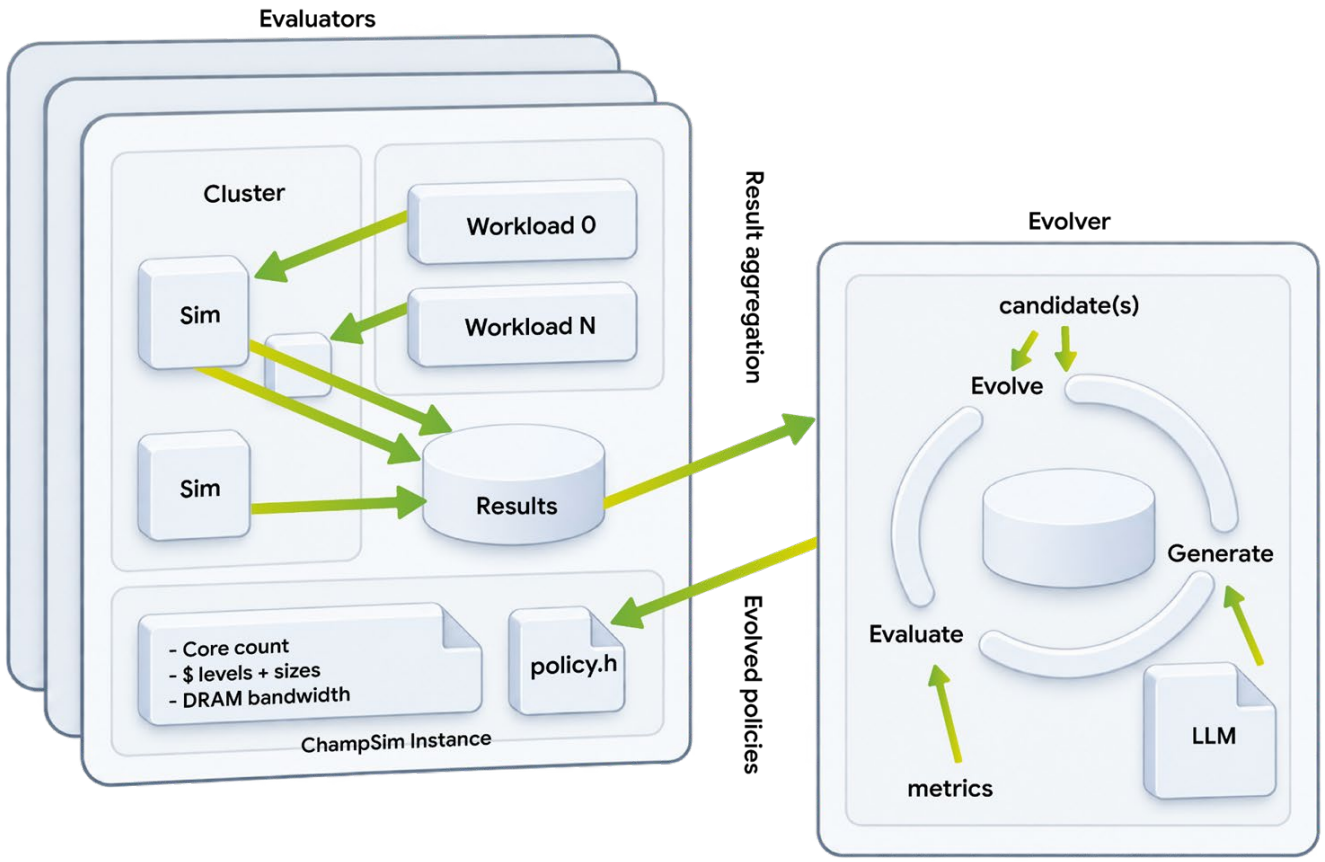
1 2 3 4



Vignette 1: AI to transform systems hardware

Evolutionary agents to discover new computer architectures

AlphaEvolve for evolutionary LLM-guided search
New ideas & championship-winning benefits

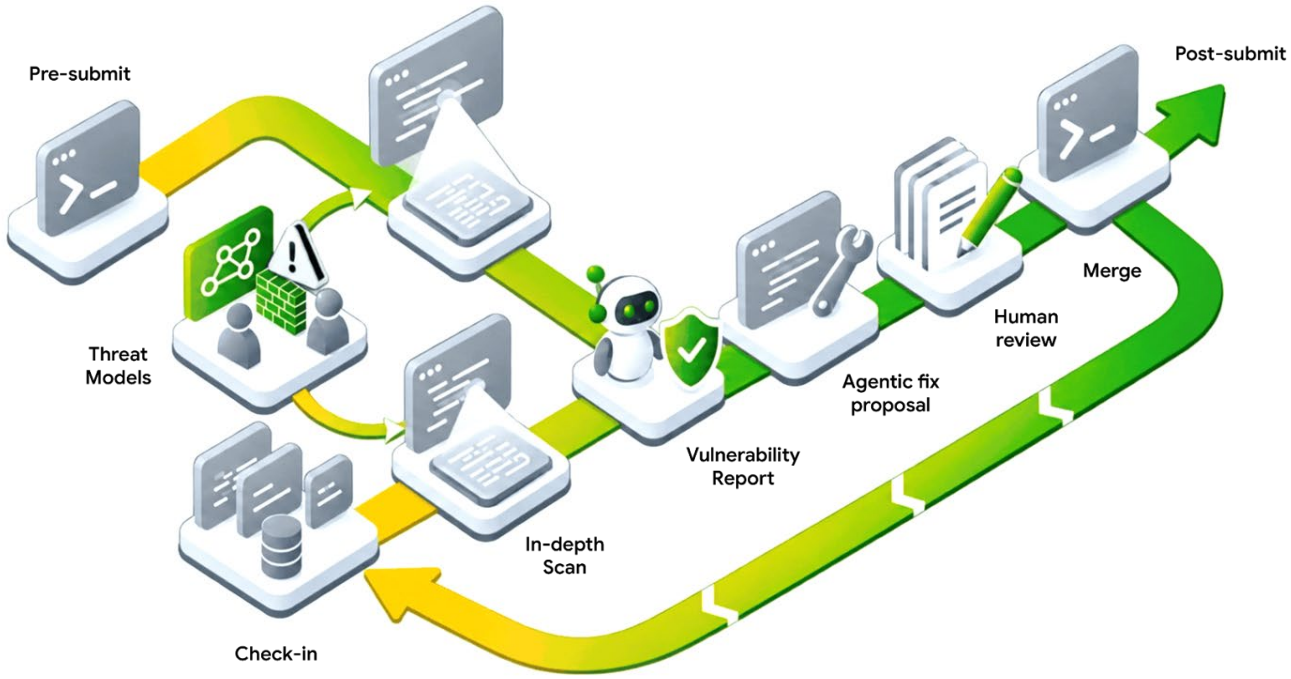


https://arxiv.org/abs/2602.22425

Vignette 2: AI to transform systems software

Pervasive agentic security check and bug fix in software development lifecycle

Every code change scanned before merge
92% precision with seconds of scan time
Mantis open sourced to community

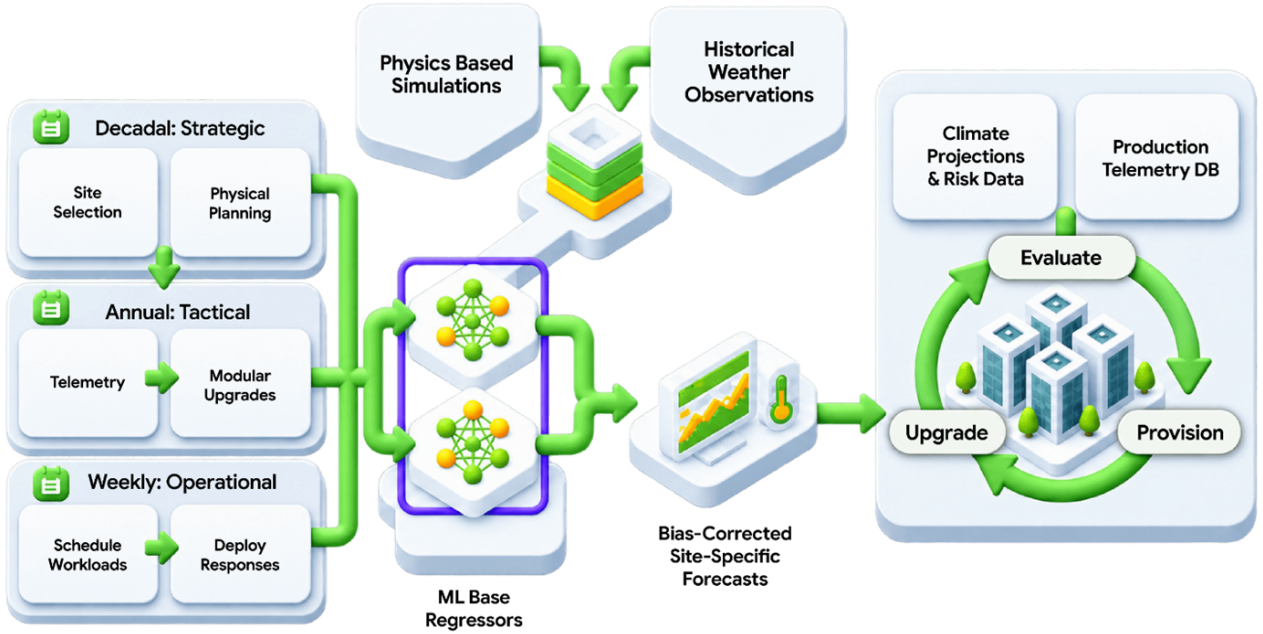


https://cloud.google.com/blog/topics/systems/using-ai-agents-to-secure-google-infrastructure

Vignette 3: AI to transform data center design

AI-enhanced models for extreme weather event prediction

Right provision costs of infrastructure vs risks of downtime. Site-specific multi-epochal modeling. Applied to Google data centers. Methodology opened to community.



https://ieeexplore.ieee.org/document/11617528/

Vignette 4: AI to transform data center operations

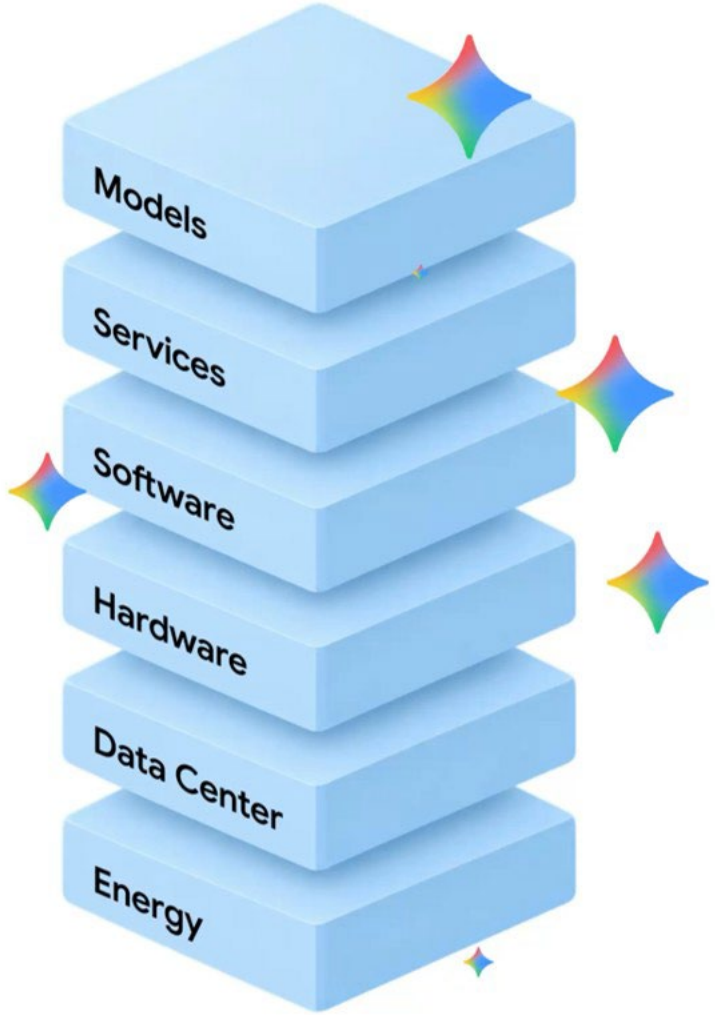
AI-automation for data center operations & capacity delivery

Accelerate & amplify data center capacity by automating drudgery & toil; increased safety and speed



Many more opportunities ahead...

Everything tastes better with a sprinkle of AI!



Intelligent Infrastructure Igniting Industry Innovation



I



YOU

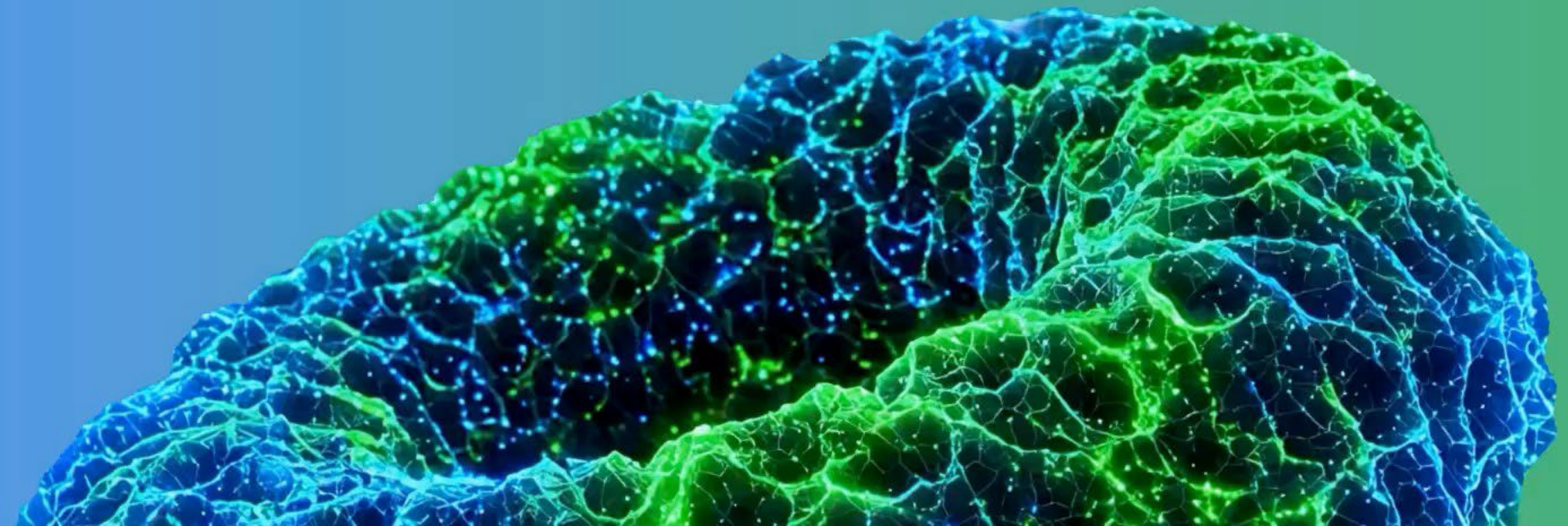


US

Impressive → Useful → Sustainable

Industry Innovation for Intelligent Infrastructure

Call to Action



Call to action 1

Responsible AI

Secure by default, private by design

Tiers of checks & balances to address hate, harm, hallucinations
Information quality, Explainable AI

Partnerships & communities

AI principles, Responsible AI practices
Partnerships with governments, industry, civil society, researchers



Call to action 2

Systems for AI for systems

Data collection & design challenges

Lack of high quality datasets and simulation, data sparsity, +ve/-ve datasets and perturbation for space expansion, generality

Systems challenges + ML challenges

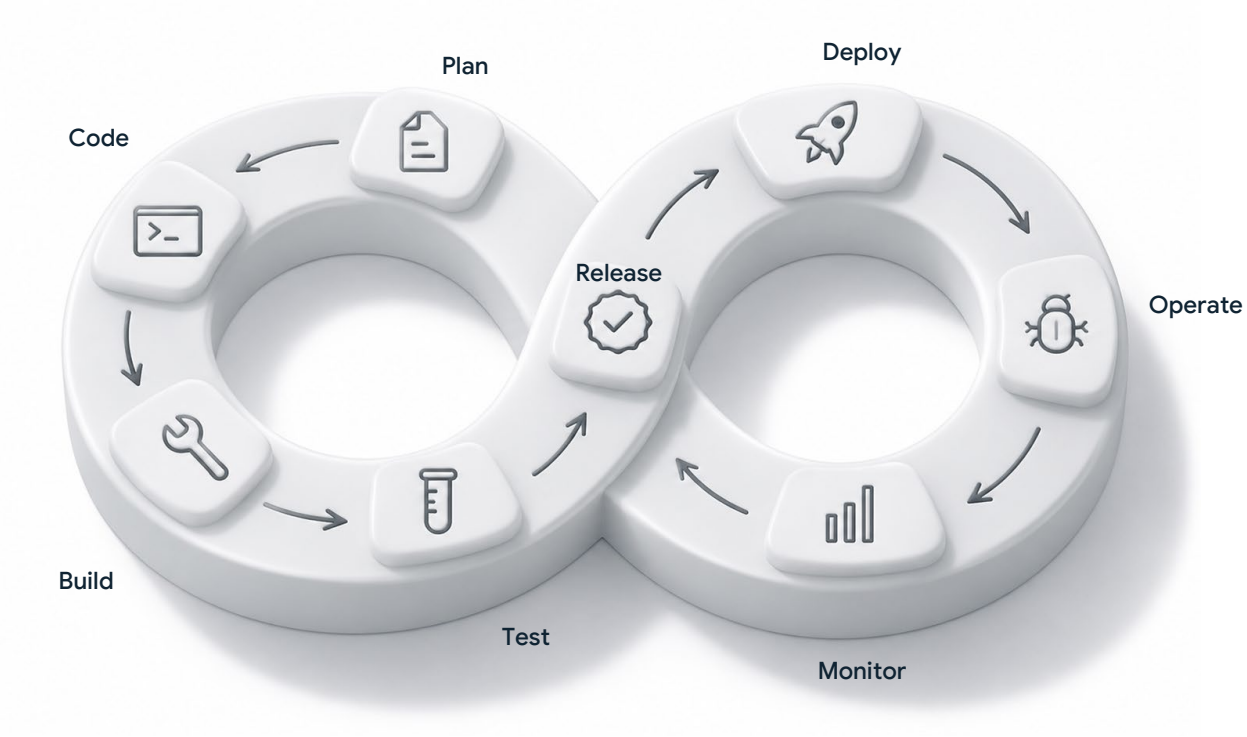
Objectives, monitoring, perturbation, safety, autotuning; denormalization, latency (human assists), increased search space for codesign, scale, ...

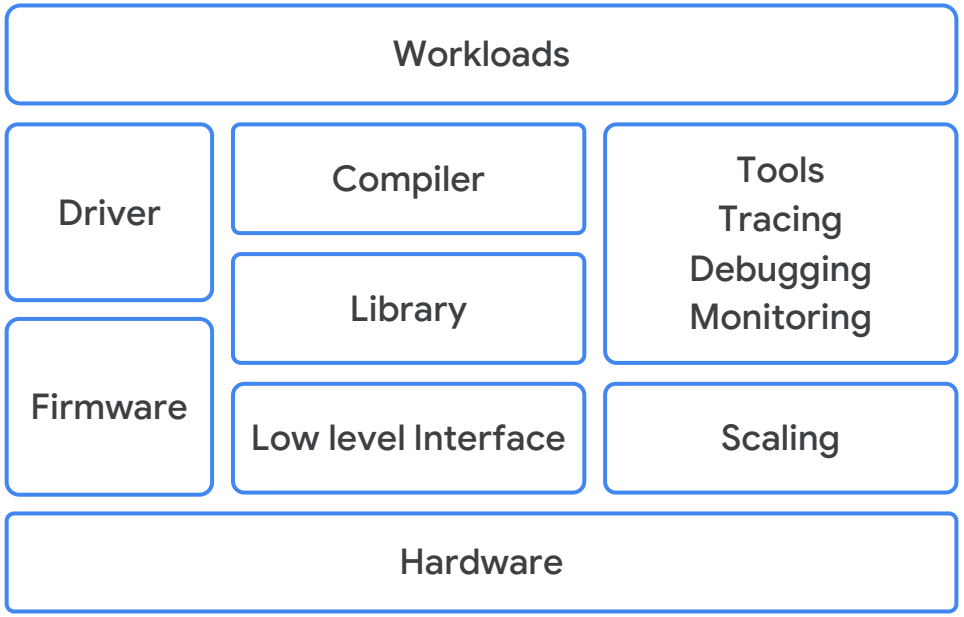


Call to action 3

Full-stack (re)design

The 10x problem & rethinking interfaces for the AI-infused workflow





Call to action 4

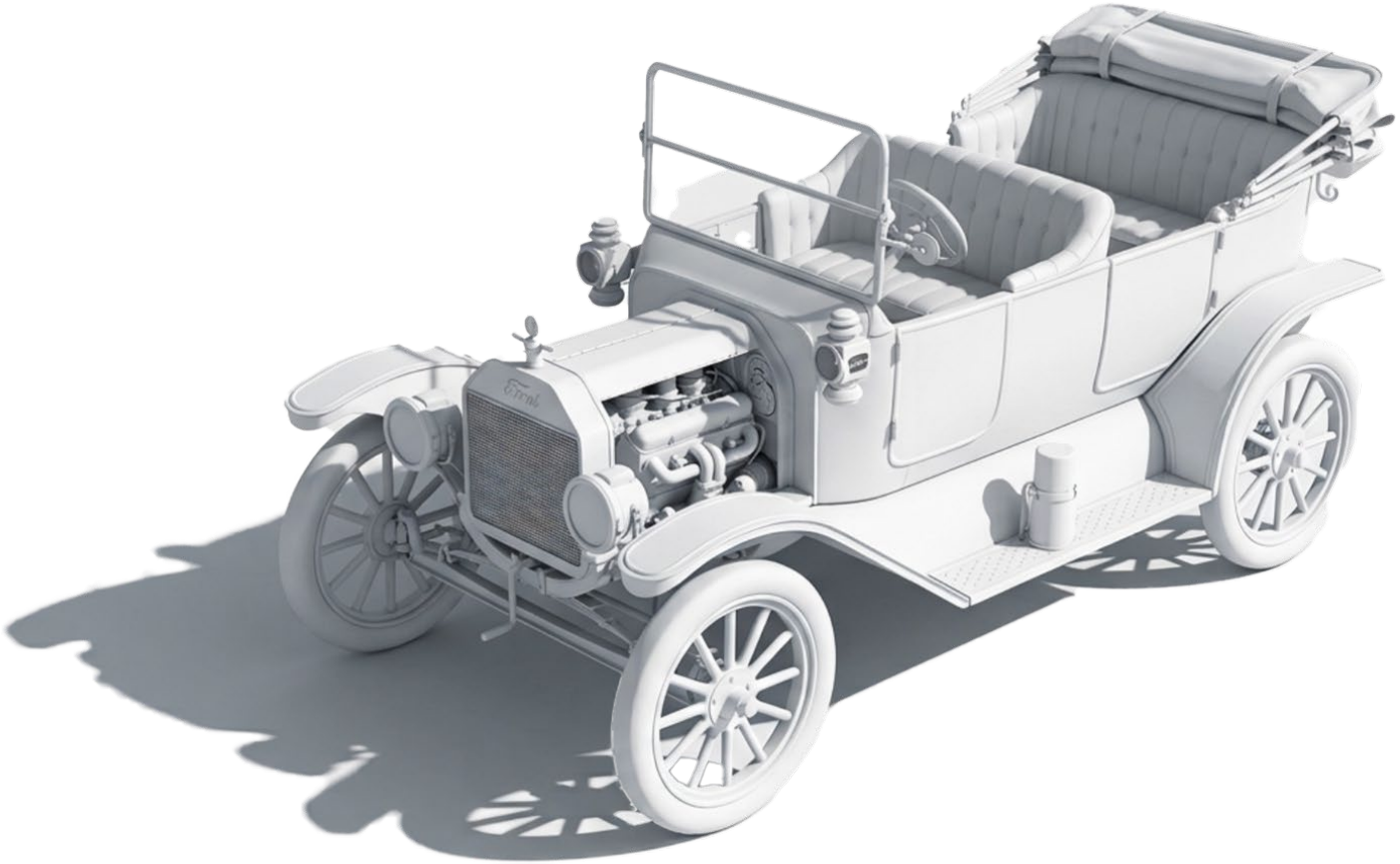
AI-native innovations

Replicate | AI-lift & shift

Recombine | AI-augmented

Reimagine | AI-first

Reinvent | AI-native



Online albums → Single songs → Subscriptions → YouTube shorts

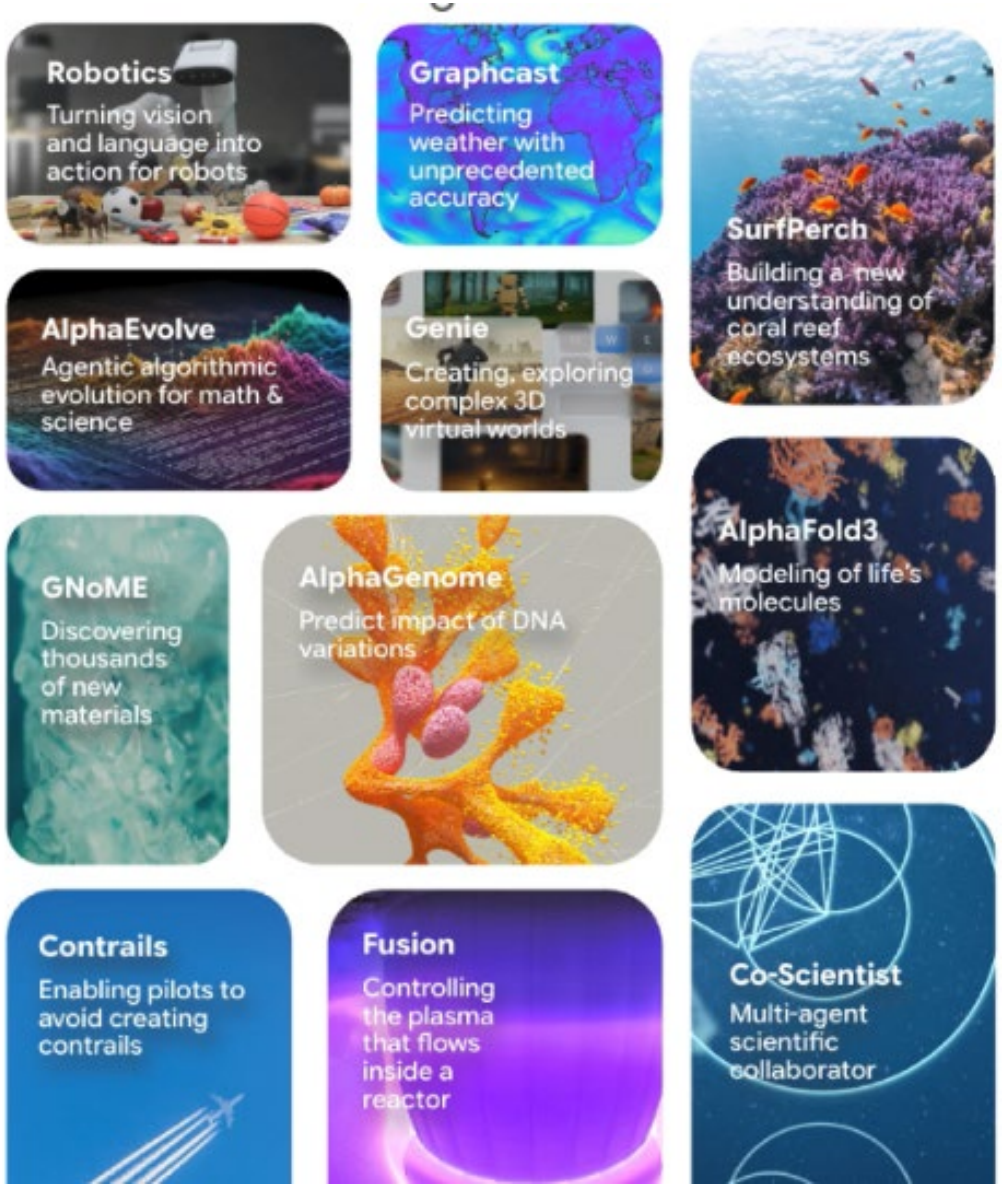
Extraordinary AI advances & extraordinary infrastructure



We are in extraordinary times

AI & Science

Artificial intelligence is transforming all aspects of science & society



We are in extraordinary times

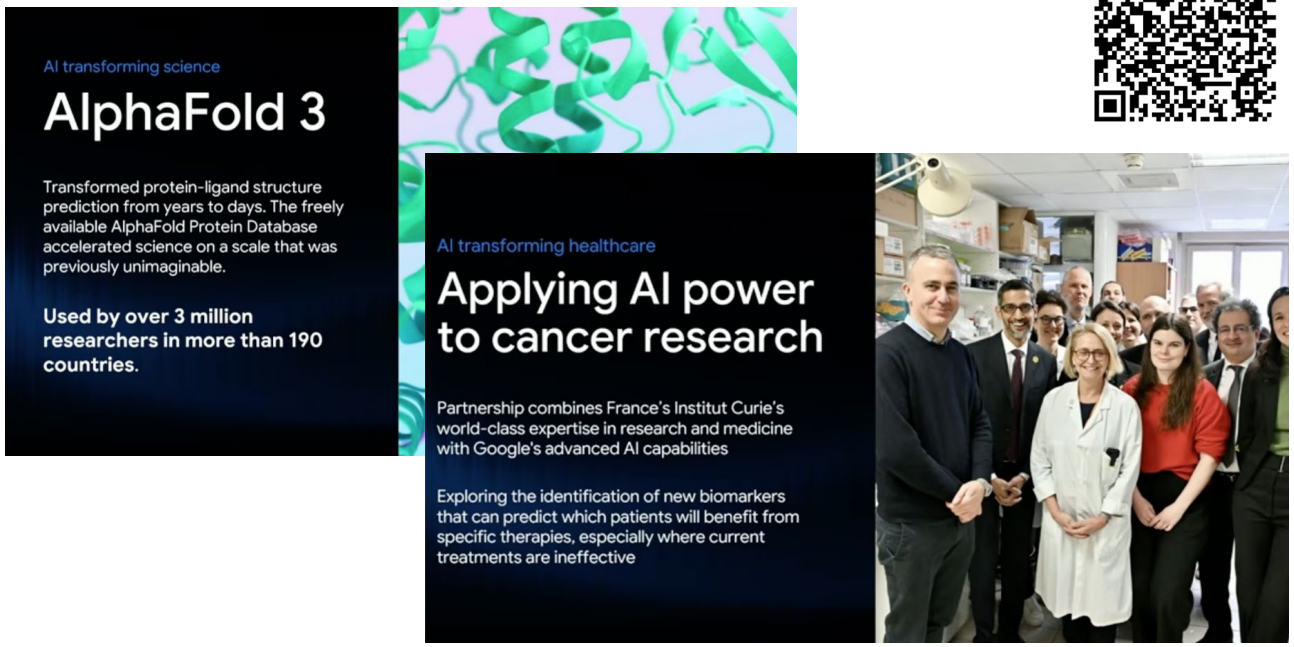
AI & Science

Artificial intelligence is transforming all aspects of science & society

Empowering researchers to solve biological mysteries

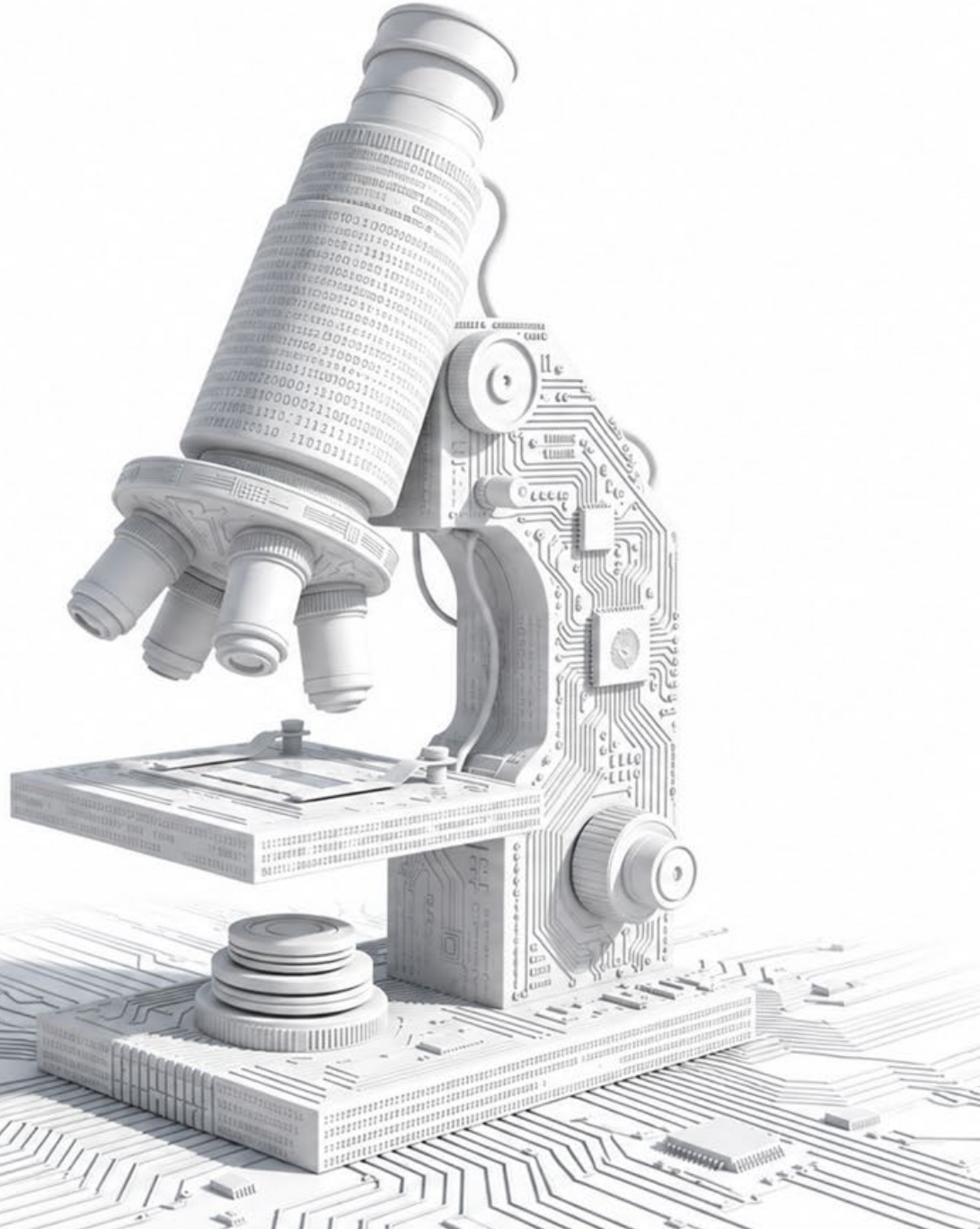
AlphaGenome is already helping scientists advance their research.

coding variants. Application of the combined Atlas resource helped solve an epileptic encephalopathy rare disease case, increased the statistical power to detect rare non-coding variants driving population-level



If AI researchers are deciphering the code of life,

we are the ones building the microscopes!



Intelligent Infrastructure for the Intelligence Era

Join us on the journey!

