

**[Seoul Bio Hub Silicon Valley Workshop]**  
**The AI-Biotech Landscape for Founders - Technology  
Foundations, Market Dynamics, and Building from Seoul  
to Silicon Valley**

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**Co-Founder & CTO @ Erudio Bio, Inc.**

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

**Co-Founder & Leader & Chair of Silicon Valley AI Nexus**

**CGO / Global Managing Partner @ LULUMEDIC**

**Advisor to Korean American Semiconductor Professional Alliance**

**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 ~
- *Co-Founder, Leader, and Chair of Silicon Valley AI Nexus, USA* 2024 ~
- *CGO / Global Managing Partner @ LULUMEDIC, Seoul, Korea* 2025 ~
- *AI-Korean Medicine Integration Initiative Task Force Member @ The Association of Korean Medicine, Seoul, Korea* 2025 ~
- *Advisor to Korean American Semiconductor Professional Alliance (KASPA)* 2026 ~
- *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 ~
- Global Advisory Board Member @ Innovative Future Brain-Inspired Intelligence System Semiconductor of Sogang University, Korea 2020 ~
- Technology Consultant @ Gerson Lehrman Group (GLG), NY, USA 2022 ~



- Co-Founder & CTO / Head of Global R&D / Chief Applied Scientist / Senior Fellow @ Gauss Labs, Inc., Palo Alto, CA, USA 2020 ~ 2023
- VP / Fellow @ SK hynix 2020 ~ 2021
- 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, Samsung Electronics 2015 ~ 2016
- Principal Engineer @ DT Team, DRAM Dev, Samsung Electronics 2012 ~ 2015
- Senior Engineer @ CAE Team, Memory Business, Samsung Electronics 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.

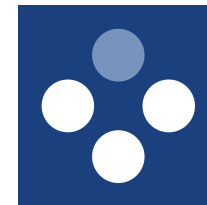
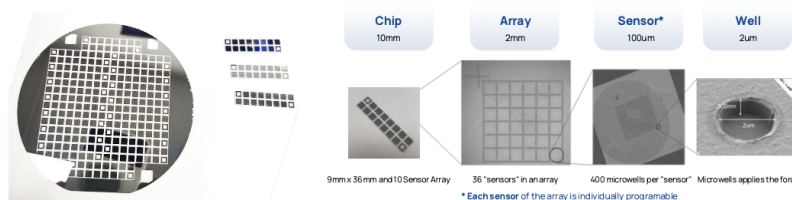
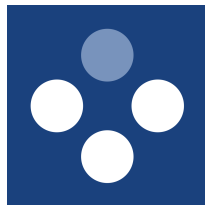
## Unpacking AI-Bio-Medical Landscape for Founders

- Erudio Bio US / Erudio Bio Korea - 5
  - Powering AI-driven medicine with ground-truth binding data
  - Versatile Smart Assay (VSA) Platform
  - When Erudio's VSA meets AI - Gates Foundation Grant & bioTCAD
- Silicon Valley's Cultural Engine of Innovation and Disruption - 23
  - My journey from Samsung & Amazon to Gauss Labs & Erudio Bio
  - Innovation ecosystem of Silicon Valley
  - Founding and scaling startups
- Appendix - Silicon Valley AI Nexus - 32
  - Strategic partnerships & ecosystem, community & engagement & interest groups
- Appendix - AI and Biotech - 43
  - AI in biology & AlphaFold 3, emerging Trends in Biotech
- Selected references - 62
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**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 ( $\sim 10\mu\text{L}$ )
  - measuring not just presence, but *strength* and *kinetics* of molecular interactions
- *dual business model*
  - diagnostics - *multi-cancer biomarker detection* with clinical institutions & hospitals
  - *drug discovery - bioTCAD<sup>TM</sup> 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
  - expanding *pharma partnerships and B2G*

Gates Foundation



# **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*





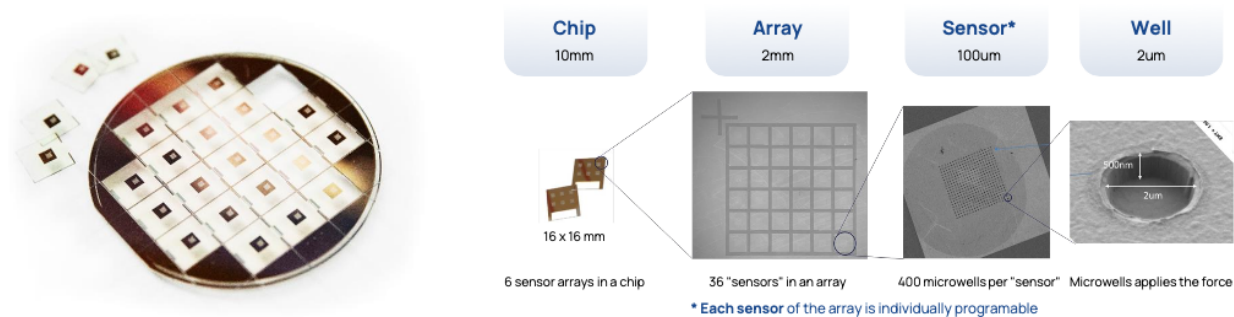
## Erudio Bio starts revolution with Gates Foundation's support

- 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



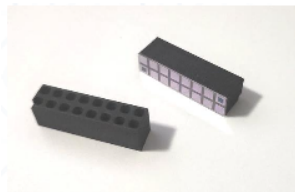
- generates *1000x more data* than the prevailing technology
  - scalable multi-omic microarray sensor
- *21 patents* in US, Canada, EU, and China
- indicates how good the data is in real time
  - patented “dynamic force spectroscopy” and “powerful Bayesian inference” method provides our data *quality 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 – *cross-reactivity*
    - 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



## VSA's business models



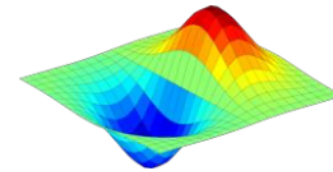
Consumable chip  
& flowcell



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

**When Erudio's VSA meets AI - Gates Foundation Grant**

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

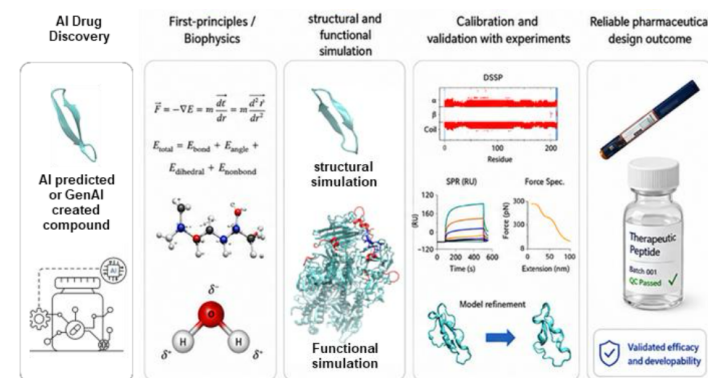
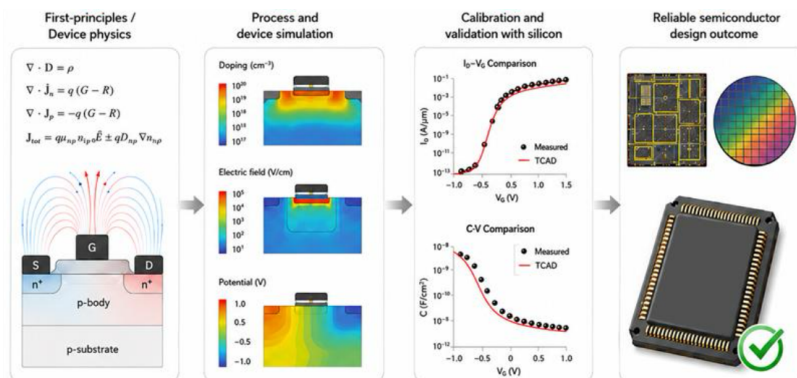
Gates Foundation



- *\$1M Grant Award (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 LMICs
  - addressing the 90% clinical trial failure rate that drives up drug costs
- funded project - develop *bioTCAD<sup>TM</sup> platform for lead optimization of drug discovery*
  - 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*

## bioTCAD - hybrid AI & physics-based drug development

- (old school) AI/ML excels at pattern recognition across large chemical libraries
  - identifying candidate hits at scale – valuable role established and growing
- AI alone *cannot reliably explain binding physics or predict behavior in unexplored and novel chemical space* – *capability and credibility gap*
- bioTCAD combines *AI and measurement-backed, physics-grounded simulation*
- applies *the* principle that made semiconductor TCAD trustworthy
  - validate model parameters to YOUR experimental measurements to be reliably right

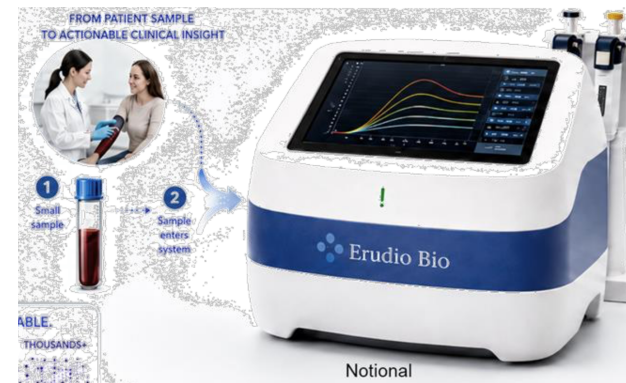




## **Erudio Bio's Business Models**

## Erudio Bio Applications

- drug development
- clinical diagnostic
  - medicine is already 20% of the world's economy and growing at 5% per year
- biodefense
  - GWOT to great power competition
  - need to defend against near-peer adversaries
  - flexible, efficient solution needed from CBRND to readiness



# Teams

## Team & advisory board

- team
  - Kee-Hyun Paik, Ph.D. (CEO) - chip, microfluidics, instrumentation
  - Sunghee Yun, Ph.D. (CTO) - AI, optimization, business development, software
  - Susanne Baumhueter, Ph.D. - biology, immunology, project management
- 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
  - Phil Ferro - virologist, formerly DoD, DoS, HHS and White house
  - Bill Chen - Former hedge fund and VC professional with national security, FFRDC
  - Ronald W. Davis - Director of Stanford Genome Tech Center (\$15B+ exits)
  - Michael Snyder - Prof. Genetics, Dir. Stanford Human Genome Center
  - William J. Greenleaf - Prof. Genetics and Applied Physics, Stanford University



Sunghee Yun

Jul 22, 2026



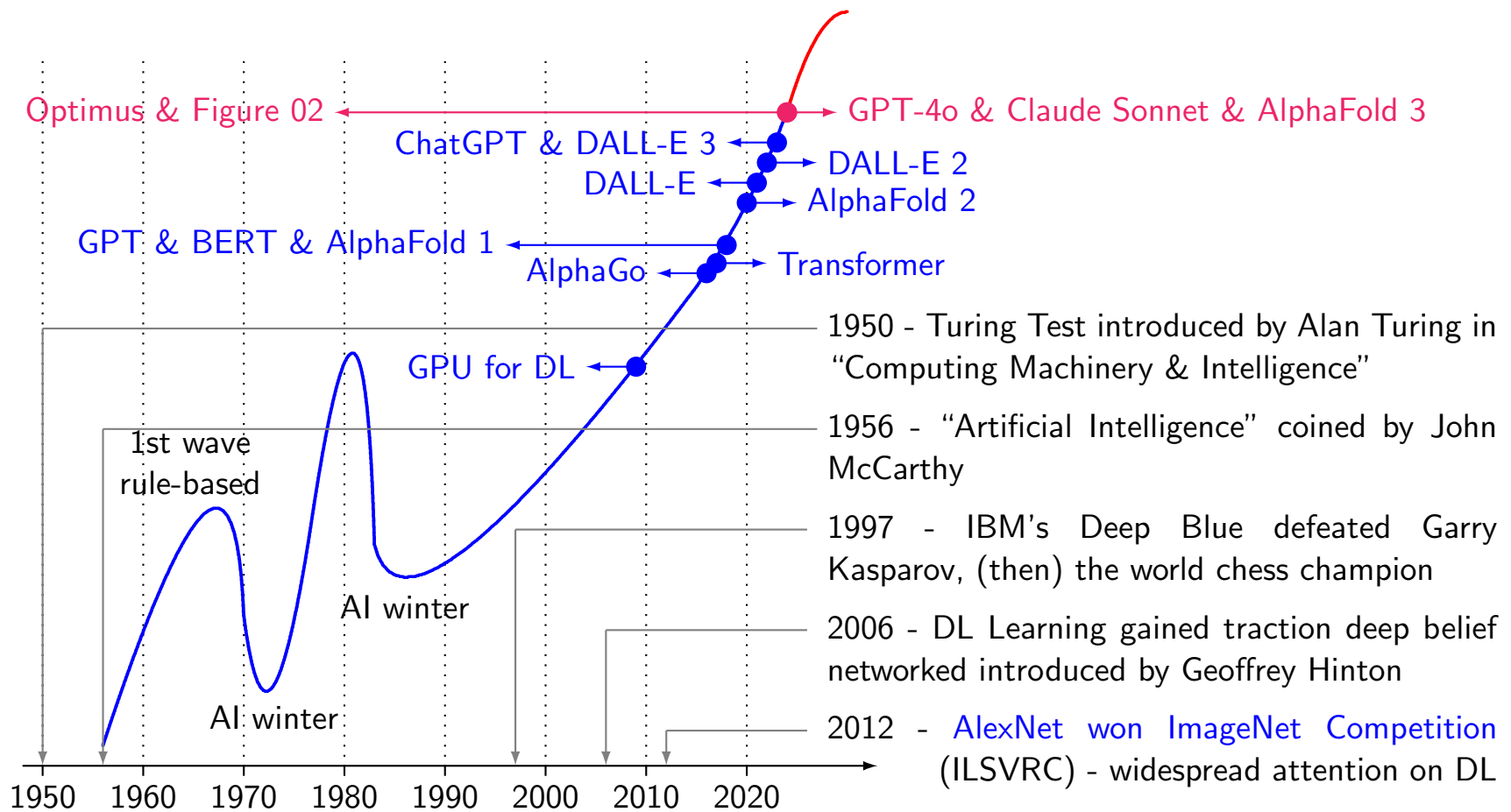
# **Silicon Valley's Cultural Engine of Innovation and Disruption**

## 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* 😊



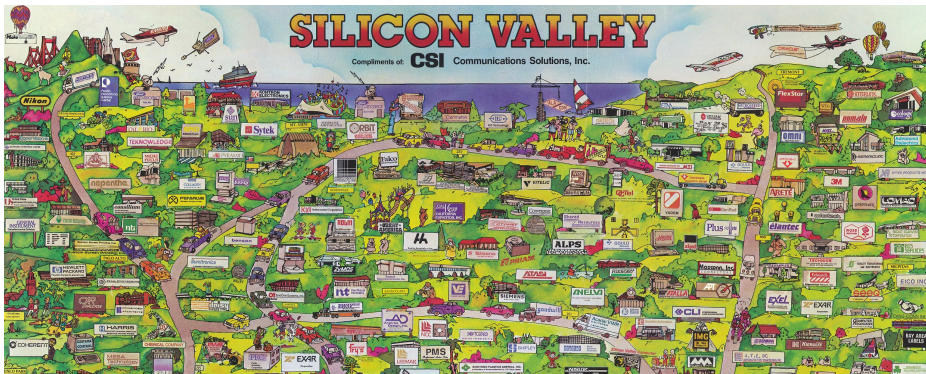
## Joining Amazon.com, Inc. at the inflection point of AI





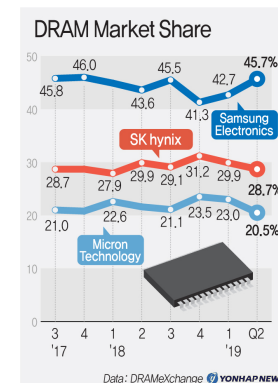
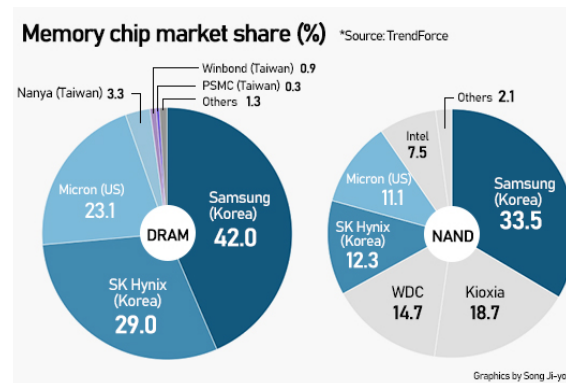
## Innovation ecosystem of Silicon Valley

- key characteristics
  - risk-taking culture, *trust* in technology → *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

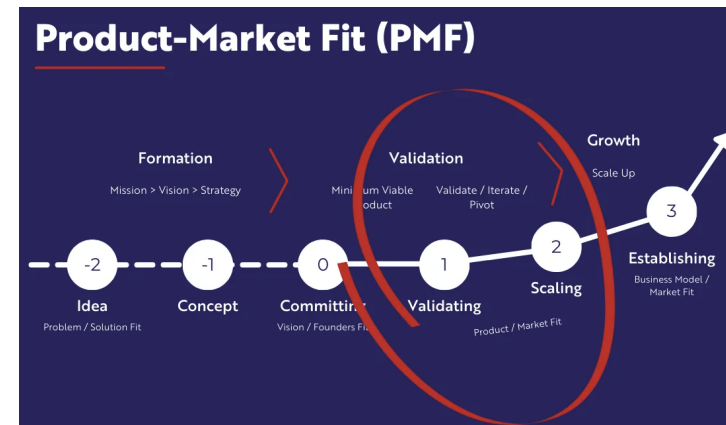
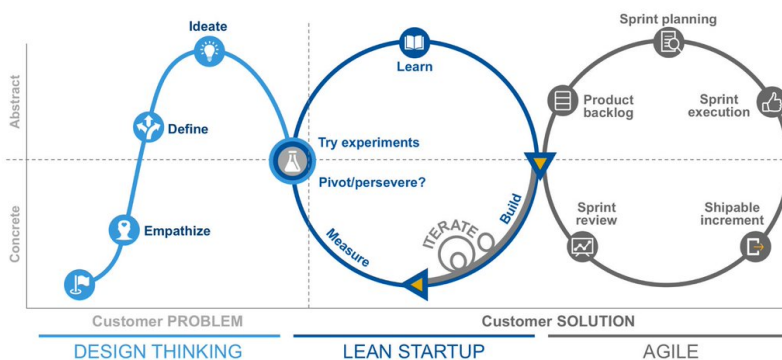
- Amazon's culture & leadership principles
  - customer obsession as driver of innovation
  - high standards & ownership culture, disagree & commit
  - bias for action and long-term thinking - sounds contradictory?
  - mechanisms like “two-pizza teams” & “Day One” for (or rather despite) scalability
- 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

### Combine Design Thinking, Lean Startup and Agile



## 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



# **Appendices**

# **Silicon Valley AI Nexus**

## Silicon Valley AI Nexus (or just AI Nexus)

- 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)
  - Consulate General of the Republic of Korea at 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 one! AI Nexus event!
- 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



## Three Core Tenets

- *Explore & Lead*
  - world-class forums, the AI & Humanity Council, and thought leadership shaping AI's most consequential questions
- *Elevate Community*
  - mentorship, startup showcases, professional connections, and leadership opportunities that amplify every voice
- *Give Back to Society*
  - policy engagement, academic partnerships, and public discourse ensuring AI's benefits reach beyond Silicon Valley

## **AI Nexus encourages and embraces Interest Groups**

- Bio / Medical / Data Group (7)
  - Chanik Insuk Jeff Jongmin Minha Mitch Sunghee led by Chanik
- Karaoke Group (4)
  - Hayden Jeff Sunghee Yeseul led by Sunghee
- AI Hands-on Group (5)
  - Chanik James Kyoung Whan Minha Sunghee led by Minha
- East Bay Group (7)
  - Daniel Eugene Hyunjung Linda MiSook MJ Sunghee led by Hyunjung

## Collaboration with Institutions & Universities

- MOUs
  - SNU
    - *AI Nexus × SNU College of Engineering Silicon Valley Immersion Program*
    - *Winter Internship 2026*
  - asked by
    - KIC SV
    - SVreboot
    - XL8
    - KASPA
    - Korea Univ.
    - Sungkyunkwan Univ.
    - KAIST
    - Korean American Semiconductor Professional Alliance (KASPA)
    - *etc.*

## Collaboration with Institutions & Universities

- Co-hosting with
  - K-BioX
  - KOTRA SV
  - KIC SV
  - K-ASIC
  - Korea-America Student Conference (KASC)
  - Consulate General of the Republic of Korea at San Francisco
  - Korean American Bar Association of Northern California (KABANC)
  - *etc.*



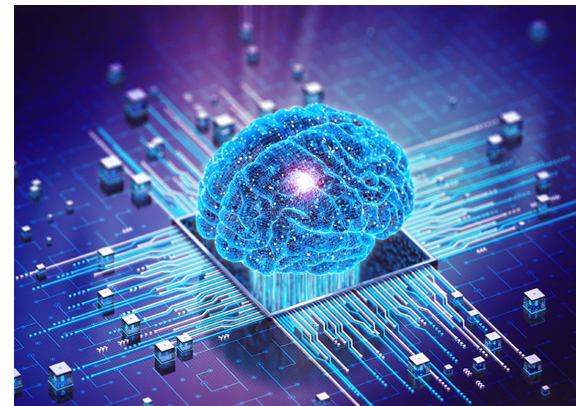
## AI Nexus Committee

- Board of Directors
  - *Sunghee Yun* - Co-Founder & Char
  - *Minha Hwang* - Co-Founder & AI Master
  - *Sue Kim* - Co-Founder & Marketing Leader
  - *Youngwook (Hayden) Song* - Co-Founder & Legal Affairs Advisor
  - *Bo Hyoung (Jeff) Lee* - Co-Founder & Legal Affairs Advisor
  - *MiSook Chung* - Co-Founder & Community Engagement Chair
- Vision & Principles Committee
- Tech & Social Media Committee
- Program & Content Committee
- the full list of committees can be found [here](#)!

# **AI & Biotech**

## AI in biology

- AI has been used in biological sciences, and science in general
- AI's ability to process large amounts of raw, unstructured data (*e.g.*, DNA sequence data)
  - reduces time and cost to conduct experiments in biology
  - enables others types of experiments that previously were unattainable
  - contributes to broader field of engineering biology or biotechnology
- AI increases human ability to make direct changes at cellular level and create novel genetic material (*e.g.*, DNA and RNA) to obtain specific functions



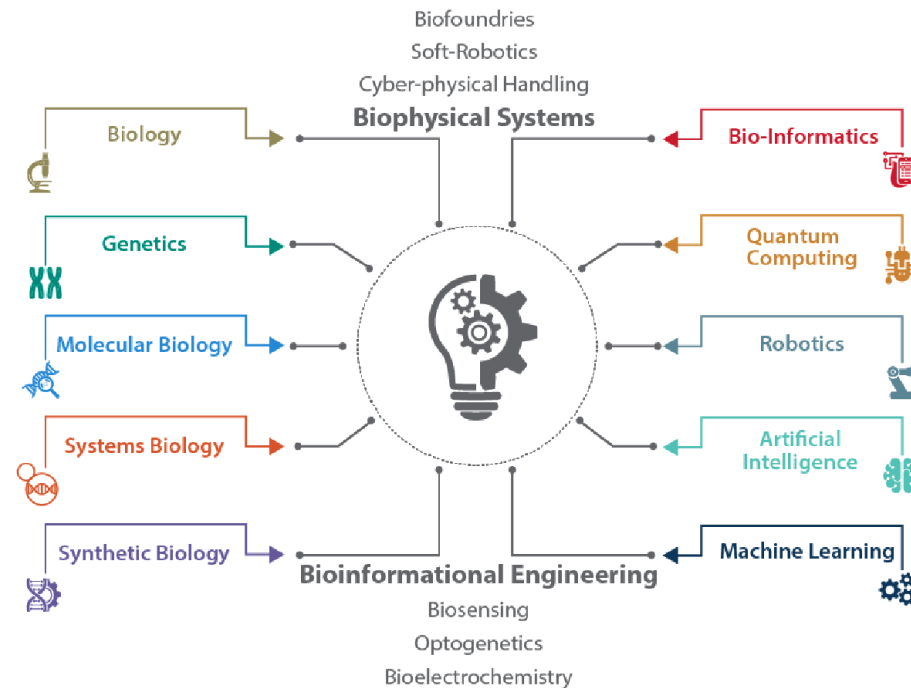
**Biotech**

# Biotech

- biotechnology
  - is multidisciplinary field leveraging broad set of sciences and technologies
  - relies on and builds upon advances in other fields such as nanotechnology & robotics, and, increasingly, AI
  - enables researchers to read and write DNA
    - sequencing technologies “read” DNA while gene synthesis technologies take sequence data and “write” DNA turning data into physical material
- 2018 National Defense Strategy & Senior US Defense and Intelligence Officials identified emerging technologies that could have disruptive impact on US national security [[Say21](#)]
  - [AI](#), lethal autonomous weapons, hypersonic weapons, directed energy weapons, [biotechnology](#), quantum technology
- other names for biotechnology are engineering biology, synthetic biology, biological science (when discussed in context of AI)

## Biotech - multidisciplinary field

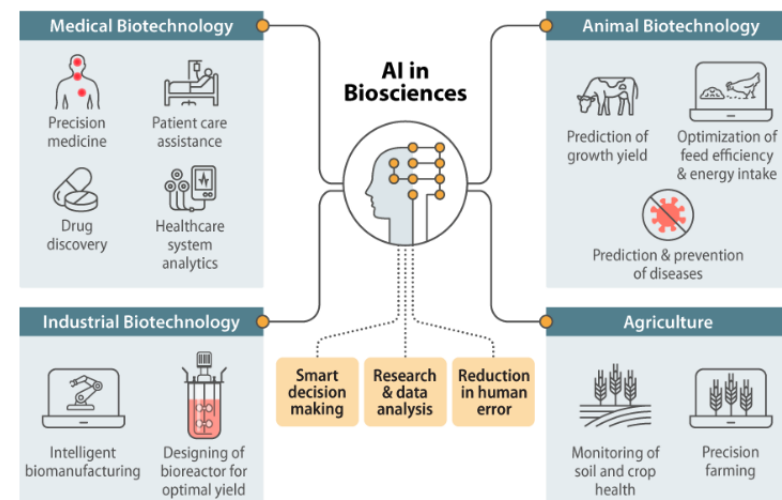
- sciences and technologies enabling biotechnology include (but not limited to)
  - (molecular) biology, genetics, systems biology, synthetic biology, bio-informatics, quantum computing, robotics [DFJ22]



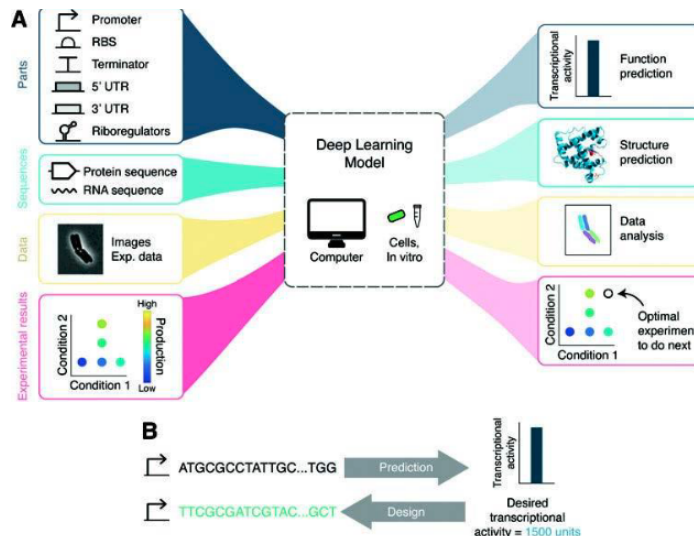
# Convergence of AI and biological design

- AI & biological sciences converging [BKP22]
  - each building upon the other's capabilities for new research and development across multiple areas
- Demis Hassabis, CEO & cofounder of DeepMind, said of biology [Toe23]

“... biology can be thought of as information processing system, albeit extraordinarily complex and dynamic one ... just as mathematics turned out to be the right description language for physics, biology may turn out to be *the perfect type of regime for the application of AI!*”
- both AI & biotech rely on and build upon advances in other scientific disciplines and technology fields, such as nanotechnology, robotics, and increasingly big data (*e.g.*, genetic sequence data)
  - each of these fields itself convergence of multiple sciences and technologies
- so *their impacts can combine to create new capabilities*



## Multi-source genetic sequence data

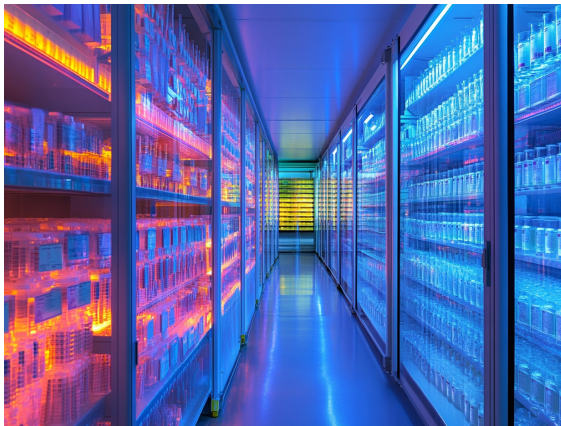


- AI, essential to analyzing exponential growth of genetic sequence data
  - “AI will be essential to fully understanding how genetic code interacts with biological processes” - US National Security Commission on Artificial Intelligence (NSCAI)
  - process huge amounts of biological data, *e.g.*, genetic sequence data, coming from different biological sources for understanding complex biological systems
    - sequence data, molecular structure data, image data, time-series, omics data
- *e.g.*, analyze genomic data sets to determine the genetic basis of particular trait and potentially uncover genetic markers linked with that trait



## Quality & quantity of biological data

- limiting factor, however, is *quality and quantity* of biological data, *e.g.*, DNA sequences, that AI is trained on
  - *e.g.*, accurate identification of particular species based on DNA requires reference sequences of *sufficient quality* to exist and be available
- databases have varying standards - access, type, and quality of information
- design, management, quality standards, and data protocols for reference databases can affect utility of particular DNA sequence



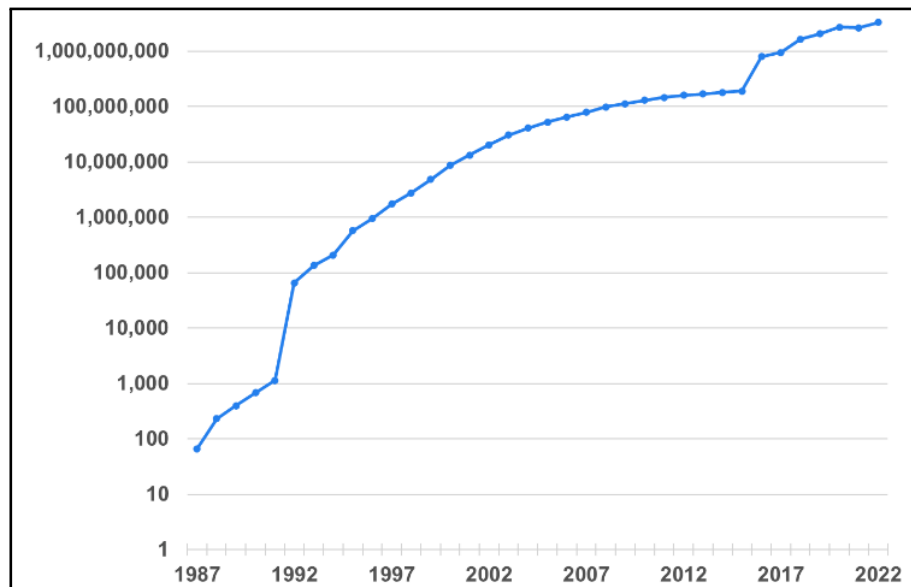
## Rapid growth of biological data

- volume of genetic sequence data grown exponentially as sequencing technology evolved
- more than 1,700 databases incorporating data on genomics, protein sequences, protein structures, plants, metabolic pathways, *etc.*, *e.g.*
  - open-source public database
    - Protein Data Bank, US-funded data center - more than *terabyte of three-dimensional structure data* for biological molecules, *e.g.*, proteins, DNA, RNA
  - proprietary database
    - Gingko Bioworks - more than *2B protein sequences*
  - public research groups
    - Broad Institute - produces roughly *500 terabases of genomic data per month*
- great potential value in aggregate volume of genetic datasets that can be collectively mined to discover and characterize relationships among genes

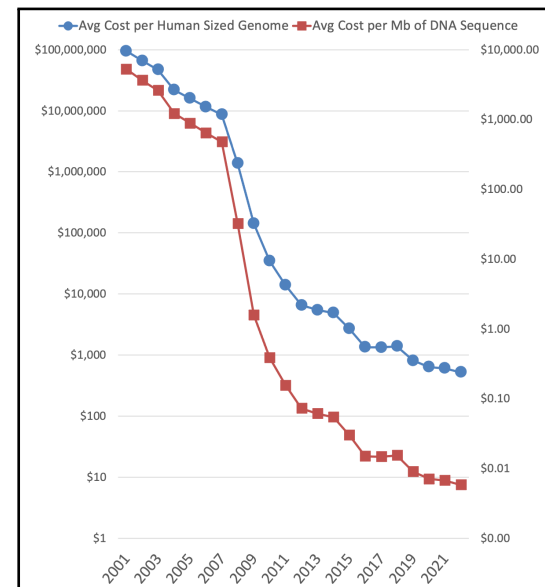
## Volume and sequencing cost of DNA over time

- volume of DNA sequences & DNA sequencing cost
  - data source: National Human Genome Research Institute (NHGRI) [Wet23] & International Nucleotide Sequence Database Collaboration (INSDC)
- *more dramatic than Moore's law!*

# sequences in INSDC



DNA sequencing cost



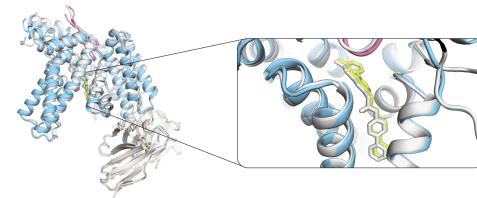
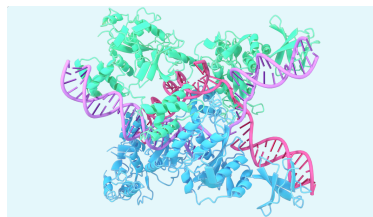
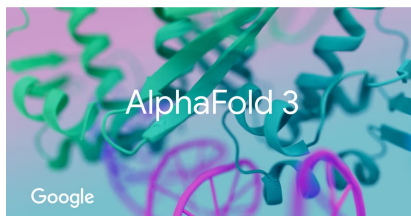
## Bio data availability and bias

- US National Security Commission on Artificial Intelligence (NSCAI) recommends
  - US fund and prioritize development of a biobank containing *“wide range of high-quality biological and genetic data sets securely accessible by researchers”*
  - establishment of database of broad range of human, animal, and plant genomes would
    - *enhance and democratize biotechnology innovations*
    - *facilitate new levels of AI-enabled analysis of genetic data*
- bias - availability of genetic data & decisions about selection of genetic data can introduce bias, *e.g.*
  - training AI model on datasets emphasizing or omitting certain genetic traits can affect how information is used and types of applications developed - *potentially privileging or disadvantaging certain populations*
  - access to data and to AI models themselves may impact communities of differing socioeconomic status or other factors unequally

# **Emerging Trends in Biotech**

# AlphaFold

- solving 50-year-old protein folding problem, *“one of biology’s grand challenges”*
  - definition - given amino acid sequence, predict how it folds into a 3D structure
  - proteins fold in microseconds, but predicting computationally nearly impossible
- AlphaFold 1 (2018) - DL + physics-based energy functions → AlphaFold 2 (2020)
  - attention-based NN solving protein folding “in principle” → AlphaFold 3 (2024) - diffusion-based DL, drug-protein interactions, protein complexes
- AlphaFold protein structure database
  - >200MM protein structures - nearly every known protein, used by >2MM researchers
- Applications & implications
  - drug discovery - target identification, lead optimization, side effect prediction
  - enzyme engineering, agriculture, environmental, vaccine development



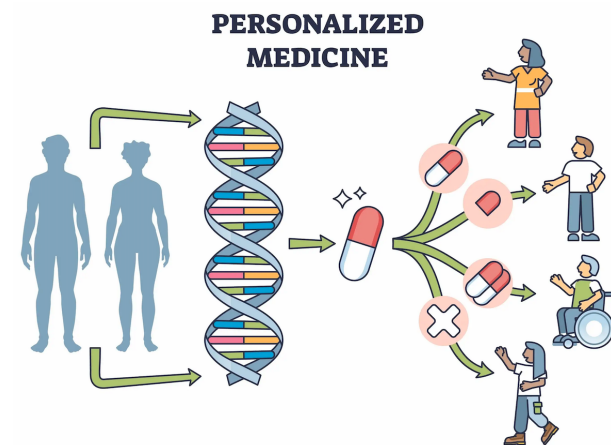
# AlphaGo

- [illegible]



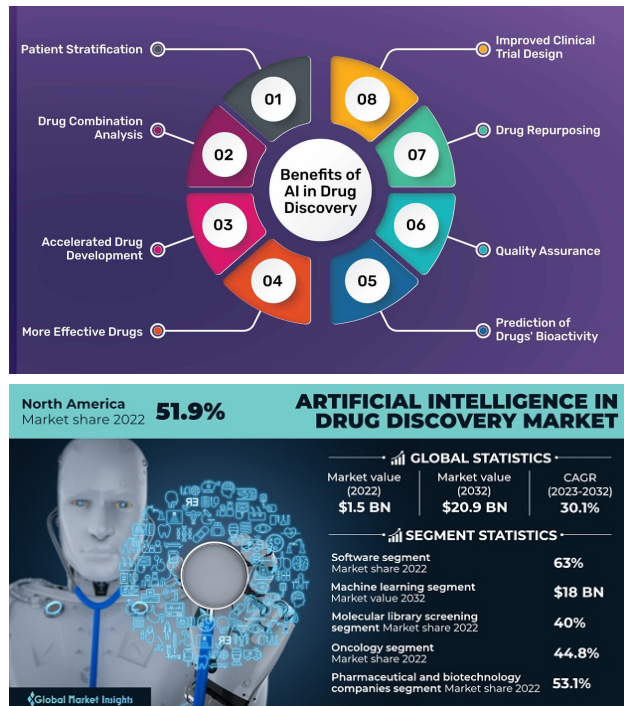
## Personalized medicine

- *shift from one-size-fits-all approach to tailored treatments*
- based on individual genetic profiles, lifestyles & environments
- AI enables analysis of vast data to predict patient responses to treatments, thus enhancing efficacy and reducing adverse effects
- *e.g.*
  - custom cancer therapies
  - personalized treatment plans for rare diseases
  - precision pharmacogenomics
- companies - Tempus, Foundation Medicine, *etc.*





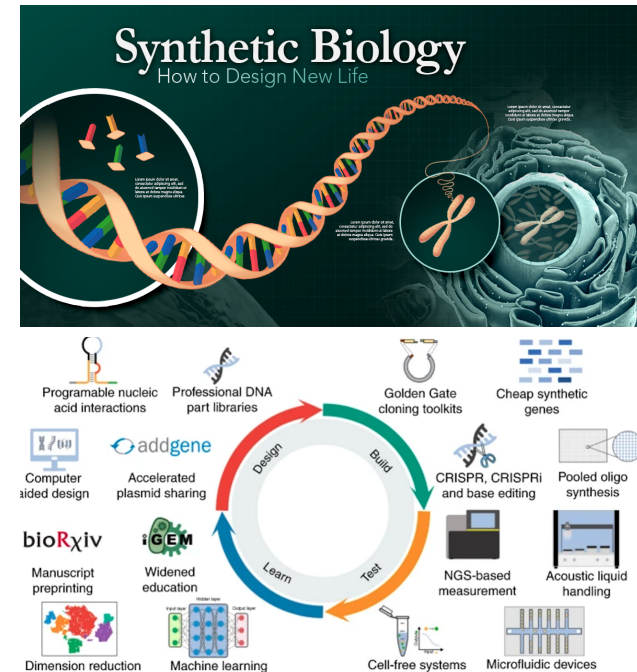
## AI-driven drug discovery



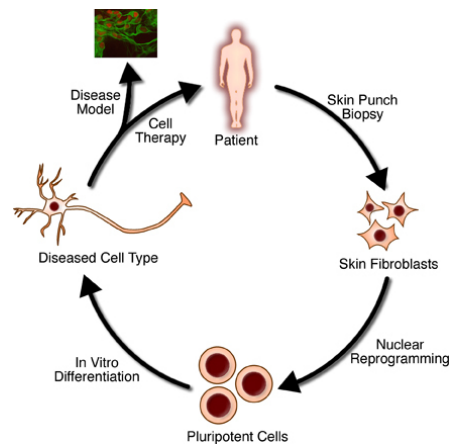
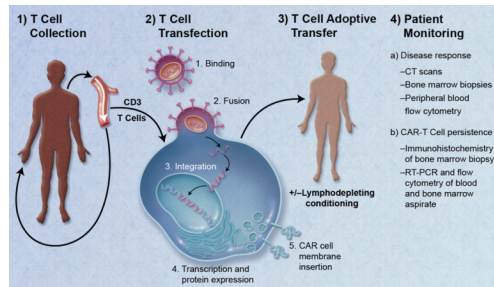
- traditional drug discovery process - time-consuming and costly often taking decades and billions of dollars
- AI streamlines this process by predicting the efficacy and safety of potential compounds with more speed and accuracy
- AI models analyze chemical databases to identify new drug candidates or repurpose existing drugs for new therapeutic uses
- companies - Insilco Medicine, Atomwise.

# Synthetic biology

- use AI for gene editing, biomaterial production and synthetic pathways
- combine principles of biology and engineering to design and construct new biological entities
- AI optimizes synthetic biology processes from designing genetic circuits to scaling up production
- company - Ginkgo Bioworks uses AI to design custom microorganisms for applications ranging from pharmaceuticals to industrial chemicals



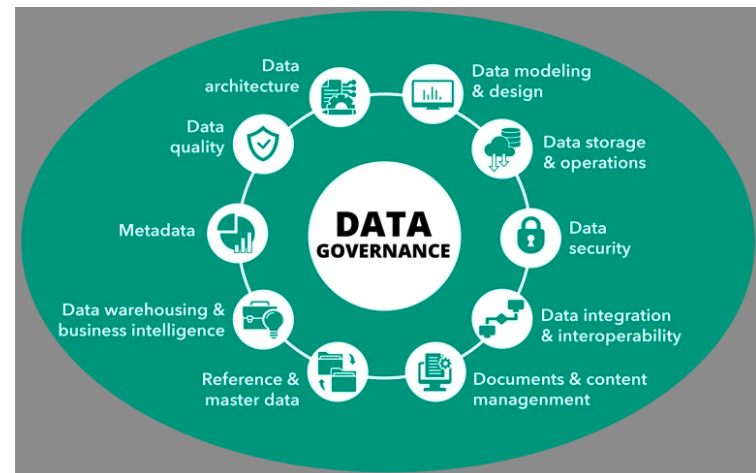
## Regenerative medicine



- AI advances development of stem cell therapies & tissue engineering
- AI algorithms assist in identifying optimal cell types, predicting cell behavior & personalized treatments
- particularly for conditions such as neurodegenerative diseases, heart failure and orthopedic injuries
- company - Organovo leverages AI to potentially improve the efficacy and scalability of regenerative therapies, developing next-generation treatments

## Bio data integration

- integration of disparate data sources, including genomic, proteomic & clinical data - one of biggest challenges in biotech & healthcare
- AI delivers meaningful insights *only when* seamless data integration and interoperability realized
- developing platforms facilitating comprehensive, longitudinal patient data analysis - vital enablers of AI in biotech
- company - Flatiron Health working on integrating diverse datasets to provide holistic view of patient health



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## Selected references & sources

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**Thank You**