[ABDD Summit 2026 at Stanford]
iTalk - Erudio Bio & Silicon Valley AI Forum (K-PAI)

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Co-Founder & CTO @ Erudio Bio, Inc.

Co-Founder & CEO @ Erudio Bio Korea, Inc.

Leader of Silicon Valley Privacy-Preserving AI Forum (K-PAI)

CGO / Global Managing Partner @ LULUMEDIC

Global Leadership Initiative Fellow @ Salzburg Global Seminar

Visiting Professor & Advisory Professor @ Sogang Univ. & DGIST

About Speaker

- *Co-Founder & CTO @ Erudio Bio, Inc., San Jose & Novato, CA, USA*   2023 ~
- *Co-Founder & CEO @ Erudio Bio Korea, Inc., Korea*   2025 ~
- *Leader of Silicon Valley Privacy-Preserving AI Forum (K-PAI), CA, USA*   2024 ~
- *CGO / Global Managing Partner @ LULUMEDIC, Seoul, Korea*   2025 ~
- *KFAS-Salzburg Global Leadership Fellow @ Salzburg Global Seminar, Austria* 2024 ~
- *Adjunct Professor, EE Department @ Sogang University, Seoul, Korea*   2020 ~
- *Advisory Professor, EECS Department @ DGIST, Korea*   2020 ~
- *AI-Korean Medicine Integration Initiative Task Force Member @ The Association of Korean Medicine, Seoul, Korea*   2025 ~
- *Director of AI Semiconductor @ K-BioX, CA, USA*   2025 ~
- Global Advisory Board Member @ Innovative Future Brain-Inspired Intelligence System Semiconductor of Sogang University, Korea   2020 ~
- Technology Consultant @ Gerson Lehrman Gruop (GLG), NY, USA   2022 ~
- Chief Business Development Officer @ WeStory.ai, Cupertino, CA, USA   2025 ~
- Advisor @ CryptoLab, Inc., Seoul, Korea   2025 ~

- Co-Founder & CTO / Head of Global R&D / Chief Applied Scientist / Senior Fellow @ Gauss Labs, Inc., Palo Alto, CA, USA   2020 ∼ 2023

- Senior Applied Scientist @ Amazon.com, Inc., Vancouver, BC, Canada   2017 ∼ 2020

- Principal Engineer @ Software R&D Center, Samsung Electronics   2016 ∼ 2017

- Principal Engineer @ Strategic Marketing & Sales, Memory Business   2015 ∼ 2016

- Principal Engineer @ DT Team, DRAM Development, Samsung   2012 ∼ 2015

- Senior Engineer @ CAE Team, Memory Business, Samsung, Korea   2005 ∼ 2012

- PhD - Electrical Engineering @ Stanford University, CA, USA   2001 ∼ 2004

- Development Engineer @ Voyan, Santa Clara, CA, USA   2000 ∼ 2001

- MS - Electrical Engineering @ Stanford University, CA, USA   1998 ∼ 1999

- BS - Electrical & Computer Engineering @ Seoul National University   1994 ∼ 1998

Highlight of Career Journey

- BS in Electrical Engineering (EE) @ Seoul National University
- MS & PhD in Electronics Engineering (EE) @ Stanford University
  - *Convex Optimization - Theory, Algorithms & Software*
  - advisor - *Prof. Stephen P. Boyd*
- Principal Engineer @ Samsung Semiconductor, Inc.
  - *AI & Convex Optimization*
  - collaboration with *DRAM/NAND Design/Manufacturing/Test Teams*
- Senior Applied Scientist @ Amazon.com, Inc.
  - *e-Commerce AIs* - anomaly detection, deep RL, and recommender system
  - *Jeff Bezos's project - drove $200M* in sales via Amazon Mobile Shopping App
- *Co-Founder & CTO / Global R&D Head & Chief Applied Scientist* @ Gauss Labs, Inc.
- *Co-Founder & CTO* @ Erudio Bio, Inc.
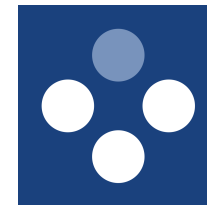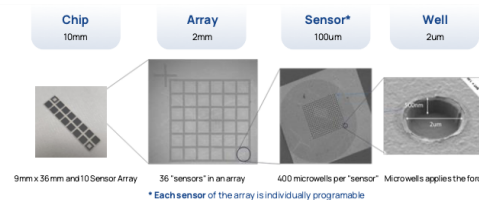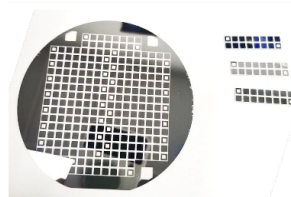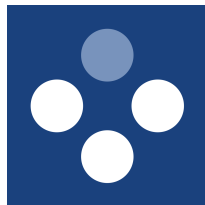- *Co-Founder & CEO* @ Erudio Bio Korea, Inc.

Unpacking Biotech, AI, and Silicon Valley!

Erudio Bio

Powering AI-driven medicine with ground-truth binding data

- problems we solve
  - 90% of drugs fail in clinical trials due to poor early-stage prediction
  - multiplexed diagnostics suffer from false positives and cross-reactivity
- *Erudio Bio's Innovation*
  - VSA platform uses patented "dynamic force spectroscopy" to generate 1000x more high-quality binding data from single sample ($\sim 10\mu$L)
  - measuring not just presence, but *strength* and *kinetics* of molecular interactions
- *dual business model*
  - diagnostics - multi-cancer biomarker detection with clinical institutions & hospitals (Seoul National University Hospital Bundang, Keimyung University Dongsan Hospital)
  - drug discovery - bioTCAD$^{\mathrm{TM}}$ platform providing ground-truth labels to train & validate pharma AI models, reducing preclinical cycles

Validated technology, proven team, clear path to market

- validated impact
  - *$1M Gates Foundation Grant* (2025) to democratize drug development for global health
  - partnerships with top research institutions (KRIBB, KAIST)
- unique team - *Stanford-trained founders* combining
  - semiconductor TCAD expertise & force spectroscopy innovation (20+ years)
  - AI & optimization leadership (Samsung, Amazon, SK hynix, Gauss Labs)
- market entry
  - *Korea → Asia hub & US* strategy with 2026 regulatory milestones and expanding pharma partnerships

Biological assays struggle with scale & accuracy

Data is expensive

- so we make decisions with *incomplete* picture
- status quo
  - limited, small-scale testing confirms diagnosis
  - outcome only as good as doctor's ability to determine which tests, limiting the picture
  - cross reactivity prevents larger scale testing
- Erudio creates
  - *comprehensive, large-scale* testing will drive diagnosis without assumptions
  - increased scale enables enhanced scientific discovery leading to
    - *better patient care*
    - *reduced time to diagnosis*
    - *cost reduction*

Erudio Bio starting Revolution

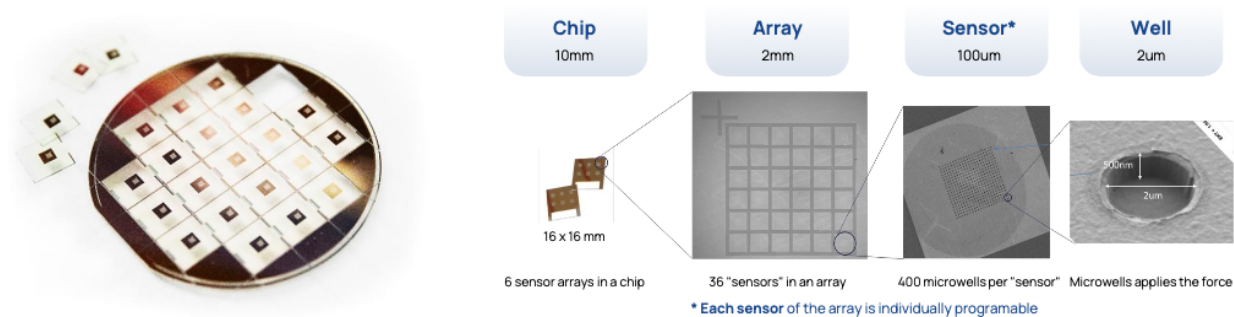# Erudio Bio starts revolution with Gates Foundation's support

- more data
  - comprehensive data from single biological sample
  - multiplexed analysis of nucleic acid, protein, cells, and more!
  - *multi-omic platform*
- actionable data
  - combined quality score from all data sources for comprehensive & conclusive assessment
- earlier data
  - complete data early to drive accurate decision making

Versatile Smart Assay (VSA) Platform
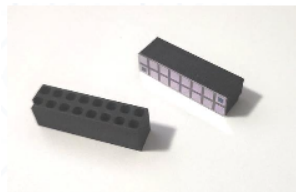
VSA technology

- generates *1000x more data* than the prevailing technology
  - scalable multi-omic microarray sensor
- *21 patents* in US, Canada, China, and Europe
- indicates how good the data is in real time
  - patented "dynamic force spectroscopy" and "powerful Bayesian inference" method provides our data *quality score* to know their accuracy for actionable data
- AI software extracts a detailed, interpretable picture for quick diagnosis
  - leads to *AI knowledge discovery* resulting in *data-driven diagnosis*

Enabling comprehensive data acquisition

- antibodies - versatile tools in biology

  – can engineer to target virtually *anything* we want

  – problem

    - indiscriminate interactions severely limits use of antibodies in multiplex formats

    - error-prone results due to non-specific binding

- solution - comprehensive data with *dynamic force spectroscopy*

  – comprehensive binding strength to distinguish specific from non-specific binding

  – *quality score* discerns noise from useful data to enable multiplexing
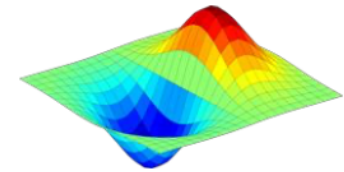
Erudio Bio's business models

Consumable chip & flowcell   **Instrument**   **Consumable reagent kit**   **Software AI/ML & SaaS**

- VSA platform

  – instrument - recurring revenue with high margin

  – modular licensable software - AI based data interpretation and feature extraction

- SaaS

  – subscription based pre-validation of reagent database
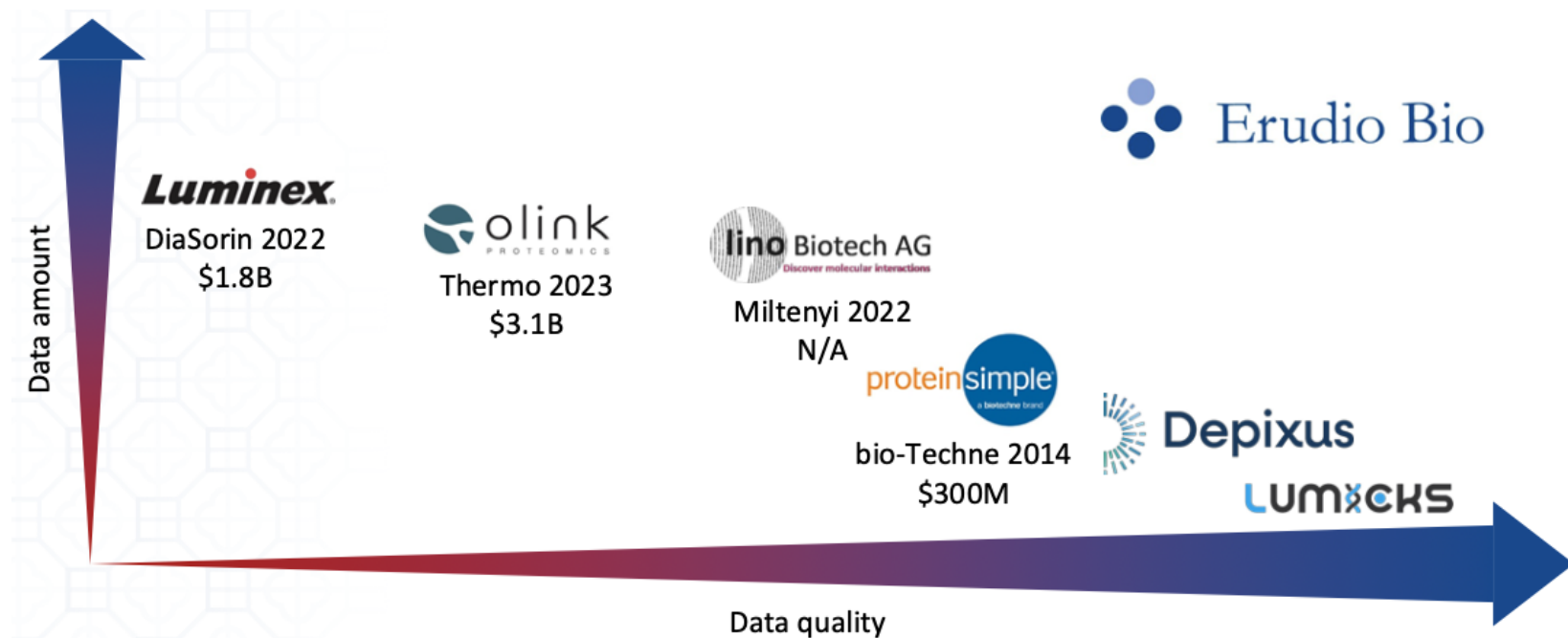
  – AI feature extraction and knowledge discovery

Milestones

Erudio Bio key milestones

- IP developed at Stanford School of Medicine under mentorship by father of microarrays - Dr. Ronald Davis
- data vetted by Analog Devices ($115B market cap semiconductor company), Harvard Medical School & Massachusetts General Hospital
- commercial partnership with Analog Devices to manufacture at scale
- JDA with Shanghai General Hospital's National Clinical Research Center for Eye Diseases
- JDA with Seoul National University General Hospital (SNUBH) for multiplexed cancer biomarker detections
- partnerships with
  - Keimyung University Dongsan Hospital, KRIBB, KAIST NanoFab, Lulumedic

Competitive landscape

- Erudio Bio
  - *only company* providing both high quality data and large data output
- efficient workflow integration facilitates customer adoption

Erudio Bio engaging with Customers

Validating out technology in clinical settings

- joint development agreement signed with *Shanghai General Hospital's National Clinical Research Center for Eye Diseases*

  – co-develop multiplexed diagnostic test for uveitis

  – addresses low sample volume and diagnostic inaccuracies

- globally unique partner, customer so large that it is a market by itself

  – 45 large hospitals with 83M patient visits per year

  – standard of care for smaller hospitals in Shanghai to access additional 280M patients

Clinical validation to market leadership in Korean preventive care

- market opportunity - *preventive care* is foundation of Korean healthcare
  - $\sim$ 15M health screenings performed in S. Korea testing
  - ideal market segment for Erudio Bio's multi-omic multiplexed VSA platform
  - multi-billion dollar addressable market for multi-cancer early detection
- joint development agreed with *Seoul National University Hospital Bundang (SNUBH)*
  - premier hospital of national importance
  - enabling expansive proactive health assessment for efficient health care system
  - collaboration with target of *multiplexed cansor biomarker medical equipment business*

Teams

Team & advisory board

- team
  - Sunghee Yun, Ph.D. (CTO) - AI, optimization, business development, software
  - Kee-Hyun Paik, Ph.D. (CEO) - chip, microfluidics, instrumentation
  - Susanne Baumhueter, Ph.D. - biology, immunology, project management
  - Leon Chen, MBA, CFA (COO) - business development, product, operations
  - Jin Young Huh (CLO) - chief legal officer, business development in Korea
- advisory board
  - Michael Cola - CEO of AEVI Genomic Medicine ($62B sales to Takeda)
  - Tim Germann - CCO of Carterra Bio
  - Karyn Eliot - retired CIA Sr. Executive
  - Ronald W. Davis - Director of Stanford Genome Tech Center ($15B+ exits)
  - William J. Greenleaf - Prof. Genetics and Applied Physics, Stanford University

Gates Foundation Grant

Erudio Bio wins $1M Gates Foundation Grant - scaling bioTCAD

- $1M Grant Award (August 2025)
  - Gates Foundation recognizes Erudio Bio's potential to transform drug development for global health

- mission alignment - democratizing medicine by making preclinical drug design faster, yet reliable & accessible
  - lowering development costs for diseases affecting low- and middle-income countries (LMICs)
  - addressing the 90% clinical trial failure rate that drives up drug costs

- funded project - scale bioTCAD$^{\text{TM}}$ platform to generate ground-truth binding datasets
  - expand force spectroscopy measurements across high-burden disease targets
  - train AI models with kinetics-resolved binding data (on/off rates, unbinding forces)
  - enable pharma/biotech to prioritize candidates earlier with higher confidence

K-PAI - Silicon Valley Privacy-Preserving AI Forum

Silicon Valley Privacy-Preserving AI Forum (K-PAI)

- pioneering community of professionals dedicated to building privacy-preserving AI solutions, products, and systems

- comprehensive expertise across AI domains
  - biotechnology, healthcare, and medical research
  - industrial applications and data centers
  - cloud infrastructure, storage solutions, mobile technologies
  - customer service platforms, multi-agent systems
  - RAG implementations, vector databases, agentic AI frameworks

- vision
  - *shaping future where AI innovation and privacy protection go hand in hand*

- active community with homepage & KakaoTalk collaboration platform for members

Our journey - forum history

- Nov-Dec 2024 - "The AI Strikes Back" & "Free Your Data"
  - Prof. Jung Hee Cheon (homomorphic encryption revolution)
- Jan 2025 - "The AI Knight Rises"
  - Sunghee Yun @ Erudio Bio on deep learning to flourishing societies
- Feb 2025 - "Silicon Citadel"
  - Chanik Park @ MangoBoost on AI data infrastructure
- Mar 2025 - "Blockchain Awakens"
  - Daejun Park @ a16z crypto on decentralized AI
- Apr 2025 - "Advancing Humanity"
  - Stanford Medicine team on bio/medical AI
  - co-hosting with K-BioX
- May 2025 - "The Autonomous Alliance"
  - Microsoft, GitHub, Uclone, SK Hynix on AI agents

Our journey - forum history

- Jun 2025 - "Silicon Companions"
  - Altos Ventures on robotics & smart devices
- Aug 2025 - "The Human-Centric AI Revolution"
  - address legal and ethical issues related to AI
- Nov 2025 - "The AI Silicon Race"
  - Korea-US Innovation Leadership at K·ASIC

Strategic partnerships & ecosystem

- *Perpetual Partnership with KOTRA Silicon Valley as Strategic Alliance*
- 2026 co-hosting partners
  - K·ASIC (Korea AI & IC Innovation Center)
  - K-BioX (biotech innovation)
  - KOTRA Silicon Valley (trade & investment)
  - Korean Consulate General, San Francisco (diplomatic support)
  - KABANC (Korean American Bar Association of Northern California - legal expertise)
- building bridges between Silicon Valley innovation and Korean institutional networks
- creating comprehensive support ecosystem: technical, legal, business, diplomatic

Community & engagement

- membership requirements
  - attend 2+ K-PAI Forums to qualify
- member benefits
  - networking with AI professionals across all domains
  - knowledge sharing and collaboration opportunities
  - direct access to world-class speakers and experts
- forum format - 5pm-8pm, typically Wednesdays at premier Silicon Valley venues
- venues - Stanford, KOTRA, SK Hynix, Altos Ventures, K·ASIC, and more
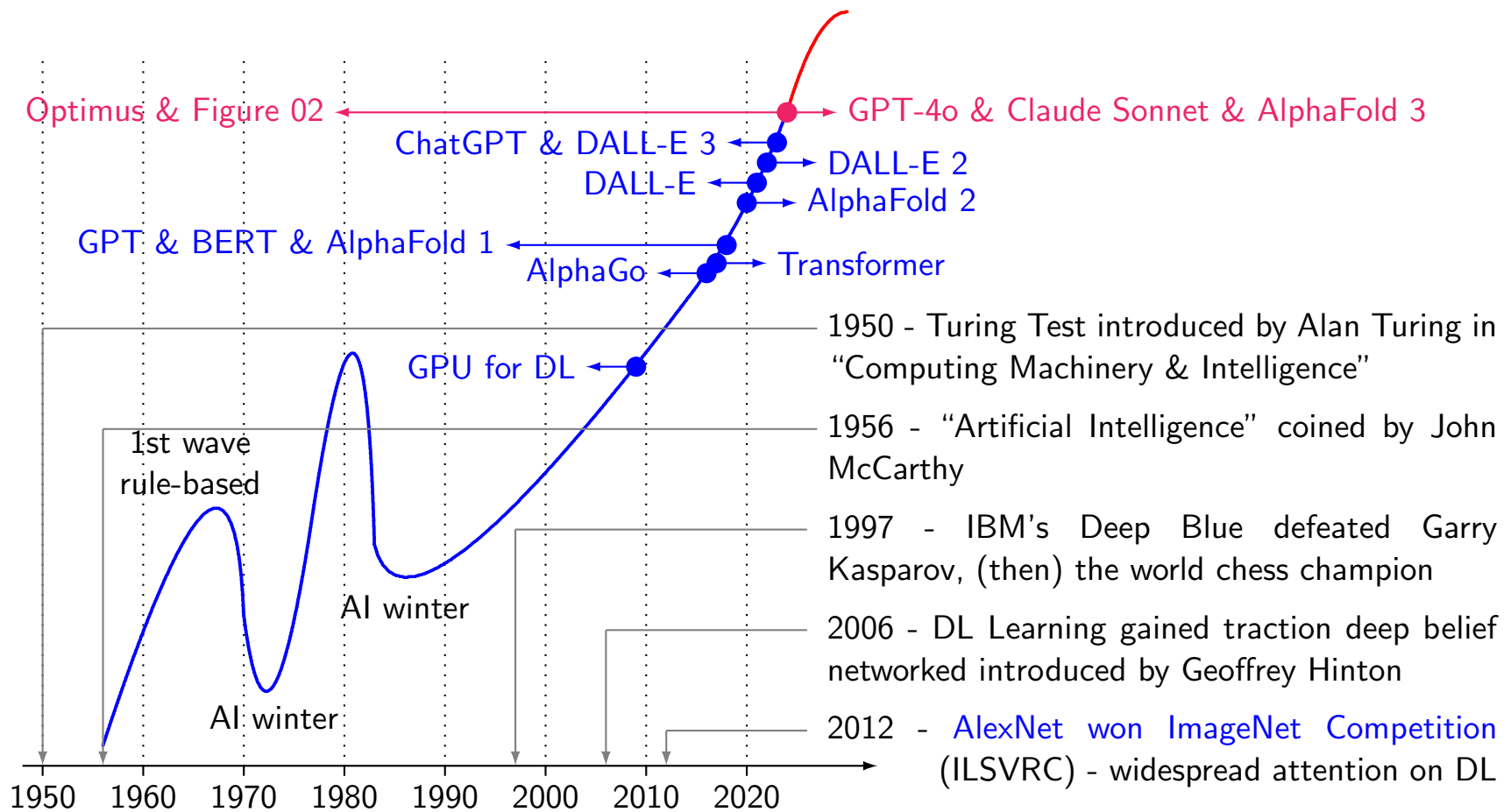- active community engagement and professional development

Silicon Valley's Cultural Engine of Innovation and Disruption

My journey from Samsung & Amazon to Gauss Labs & Erudio Bio

- Samsung Semiconductor, Inc.
  - inception into industry from academia, the world's best memory chip maker!
- Amazon.com, Inc.
  - experience so-called Silicon Valley big tech culture and technology
  - set tone for my future career trajectory!
- Gauss Labs, Inc.
  - found & operate AI startup, shaping corporate culture & spearheading R&D as CTO
  - inherent challenges of Korean conglomerate spin-off startup - cultural constraints, over-capitalization, and leadership limitations
- Erudio Bio, Inc.
  - concrete & tangible bio-technology in addition to AI
  - great decisions regarding business development; business models, market fit, go-to-market (GTM) strategies based on lessons learned *in a hard way* ☺
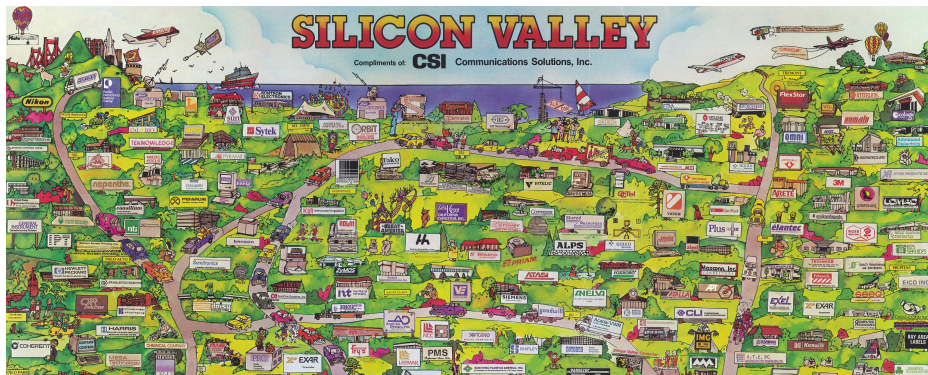
Joining Amazon.com, Inc. at the inflection point of AI

Optimus & Figure 02 ← ──────────────────── GPT-4o & Claude Sonnet & AlphaFold 3

ChatGPT & DALL-E 3 ←

DALL-E → DALL-E 2

AlphaFold 2

GPT & BERT & AlphaFold 1 ←

AlphaGo ← Transformer

GPU for DL ←

1st wave
rule-based

AI winter

AI winter

1950 - Turing Test introduced by Alan Turing in "Computing Machinery & Intelligence"

1956 - "Artificial Intelligence" coined by John McCarthy

1997 - IBM's Deep Blue defeated Garry Kasparov, (then) the world chess champion

2006 - DL Learning gained traction deep belief networked introduced by Geoffrey Hinton

2012 - AlexNet won ImageNet Competition (ILSVRC) - widespread attention on DL

1950 1960 1970 1980 1990 2000 2010 2020

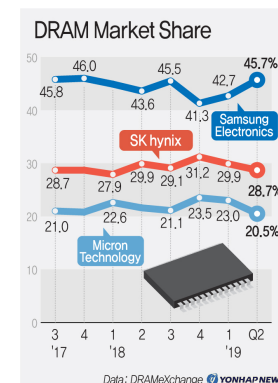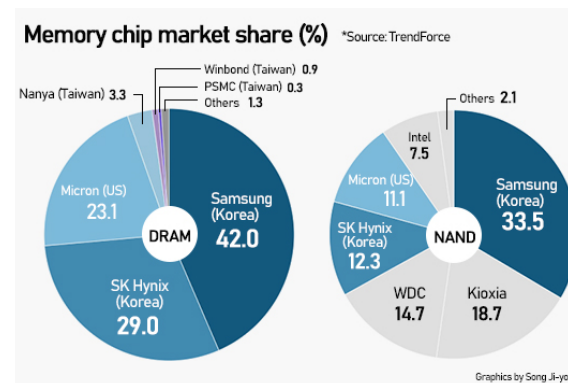# Innovation ecosystem of Silicon Valley

- key characteristics
  - risk-taking culture, *trust* in technology $\rightarrow$ *genuine* respect for engineers and scientists
  - easy access to huge capital - VCs, angel investors alike
  - talent density - engineers, researchers, scientists, entrepreneurs, PMs, TPMs, . . .
  - diversity, "collision density" of ideas
  - ecosystem of collaboration and competition - startups, academia, industry leaders
- what they mean for global big tech
  - set trends in AI, software & hardware (and or hence) product & industry innovation
  - act as testing ground for disruptive ideas

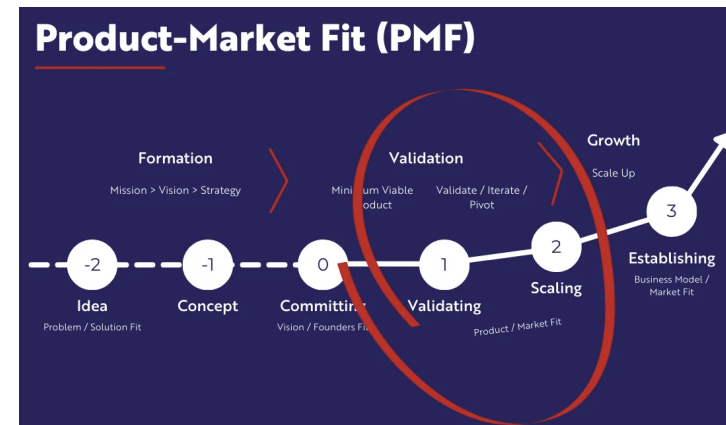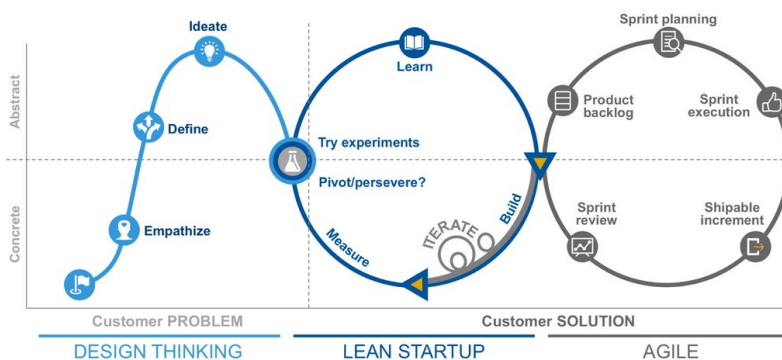# Case study: Amazon - amazing differentiators of big techs

- Amazon's culture & leadership principles
  - customer obsession as driver of innovation
  - high standards & ownership culture, disagree & commit
  - bias for action and long-term thinking - sounds contradictory?
  - mechanisms like "two-pizza teams" & "Day One" for (or rather despite) scalability
- lessons for Korean corporations
  - applying customer-centric innovation in hardware & AI, $e.g.$, on-device AI
  - balancing agility with long-term R&D
  - *build / adapt / apply on the core strength of Samsung that no other company has!*

Founding and scaling startups

- challenges
  - competence of and chemistry among co-founders crucial
  - technology & great team are *necessary*, but *not sufficient (at all!)* for success
  - business models, market fit, timing, agility, flexibility for pivoting / perseverance
- insight
  - importance of domain expertise in addition to AI
  - balancing innovation with good business decisions

Bridging Silicon Valley & Korea

- cultural differences
  - risk appetite & failure tolerance
  - decision-making speed vs hierarchy
  - innovation vs execution focus
- opportunities for collaboration
  - leveraging Korea's manufacturing expertise with Silicon Valley's software/AI strengths
  - building global teams with diverse perspectives

To be successful . . .

- embrace customer/market-centric mindset in innovation and for business decisions

- balance agility with long-term vision

- foster cross-cultural collaboration for global impact

- ((very) strategically and carefully) leverage AI to solve real-world industrial challenges

Selected References & Sources

Selected references & sources

- Robert H. Kane "Quest for Meaning: Values, Ethics, and the Modern Experience" 2013

- Michael J. Sandel "Justice: What's the Right Thing to Do?"   2009

- Daniel Kahneman "Thinking, Fast and Slow"   2011

- Yuval Noah Harari "Sapiens: A Brief History of Humankind"   2014

- M. Shanahan "Talking About Large Language Models"   2022

- A.Y. Halevry, P. Norvig, and F. Pereira "Unreasonable Effectiveness of Data"   2009

- A. Vaswani, et al. "Attention is all you need" @ NeurIPS   2017

- S. Yin, et. al. "A Survey on Multimodal LLMs"   2023

- Chris Miller "Chip War: The Fight for the World's Most Critical Technology"   2022

- CEOs, CTOs, CFOs, COOs, CMOs & CCOs @ startup companies in Silicon Valley

- VCs on Sand Hill Road - Palo Alto, Menlo Park, Woodside in California, USA

Thank You