

Thank you!

to the regulators, inspectors, and scientists who keep our meals safe.

Every safe meal begins with a decision someone in a room like this made first.

JIFSAN-CFS³ ANNUAL SYMPOSIUM

AI – Looking Forward of Where We're Going

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What is Amazon?

DAY 1 MENTALITY: CUSTOMER OBSESSION, LONG-TERM THINKING, WORKING BACKWARDS

300M+
Active customers worldwide

200+
Countries served

500M+
Grocery items sold per year

- Amazon evolved from retail → cloud → healthcare → logistics → AI
- Operates Whole Foods, Amazon Fresh, sells 500M+ grocery items/year
- Food safety is core to the business, not abstract
- Same technology powering Amazon at scale, available to government & industry partners



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Working Backwards is Amazon's product development process

Fulfillment & Delivery
500M same day deliveries in FY25



Devices
Over 600M powered by Alexa/Echo



Robotics
Over 600K robots in production use



Primary Care Network
815K One Medical and Pharma members



Communications
Amazon Leo 3,200 satellites planned



Drone Mobility
30M people in delivery area



Physical Retail
550 Stores with 100 coming



Autonomous Vehicles
Zoox 5,000 robotaxis approved



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Amazon Web Services (AWS) powers Amazon

Cloud computing delivers IT resources on demand over the Internet with pay-as-you-go pricing—replacing the need to own and maintain physical data centers and servers.

EXPERIENCE

19 years
helping millions of customers

GLOBAL REACH

36 Regions
spanning 114 Availability Zones

SECURITY

300+
security features

INNOVATION

200+
service offerings

LARGEST COMMUNITY

140.000+
partners from more than 200 countries and territories

TCO

151
price reductions since 2006

“There is no compression algorithm for experience.”



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Evolving Agentic AI

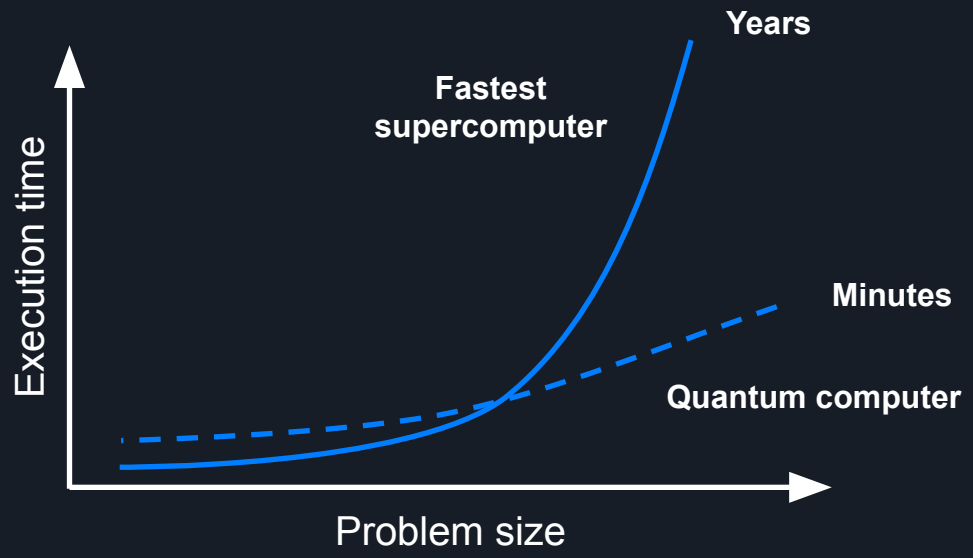


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Quantum computing

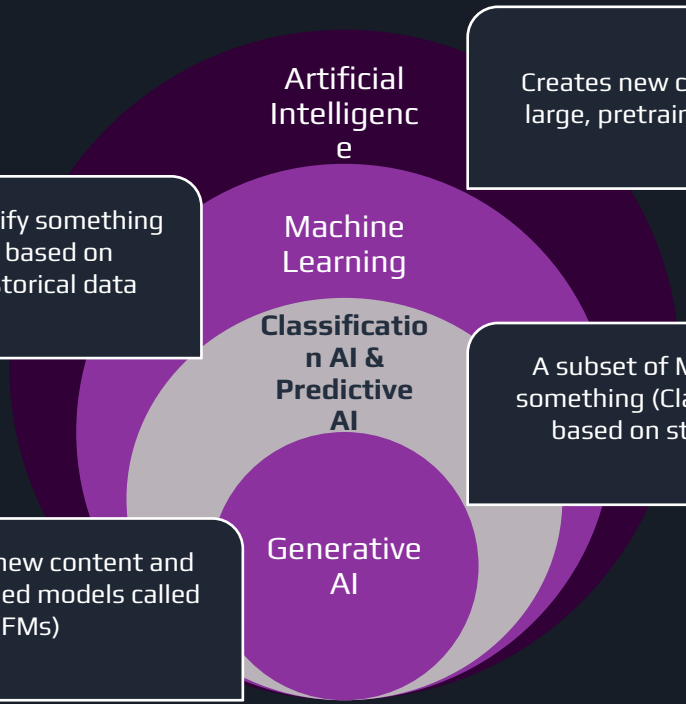
A **new paradigm for computation**

- Leverages the laws of quantum physics
- Access a **new class of problems**



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The AI landscape



Creates new content and ideas powered by large, pretrained foundation models (FMs)

Recognizes patterns to identify something or predicts future trends based on statistical patterns and historical data

A subset of ML that recognizes patterns to identify something (Classification AI) or predicts future trends based on statistical patterns and historical data (Predictive AI)

A subset of DL that can create new content and ideas powered by large, pretrained models called foundation models (FMs)

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AI in Food Safety

Real-time

Tyson Foods

ML vision on production lines catches contamination risks at the edge

41

Cargill

Cross-team AI detects faint contamination signals before recalls

17%

Delivery Hero

800+ stores monitored; NL queries for food safety insights

Farm→Fork

Chick-fil-A

Real-time Salmonella risk monitoring across the supply chain



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Autonomous Food Safety at Scale

AGENTS THAT REASON, ACT, AND ESCALATE — WITH HUMANS IN THE LOOP

41
Food safety incidents prevented
(Cargill, 18 mo)

96%
Reduction in agent deployment time
(Kinaxis)

2 months
Early detection before official recall
(Amazon)

- Agents ingest signals
- Multi-agent orchestration correlates dispersed data across departments
- High-confidence threats → autonomous action
- Low-confidence signals → escalate to human SME for validation



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Amazon Heartbeat: Agentic AI for Food Safety

- Multi-agent ML pipeline scans customer feedback in 40+ languages:
- NLP and ML agents assess food-safety relevance,
- auto-suppress risky products
- route edge cases to human reviewers.

30M+

Feedback pieces analyzed per week

40+

Languages processed

2 months

Early detection before recall



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Science & Academic Partnerships

Peer-reviewed research, responsible AI tools, and university collaborations



500+

PAPERS ANNUALLY

Responsible AI for food safety

PHD

FELLOWSHIPS

Cloud AI for biological discovery

R → P

REGULATORY TRANSLATION

Research → production safety tools

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Research to Regulation

Science Enabling Safer Food

Amazon Science publishes 500+ peer-reviewed papers annually (NeurIPS, ICML, KDD, AAAI) and has built 70+ responsible-AI tools with direct food-safety applications.

Supply Chain ML

Optimization & forecasting → FSMA 204 traceability

Anomaly Detection

Unsupervised detection at scale (SEAD) → early contamination signals for HFP

Responsible AI

Guardrails + human-in-the-loop → validated, auditable decisions



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Amazon Bio Discovery

Unified scientific experience for antibody Lab-in-the-Loop

+

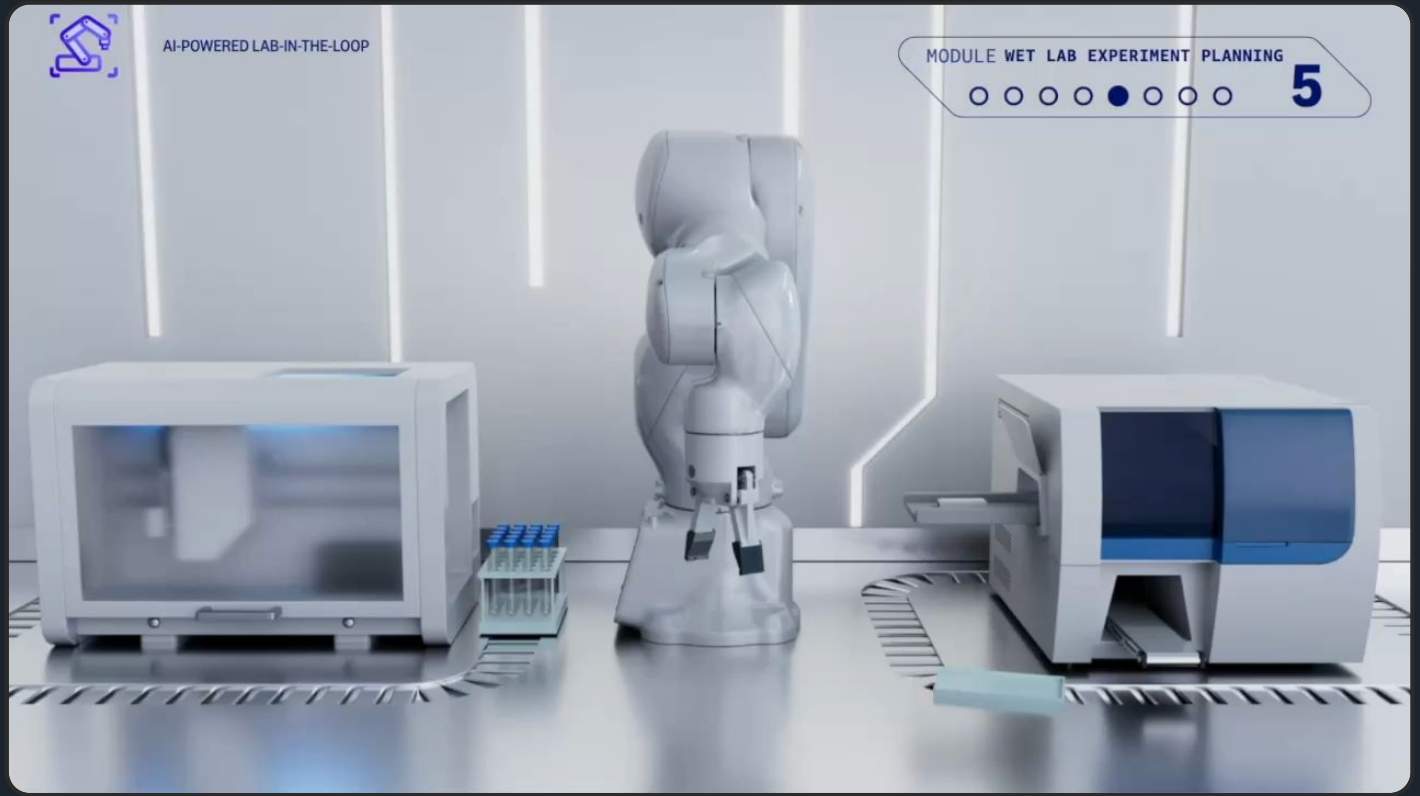
Lab in the Loop Accelerators



Enterprise solutions for wet lab integration, with AWS solutions, ProServe and Partners

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AI agents can drive laboratory workflows



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Supply Chain Intelligence: Singapore Use Case

From farm to fork: predictive visibility across the chain. Singapore imports 90% of its food, making real-time supply chain monitoring critical for food safety and freshness.

90%

Food Imported

Singapore imports nearly all food, demanding predictive supply chain visibility

Real-Time

Monitoring

Continuous supply chain tracking from farm to shelf

IoT→ML→GenAI

Tech Stack

Shelf-life & spoilage models powered by layered intelligence

Multi-Node

Traceability

Farm → transport → shelf visibility across the chain



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Chick-fil-A

Hollywood

$14K Annual savings per location	**24 hrs** Time to first ROI
$800 Saved in first 24 hours	**3-5 yrs** Sensor battery life

Case Study: Chick-fil-A Hollywood moved from reactive to proactive food safety. Saved $800 in product within 24 hours of deployment.

https://www.qsrmagazine.com/uncategorized/chick-fil-turns-ai-fight-foodborne-illness/

Genomic & Outbreak Intelligence

WGS-BASED PATHOGEN TRACKING, CLOUD BIOINFORMATICS, AND REAL-TIME SURVEILLANCE

HealthOmics

WGS PIPELINES AT SCALE

Detection

REAL-TIME PATHOGEN TRACE-BACK

Sovereign

MULTI-PARTY PRIVACY-BY-DESIGN



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AWS Genomics & Outbreak Intelligence

Transforming pathogen genomics through cloud bioinformatics and sovereign data platforms. AWS HealthOmics and cloud-based pipelines enable whole-genome sequencing, population-scale biobanks, and real-time outbreak intelligence.

Democratize

Open Datasets

Open genomic datasets for global researchers, enabling population-scale biobanks

Detect

Outbreak Intelligence

Real-time outbreak intelligence platforms for pathogen trace-back

Collaborate

Secure Sharing

Secure multi-party data sharing with sovereign-by-design privacy controls

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Data Collaboration: Food Safety

Incident Sharing

Regulators + manufacturers
Sharing signals without
Exposing formulations

Supply Chain

Correlating temperature
Excursions with
Downstream complaints

Surveillance

Multi-country outbreak
Signals across borders



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AWS Clean Rooms

SECURE DATA COLLABORATION:

Zero-Copy

NO RAW DATA LEAVES
YOUR ENVIRONMENT

Cryptographic

PRIVACY-PRESERVING
ANALYTICS

Multi-Party

REGULATOR + INDUSTRY
+ ACADEMIA

Quantum Computing

The next frontier: solving molecular and global-scale problems beyond classical reach



Molecular

SIMULATION

Contaminant-protein binding via quantum algorithms

Global

OPTIMIZATION

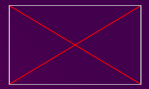
Quantum annealing for inspection scheduling at scale

Braket

AMAZON BRAKET

Access to quantum hardware & simulators today

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Why Quantum Computing?

NOT A FASTER CLASSICAL COMPUTER — A FUNDAMENTALLY NEW PARADIGM LEVERAGING QUANTUM PHYSICS

Exponential Speed-Up

Classical simulation of quantum systems grows exponentially with particle count. Quantum computers solve these in polynomial time.

Superposition & Entanglement

Qubits explore all states simultaneously. N qubits encode 2^N states — enabling molecular simulations and optimization impossible classically.

2^N

states explored simultaneously

Key Application Domains

- Physics & Chemistry — molecular simulation
- Material Science — novel material engineering
- Optimization & ML — resource allocation
- Cryptography — post-quantum security



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Quantum Computing for Food Safety

Solving problems too complex for classical computers at molecular and global scale. Amazon Braket provides access to quantum hardware and simulators, enabling researchers to explore these applications today.

Simulate

Molecular Toxicology

VQE algorithms model toxin-protein binding; predict toxicity of PFAS, mycotoxins before harm

Optimize

Global Supply Chain

Quantum annealing for inspection scheduling across thousands of facilities and import lines

Protect

Integrity & Evolution

Post-quantum cryptography for FSMA 204 traceability; model antimicrobial resistance mutations

3–7 yrs

Timeline to practical applications

10^{18}

Molecular combinations intractable classically

Now

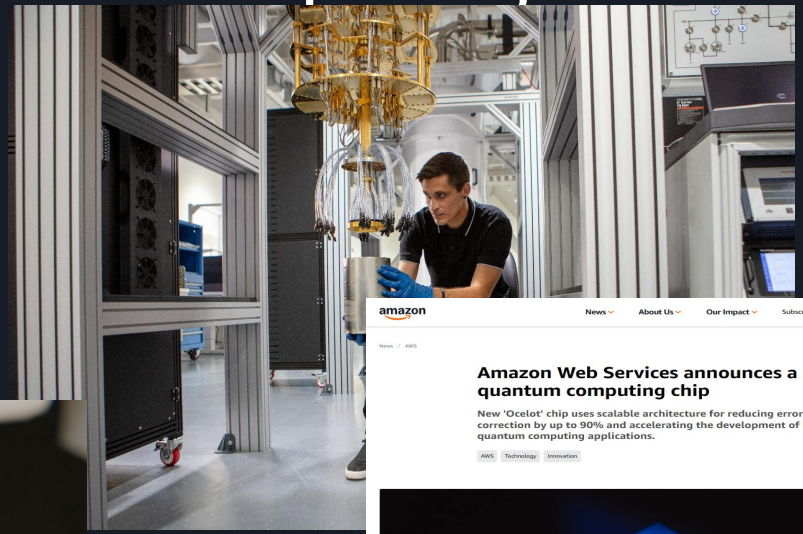
Amazon Braket access to quantum hardware

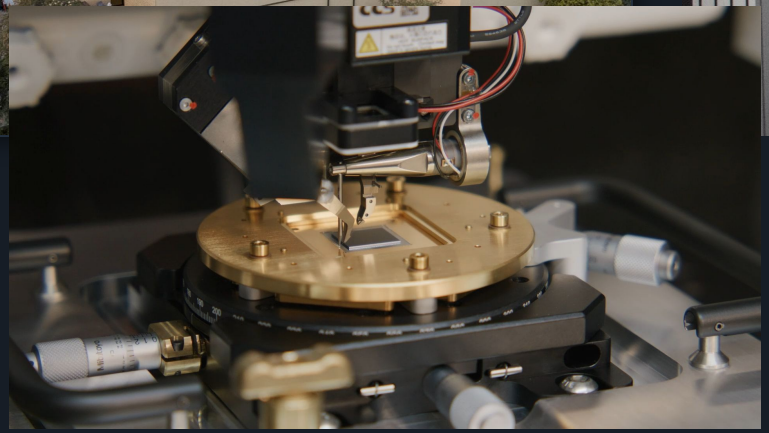


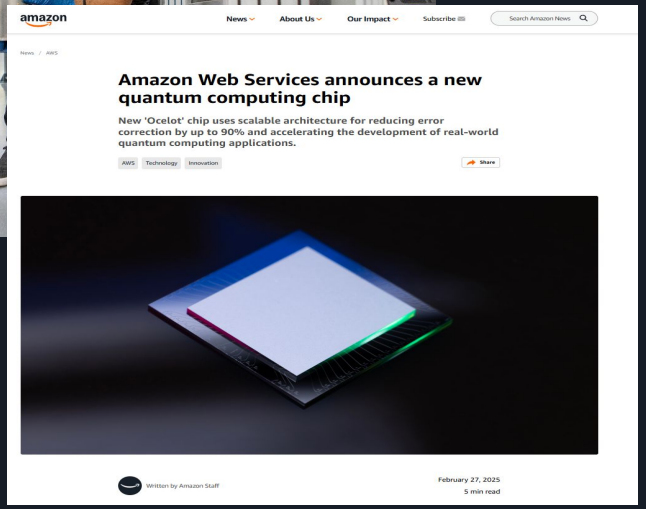
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AWS Center for Quantum Computing





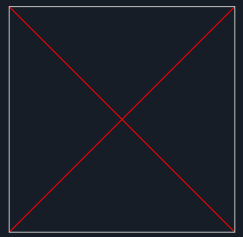




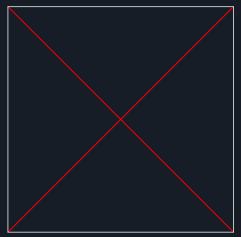
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https://www.aboutamazon.com/news/aws/quantum-computing-aws-ocelot-chip

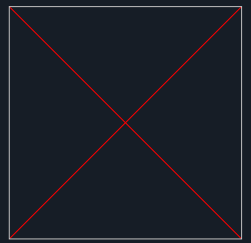
Resources



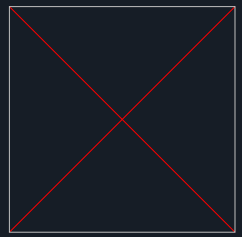
Amazon Science



Gen AI Use cases



Amazon Healthcare & Life Sceinces



AWS Quantum Computing Blogs



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