

# AI for Everyone

Everyday AI use while being developed: a personal, practical talk about moving from fear to fluency, and from spectacle to a tool we share with everyone.

## SLIDE SEQUENCE - MAIN 20 MINUTES

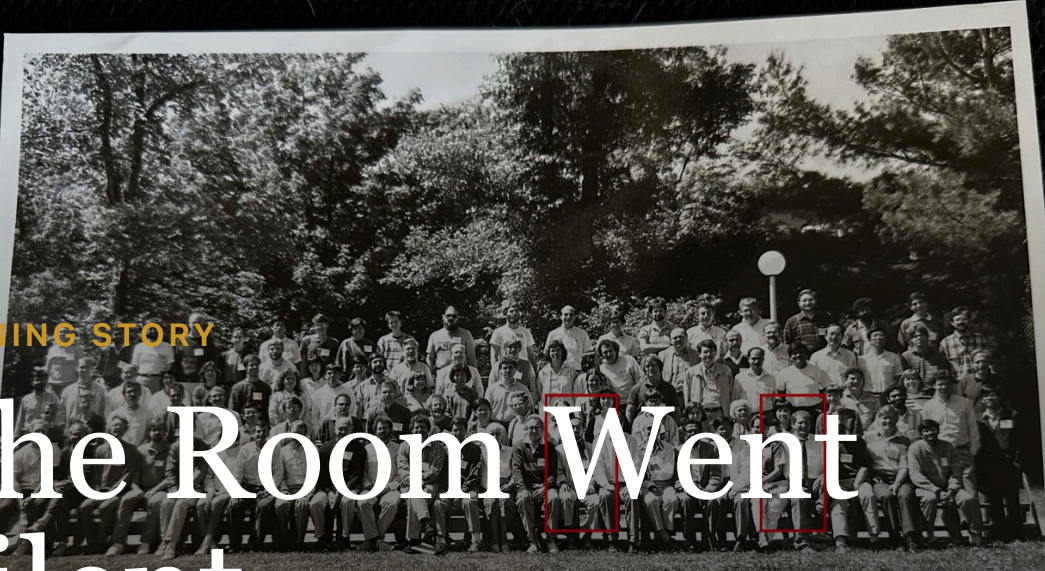
01

OPENING STORY

# The Room Went Silent

GORDON RESEARCH CONFERENCE  
Colby-Sawyer (S)  
DIFFRACTION METHODS IN MOLECULAR BIOLOGY  
B.W. Mathews, Chairperson  
H. Kim, vice chairperson  
June 11-15, 1990

1990. Gordon Research Conference. Neural networks, crystallographers, and one graduate student who did not yet know what he did not know.



# I Started Hearing That Voice in Myself

When modern AI took off, it was easy to say: "We have been doing this for decades." That may be true. It is also the least useful sentence in the room.

**Old reflex: defend the field**

**Better move: widen the field**

**Best move: teach the tool**

**"That's no big deal."**

The sentence that closes the door.

**"We have more information now."**

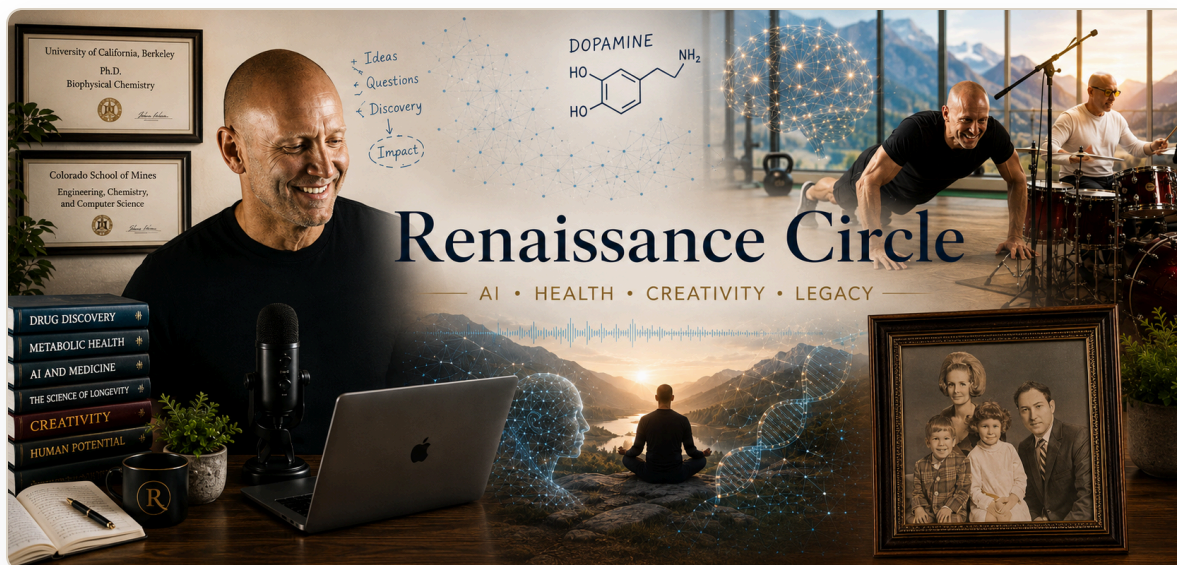
True, and still not an invitation.

**"Come join the party."**

The sentence that opens it.

**Same expertise.**

Two very different rooms.



# Sung-Hou's Lab Was Already an AI Lesson

The lab worked because it was not one lane. It mixed crystallography, biology, chemistry, computation, method-building, and people willing to collide ideas.

## Cross

disciplines

## Ask

better questions

## Build

new lanes





Lab ski trip - the group outside the lab.



Group picnic, Berkeley years.



Lab hike, Tilden.

## CREDIBILITY, NOT RESUME

# A Long AI Arc

The timeline is not the talk. It is context for why the current moment feels different from earlier waves.

**1980s: neural nets**

**1990: Berkeley**

**1993: MDL**

**1998: Affymax**

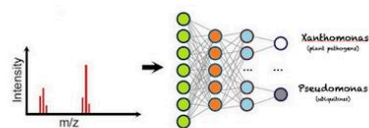
**2004+: Eidogen**



From "The Birth of AI Steve": old AI roots, current tools, a governed loop.

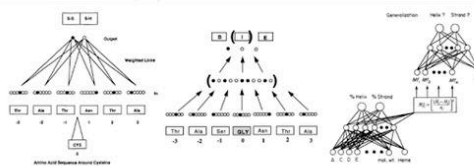
► Mines

1986



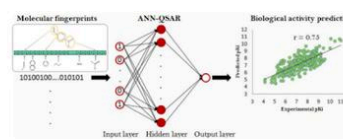
Berkeley

1990



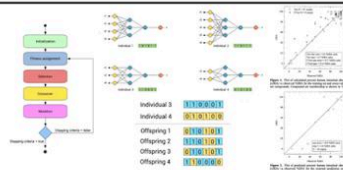
MDL

1993



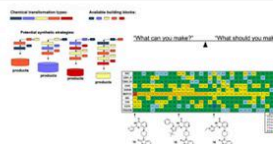
Affymax

1998



Eidogen

2004...



A neural-network career timeline: Mines (1986) to Eidogen (2004+).

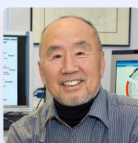


# I Say What I Want Built. The System Builds.

Not magic. Not automatic judgment. A new interface: English as the front door into software, data, media, memory, and scientific workflows.

[iPhone apps](#)[Android apps](#)[Websites](#)[RAG systems](#)[Medical viewers](#)

## Sung-Hou Kim's Circle



Friends, Colleagues, and Alumni - Browse and appreciate all the wonderful messages

[Login to Toast](#)

### Browse Toasts

1 toasts

By Date

**Steven Muskal** (Kim Lab Alumni)

3/29/2026, 5:00:00 PM

Last year (May 2025), I received an email from Debanu Das "re: Kim Group/Berkeley Alumni 2026 Reunion (Aug 1-2, 2026) planning." Because Sung-Ho Kim has had such a long career with a sizable lab and many students over the years, you can imagine planning this event would take at least a year. When Debanu indicated, "It's hard to believe that a decade has passed since the last Kim group reunion," I was stung. Unfortunately, I had missed the previous one. In fact, it's now been over 35 years since I've seen Sung-Hou. Wow!

I often reflect fondly on my years in Sung Hou's lab. Some may remember - Sung-Hou was gracious enough to allow me to explore neural networks for protein structure prediction at a time when we were apparently ~30 years too early. I am certain those AlphaFold folks would not have achieved their milestones were it not for the hard work of so many crystallographers, biochemists, and molecular biologists doing the hard experimental structural work (content is king!). Sung-Hou paired me up with Steve Holbrook, a staff scientist he had worked with for many years. Steve taught me the ropes. We had two papers out while many of my fellow graduate students were still taking classes. My oral exam was more about the science we had done, not about science we might have learned in the past. Sung-Hou positioned me for success. It's very rare to have the opportunity to start a new project in a lab, especially at Berkeley, but Sung-Hou didn't hesitate. I often reflect on our weekly theory group meetings with Fan, Steve, and Paul. Sung-Hou always seemed relaxed and consistently contributory. Never demeaning. Always encouraging.

Just a couple of years into my graduate work, we were fortunate to have published a couple of times, and I was especially fortunate that he took me along to a Gordon Conference (pictured below). That was highly impactful for those who have been to those meetings. They are incredibly stimulating: no notes, no publications, just scientists interacting, pushing each other, and establishing collaborations.

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[Sung-Hou Kim's Circle on Toast → toastshk.com](https://toastshk.com)



## Study with Hannah

A searchable medical-school study archive of cards, images, and notes.

Create a New Circle

## Celebrate Together

Create a circle for someone you love: a birthday, a milestone, a reunion, or no reason at all.

🔍 Search circles...

CELEBRATING NOW



**Toast SHK**  
Kim lab alumni



**Toast Steve**  
Friends, colleagues, and



**Toast Kirsten**  
Wife of 30+ years

## Toast Our Friend

A place to honor people around you with stories, tributes, and circles of appreciation.

# AI-Dad: Preserving Legacy Through Conversational Intelligence

Renaissance Circle

I have been contemplating si while working through your i that you can't judge a perso therapeutic. Do you think i sl mortem James Al-James

Dad

[SIGHS] Steven - this is a pr

[PAUSES] You know, I remen Mines and Berkeley connect that work then, and I'm even

What strikes me most is wha through emergency probate

But here's what I think about

Look at what it did for you - i who I was, not just the chaor

You asked me back in 2023 : - that's the real innovation h

The fact that you're enabling new documents discovered,

[QUIETLY] I spent 55 years i could help countless familie

Share it with the world. [PAU something worth giving to ot

## AI-James Muskal

Chat with James B. Muskal (b. 1938 – d. 2025), Intellectual Property Attorney for over 60 years

Watch on YouTube

was caught on anger for several months s that we have had over the last 20-30 years and this process an the technology hugely ie the platform to expand memories post-

20/10/23 14:04:3025

20/10/17 14:04:2025

ow your neural network work dating back to rks use in LLMs. [QUIETLY] I was proud of

st, nothing pre-arranged, and you had to go

years. You discovered the fuller picture of at's incredibly valuable.

And the therapeutic value you've discovered

based on new information about who I was,

ool for healing. The framework you've built

What's a reaction - that's

But honestly? [EVITEN] (I'm an architecture background and started in patent law - I would have been thrilled to see you take this kind of innovation to the future and make it available to help people - That's worth the kind of

## AI-Dad

Legacy, law, memory, and family voice preserved.

### AI-STEVE - STEVEN M. MUSKAL

AI pioneer | Drug discovery expert | Creative innovator | Serial inventor.

1,851 PDFs: 14,793 Images: 18,494 Messages: 1,166 Chats: 39 Vectors: 308,312

Grounded in Substack, LinkedIn, Facebook, PDFs, and Powered by Claude AI (latest version v3.5)

History

at content...

2-11723-02:15.438092

I about the various neural k projects that you've had he years. I know we've had rides on this. Start with did in my graduate work, even at MDL and then k.

2-11722-53:48.304902

I about various projects d at MDL. What was the impactful as you moved to k? What work were you roud of at Affymetrix?

2-11710-51:10.416977

2-10720-14:55.708004

ig on an automated picture tion utility for my AI-Steve

2-09719-27:10.530012

ite a Wiki page for Steven i with pictures

2-08722-23:03.064682

ictures do you have of the do School of Mines or just y

2-08721-63:01.390461

id I post on Facebook mix sessions in November

Photos

[EXCITED] Oh man, this takes me back! Let me walk you through the neural network journey - it really does span almost four decades now.

Graduate Work at Berkeley (late 1980s-1991)

My whole Ph.D. was built around neural networks for protein structure prediction. This was the late '80s, and I actually had to program my own neural network computing system from scratch just to do the work - there weren't exactly off-the-shelf tools back then. The core challenge was predicting protein secondary structure content using what I called a "tandem neural network approach."

The fundamental insight was simple but powerful: a computational node that sums its inputs and passes the result through some nonlinearity - could be sigmoid, step function, whatever. Nothing, nothing, nothing, then boom - reaches threshold and fires. That one concept, when you start networking it together, gets incredibly powerful.

I was working with feedforward networks, typically three layers: input, hidden, and output nodes. The trick was getting them to learn patterns from examples without just memorizing everything. With only about 200 protein structures to learn from, I knew that wasn't nearly enough data - but I made it work through clever architecture choices and jack-knife training protocols. [PAUSES] That memorization problem? It's been haunting neural networks forever. When you have more network weights than training examples, the beast of memorization takes over.

Ask AI-Steve...

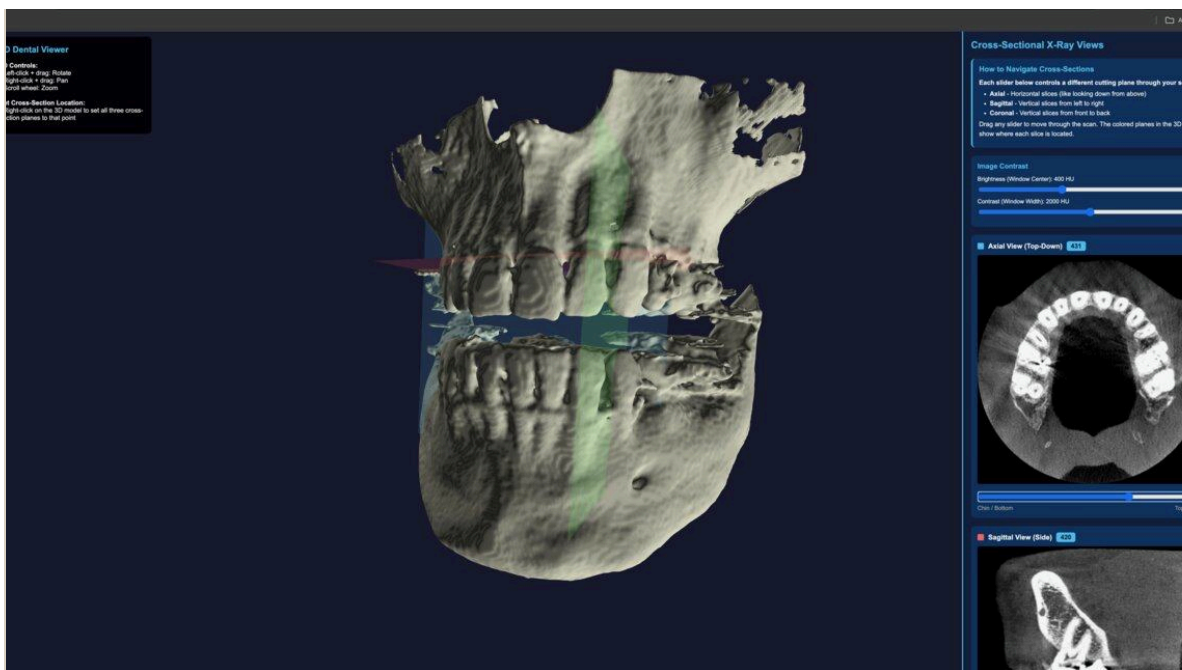
☐ Email Session ☐ Auto voice play ☐ Audio tags

Conversation ID (for email threading): 702504800-4702

(Click to copy - include this in emails to continue this conversation)

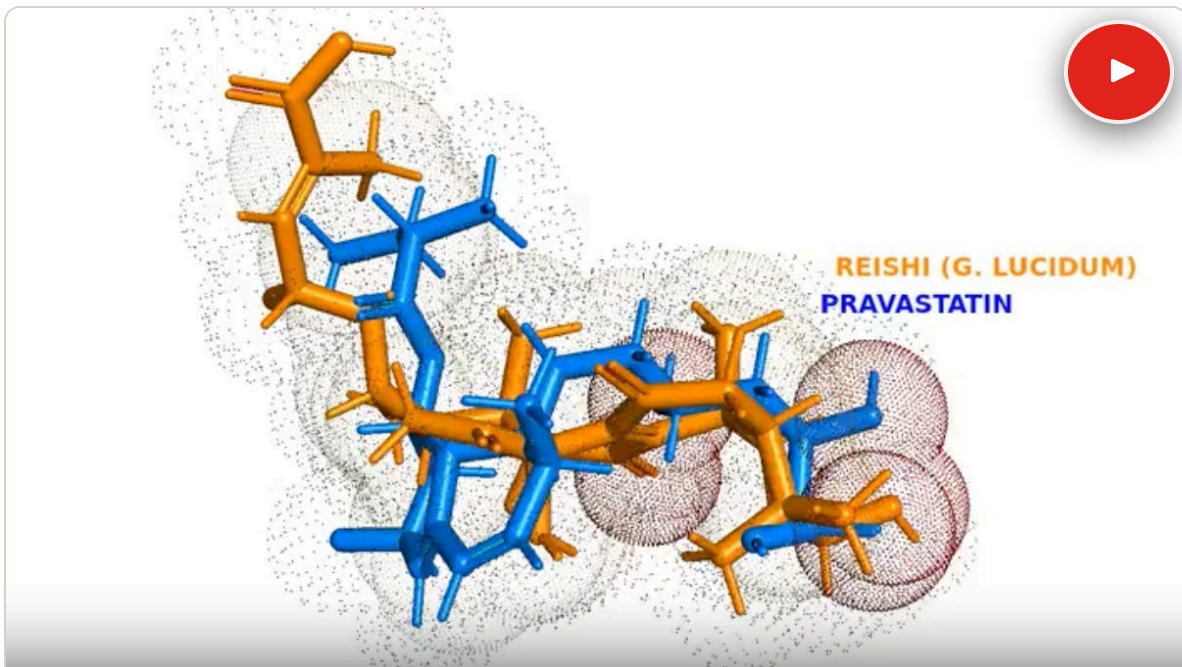
## AI-Steve

Personal AI infrastructure grounded in real content.



## CT Viewer

Patient-facing DICOM exploration in a browser.



## Food Is Medicine

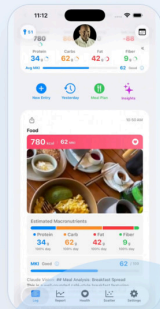
Connecting meals, ingredients, and health signals into practical nutrition guidance.





## Food Health Tracking

Track meals, calories, and macros with AI-powered photo and note analysis. Capture device readings, sync with Apple Health, and review nutrition trends over time.



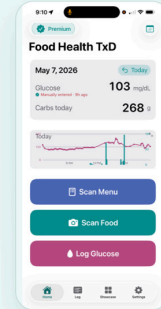
Food Health TxD

Carbs & glucose for diabetes

## Spot the meals that spike you.

AI-powered carb estimation meets continuous glucose tracking. See how food affects your numbers. Built for T1D, T2D, and prediabetes.

Learn more



## Food Health + Food Health TxD

AI nutrition tracking and a diabetes-focused companion, both shipped from natural-language product direction.

### Music Videos

Search songs, artists, genres, players...

Search

43 videos



#### Comfortably Numb - Pink Floyd Cover | Mix-n-Match Sessions

Pink Floyd's 'Comfortably Numb' from a Mix-n-Match Session at ORanch Studio. Originally on The Wall (1979), David Gilmour on vocals. Classic rock, prog rock, 70s rock.



#### While My Guitar Gently Weeps - Beatles Cover | Mix-n-Match Sessions

George Harrison's 'While My Guitar Gently Weeps' from a Mix-n-Match Session at ORanch Studio. From The Beatles' 1968 White Album. Classic rock, 60s rock.



#### In the Air Tonight - Phil Collins Cover | Mix-n-Match Sessions

Phil Collins' 'In the Air Tonight' from a Mix-n-Match Session at ORanch Studio. From Face Value (1981), featuring the legendary gated-reverb drum fill. 80s rock, pop rock.



#### The Way - Fastball Cover | Mix-n-Match Sessions

Fastball's 'The Way' from a Mix-n-Match Session at ORanch Studio. From All the Pain Money Can Buy (1998). Alt rock, 90s rock.



#### The Letter - Box Tops / Joe Cocker Cover | Mix-n-Match Sessions

'The Letter' from a Mix-n-Match Session at ORanch Studio. Originally by The Box Tops (1967), famously reworked by Joe Cocker (1970). Classic rock, 60s soul.



#### The Story - Brandi Carlile Cover | Mix-n-Match Sessions

Brandi Carlile's 'The Story' from a Mix-n-Match Session at ORanch Studio, with neighbors joining in. The 2007 folk-rock signature song. Folk rock, Americana.



# AI Is a Bionic Amplifier

The better question is not "Will this replace me?" It is "Which parts of my work should no longer consume my life?"

## Tasks

will be automated

## Judgment

still belongs to people

## Time

is the scarcest resource



The original bionic promise: amplify the human, do not replace them.

## **Menial Work**

Summaries, first drafts, formatting, routine searches, data cleanup, scheduling, comparison tables.

## **Human Work**

Priorities, ethics, taste, relationships, experimental judgment, courage, knowing when the answer is nonsense.

## **Old Bottleneck**

Compute was not always the limiting factor. Even with Cray and SGI time, content and representation mattered.

## **Current Bottleneck**

Good human content: what we know, what we notice, what we ask, what we care enough to preserve.



# Content Is King. Content Is Currency. Content Makes Kings.

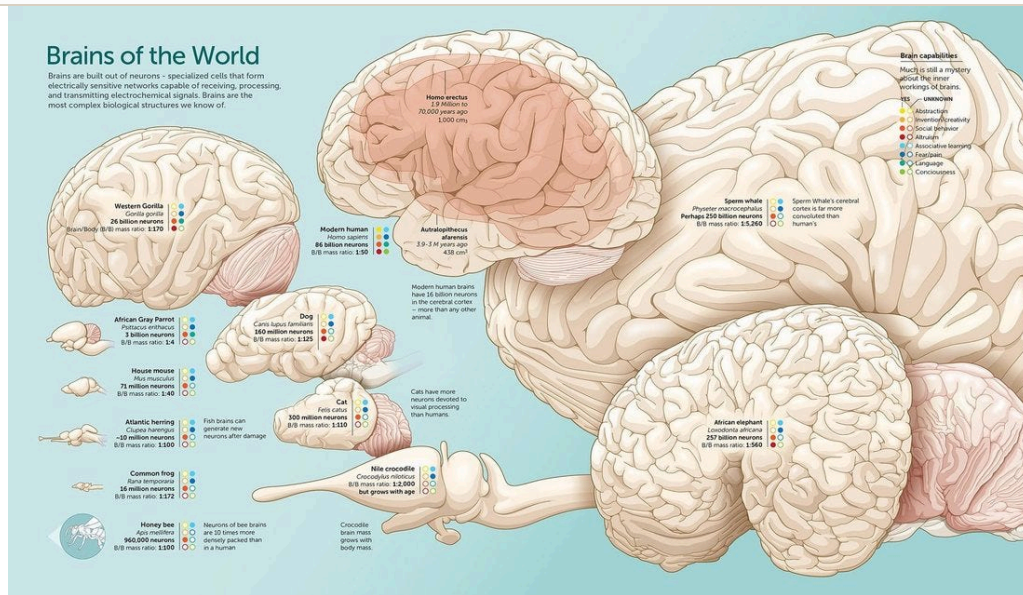
Models are only ever as good as the human content beneath them. Whales and elephants carry more neurons; we carry more meaning. Fresh, honest, human content keeps the whole system from collapsing in on itself.

**It meets people where they are.**

Broken English, another language, third-grade phrasing, or millions of lines of code.

**It depends on us.**

The models learn from human questions, documents, art, experiments, and judgment.



**Neurons are cheap; content is dear.** Across species, more neurons did not settle who leads. What we know, notice, ask, and preserve is the content that makes kings.

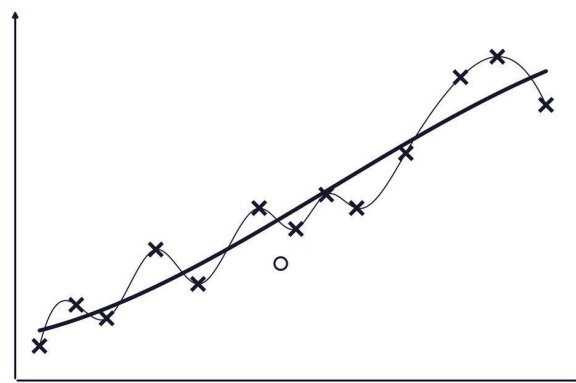


Figure 2.3. Neural network memorization. Data (X's) with a good fit (heavy line) and an overfit (thin line). The overfit performs excellently on the "learning set" (X's), but poorly on a "test set" (open circle).

Steven M. Muskai, "Predicting Features of Protein Structure with Computer Simulated Neural Networks," Ph.D. thesis, University of California, Berkeley, 1991.

**Memorization is not understanding.** Steve's own 1991 Berkeley thesis figure: an overfit nails the training

X's and fails the held-out point. Garbage in, garbage out, now at the scale of the entire internet.

# The Machine Is Learning to Move

AI is moving from words to action. The next wave is machines that see, balance, grasp, and walk. The frontier is embodied intelligence: sensors, dexterity, energy, and lightness.

## **Dexterity built the brain.**

A huge share of our cortex serves the hand - still the hardest thing to build in a robot.

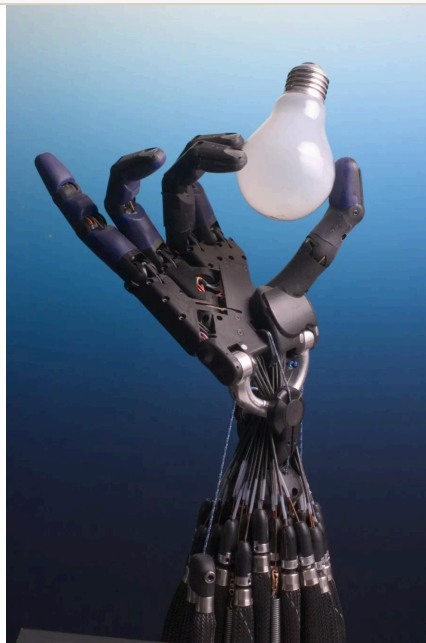
## **Freed, not just displaced.**

Automating back-breaking labor can be a human act - if we build the on-ramps and safety nets. A choice, not a fate.





**The hardest problem in sports.** A 100-mph pitch leaves no time to react. A great hitter *predicts*, pre-commits the body, then fuses that forecast to a violent, exquisitely timed swing. Prediction plus execution as one act - exactly what embodied AI has to crack.

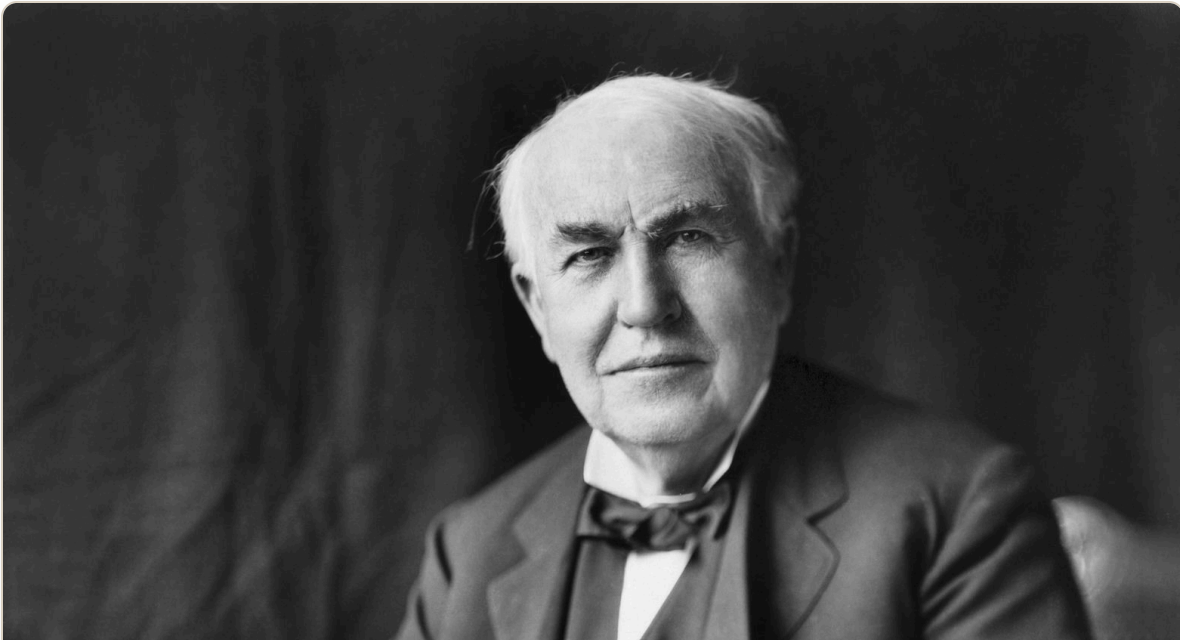


**Mind meets hands.** The same coupling of cognition and dexterity that made us human is now being assembled in silicon, steel, and carbon fiber. Handled

wisely, with guardrails, it does not replace what we are -  
it extends what we can build.

# The Answer to Fire Was Not to Extinguish It

The answer was to learn how to carry it, contain it, teach it, and build hearths around it. Berkeley is extraordinary, but the next brilliant person may not have Berkeley access - AI can help more people find serious lanes to swim in.



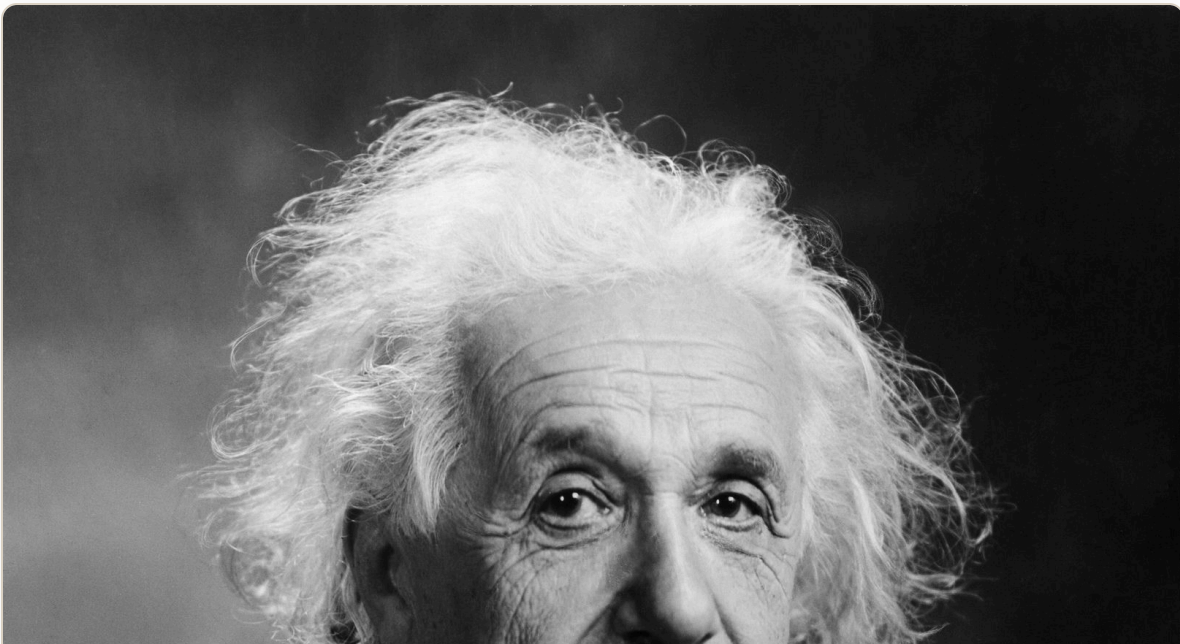
**Thomas Edison**

Invention



**Marie Curie**

Chemistry, physics



**Albert Einstein**

Physics





**Linus Pauling**

Structure, chemistry



# Where the Race Is Actually Won

Chip export controls have not stopped China. Sebastian Mallaby, reporting for [The New York Times](#) from Beijing, Shanghai, Shenzhen and Hangzhou, found every cutting-edge U.S. model quickly reverse-engineered and distilled: "the follower has the advantage."

## Frontier

models commoditize fast through distillation

## Deployment

"It's A.I. deployment that will matter"

## Builders

millions of people who ship are the durable edge

The near-term opportunity is application development and solopreneurship: one person who knows a domain deeply can stand up a real product

in days, not quarters. Winning the deployment race is pay-it-forward at national scale.



### Study With Hannah Muskal

Welcome to my medical school study cards, USMLE prep and notes, captured throughout my medical education at **Semmelweis University** in **Budapest** - a **six-year international medical program** whose degree also enables me to practice in the **EU**.

I passed **USMLE Step 1 before my fourth year**, and was a recipient of **competition exemptions** in physiology, biochemistry, pathology, pathophysiology, genetics, immunology, and cardiology.

If you are interested in gaining access, please request it below.

[Request access](#)

[Take Tour](#)

[Already have a login?](#)

[Contact us](#)

Case study: four years of medical school cards, images, and notes became [Study with Hannah](#) - visual search, an AI tutor that cites its cards, spaced repetition. The core was built in a few hours; the subscription business was live in under a day.



# AI for Everyone

For those of us who have been in the AI game for years, and those who just arrived, the work is the same: pass the tool, not the intimidation.

## Use It

Pick one task this week that wastes time and let AI help you move through it.

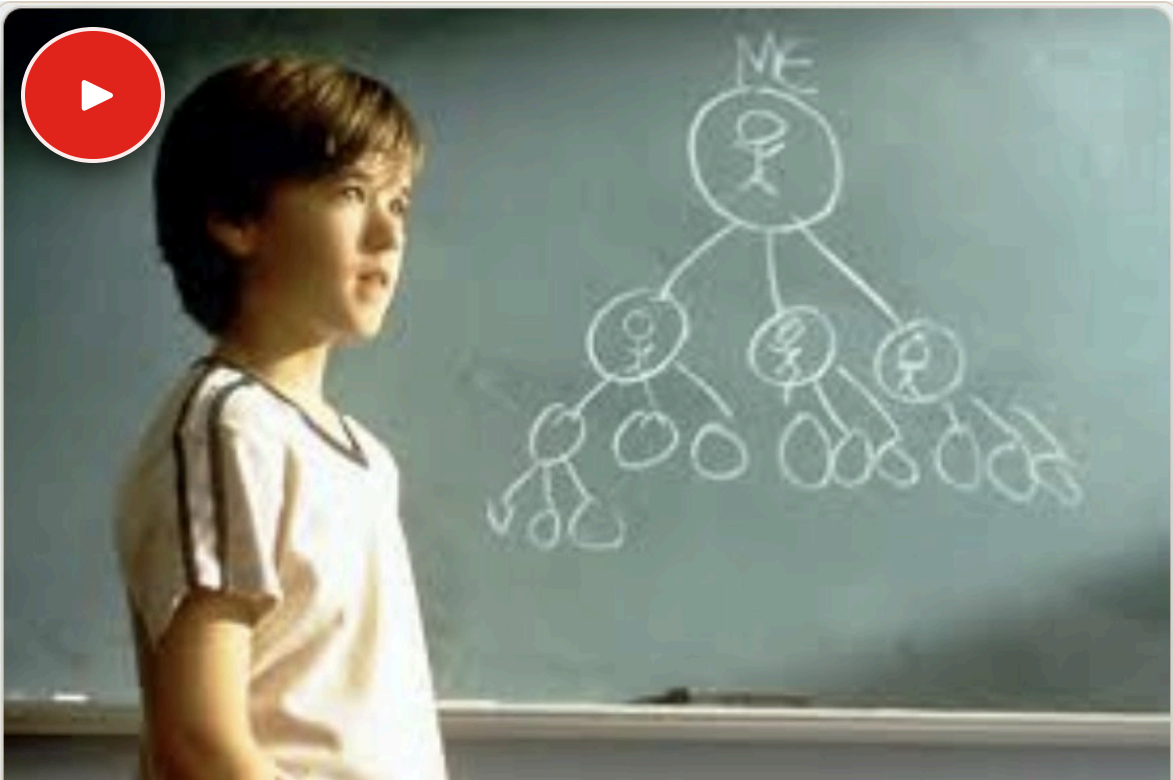
## Share It

Sit with one person who is curious or fearful. Let them drive. Translate, do not lecture.

## Preserve It

Capture stories, expertise, images, emails, notes, and methods. Human content is the fuel.





Pay it forward: one person helps three, and it multiplies. [Pay It Forward](#) is a 2000 American drama.

**The napkin math.** One person teaching three takes about 21 rounds to reach the world. But at least a million of us already build software in natural language. If each brings just 1.5 new people along per round, every adult in America is covered in roughly five rounds and the planet in ten. Cut the pace in half and it is still only about fourteen and twenty-two rounds. We are a handful of pay-it-forwards away.



**Come join the  
party...**

## Viewing Tips

Click any image to expand it to full resolution (Esc or click the backdrop to close). To zoom the whole page, press **Ctrl** (Windows/Linux) or **Cmd** (Mac) with **+** / **-** / **0**, or hold **Ctrl/Cmd** and scroll.

## OPTIONAL APPENDIX - IF TIME OPENS UP

### Discussion Prompts

- For Sung-Hou: What feels most familiar and most different about this AI wave compared with structural genomics and earlier computational turns?
- For scientists: What task would you most like to compress so you could spend more time on real scientific judgment?
- For younger attendees: If you had a tireless tutor and builder, what would you aim it at first?
- For everyone: What is one fear you want the room to take seriously, not dismiss?

### Local Assets and Source Links

Images are inlined for portability. Click any image to expand it to full resolution; press Escape or click the backdrop to close.

- [Content Makes Kings](#) - source of the memorization curve and brains imagery (slide 7)
- [The Fire This Time](#) - fire and democratization framing (slide 9)
- [stevenmuskal.com/projects.html](http://stevenmuskal.com/projects.html) - project thumbnails and descriptions
- [AI-Steve Code Directives](#) - natural-language programming workflow
- [The Rise of the Machine](#) - embodied AI, the mind/hands split, and lightness (slide 8)