Hello, everyone. Welcome to another episode of Q&A about business innovation and managing life.
I see a number of questions that have come in and saved up here.
Let's, go into them.
I see a question from Kate here.
It's a good question. What are your goals for 2026?
That's a good question. I have to admit, I haven't thought about that. I'm always thinking about my…
Kind of goals on a running basis, and I don't think I…
think about them so much in a year-by-year basis, because I typically don't know how long projects are going to take, and it's kind of, well, I don't select them that way. I have to say, one of my kind of idiosyncrasies is that I do… I always have a pad of paper, actually usually a couple of pads of paper, and I've written out
a series of, sort of, to-do items on them, and right now I have two pads of paper that have, you know, the pages, and I put a dash, and then I put some one-line item, and sometimes I have some tucked over in a corner and things like this. I find it rather satisfying to just be able to cross things out on the piece of paper. Once the piece of paper is mostly crossed out, I tend to copy the the what's left onto another piece of paper, and start again, so to speak. And I usually have some codes for myself, like, I have sort of a way of, dashedly crossing something out, which sort of means, well, it's kind of done, but, you know, I'm waiting for somebody else to do something, or something like this. And at any given time.
I probably have, I don't know, 20 or 30 items, and they range from usually, I mean, like, right now, I think I have two pads of paper, one of which is major projects I'm doing, and the other of which is more immediate things to get done, and
Sometimes, really, the major projects get done before some of the things to get done ever get finished. But
In terms of… so those are sort of in terms of my personal to-do types of things. Then there are things for our company.
And, for that.
I tend to operate from a global project list, which has a few hundred items on it. Let me talk about how that works, perhaps as of slight interest. In terms of my personal activities, I'm a big part of, sort of, things I do
by myself, or for myself, have to do with things about science and so on, and things I'm writing, and so I typically have a fairly long list of, I want to write this, I want to do this. Most, sort of, research projects that I think about doing, they ultimately would be packaged as things I write, and so those are, those are items that I have on that list.
And I think usually, in the end, I have kind of a folder that contains one folder each for all of the things that I imagine I might write about or do projects about, and there are probably maybe 40 or 50 items there, and some of those items have been kind of hanging around
sometimes for decades. It's been very satisfying to me in the last 5 years or so that I've been really, you know, checking off things that have been waiting, often for many decades to be done. Science projects, I think the longest-running one was one that I started in 1972, and finally finished to my satisfaction about 2 years ago now, about the second law of thermodynamics, and that turned into a book about that subject and so on.
That had been a project that I've been sort of steadily gestating over the course of about 50 years.

There are… for some reason, I'm kind of on a roll right now, finishing things where I kind of had started thinking about them in the 1990s and 1980s, and I now have the tools and the wherewithal to just get them finished, and it's a very satisfying thing to do.
Those are things that are represented often in this collection of folders of projects that I hope to do. The other big advantage of this sort of system of folders of projects I might do is that when something comes in and somebody sends me something, or I notice something, you know, some paper or some other thing, or I learn about something, I'll just
Throw it in the appropriate folder.
And it's not… you know, I'm often thinking to myself, how could I possibly remember that thing when I actually care about it? So long as I have a folder about a project.
to which that is relevant, it's all good, and things will sit in those folders sometimes for a decade or more, and then when I finally get around to really
doing that project, out they'll come from those, those, those folders, and, and I look at these things.
Actually, I have to say, I used to do that with paper folders, and I just realized that a project that I'm working on, hey, somebody should remind me about this, a project that I'm working on right now about the P versus NP problem, I collected a lot of material about that in the 1980s, early 1980s, particularly, and I have that in a collection of folders in my pretty organized system of paper folders.
and I realized that I haven't looked at that stuff now that I'm finally doing that project 40 years later.
And I mean, I think it's one feature of these projects in science.
Particularly, there are some fields of science that are sort of in rapid motion, but a lot of things that I've been able to think about are things that have been languishing for many decades, maybe a century or more, and so the things that, sort of, I knew about these things 40 years ago are still of current interest.
there will be areas, like in biomedicine, for example, where things that I might have… well, some things in that area have also languished for a long time, but there are things where
some things are, like, the, the sort of the papers that I collected 40 years ago are now mostly irrelevant.
That tends not to be the case when it comes to foundational science. It comes… that's much more true about, kind of, the leading edge of data people are collecting, things like that. Foundational questions, for example, about biology are still very much things that haven't been… were thought about in the 1940s, let's say, and now we finally have the tools to think about them better.
And they're still… the papers that were written in the 1940s are still worth looking at.
That's, I think, typically true. The more foundational the things one's looking at, the more likely it's relevant to look at things from a long time ago.
Not always, there are things from a long time ago where people just didn't understand some major paradigmatic point, and it's sort of all irrelevant from that period of time.
So, the… to talk about… so, the original question was, what are my goals for 2026? And I will say, some of my own… some of the projects that I'm trying to do, there's technology projects, and there's science projects.
A lot of our science projects are part of our new Wolfram Institute, technology projects are part of our company, and there are… on the science side, there's…

quite a lot that I'm trying to do that's based on our physics project, and the progress that we made on fundamental physics now, about 5 years ago. I kind of… plan A for how to make further progress on that was a lot of very bright people involved with it, and it's like, okay, you know, I initiated some things here, now I'm hoping you guys are going to take this forward.
I would say that, I'm realizing that… that, as is so often the case, that sort of the original energy source has to put energy into it on a continuing basis, and I'm now realizing that it's sort of up to me to move forward a bunch of the more difficult, the pretty heavy-lifting kinds of projects related to our physics project. Principle one is this
thing that I'm calling infragometry.
kind of trying to rebuild, sort of, geometry as it has been constructed from Euclid on, but rebuilding it, not in the terms that Euclid started from, of kind of our intuitive sense of points and lines and so on, and continuous mathematics, but rather starting from the discrete underlying structure of hypergraphs and so on, that shows up as the representation of the structure of space-time in our physics project.
And that's a heavy lift from a mathematical point of view. It's something where one has to sort of reinvent some pretty foundational things in mathematics to make that work. And we're… we're making progress.
But it's… it's a heavy lift. I mean, I… to quote somebody from a few years ago, I was asking a leading mathematician in a particular area about a particular thing we needed for the precursor to what we now call infrared geometry, and his response was, you know, to the question I asked, you know, come back in 100 years, and we may know a little bit more about the answer to that question.
Well, I'm trying to kind of front-run that process and actually figure out infrared geometry now, rather than waiting for the natural progress of mathematics, which hasn't particularly been going in that direction, but maybe some things will get developed in mathematics over the next 1 or 200 years that might help.
you might be thinking to yourselves, you know, wait a minute, AI is going to speed up the progress of that kind of mathematics. I don't think that's really what's going to happen in that case. I think that, the kind of, there's a… there's lots of things for which AI is useful for sort of thematics, searching for things, and so on.
But the, you know, build new areas of math, I don't think is the story. Partly because in my own experience of kind of exploring the computational universe, it's very easy to explore things that have never been explored before. The question is to make sort of a human connection back to things that people sort of know they care about for purposes of something like math.
But anyway, so one thing for me is infrared geometry and sort of the construction of kind of the mathematical underpinnings to really develop our physics project so that we can actually have sort of a rigorous mathematical physics approach to lots of kinds of things. I'm hoping that that will help clarify some experimental implications of our physics
project. That's something I intend to chase, and that's a place where, actually, I am using and expect to use LLMs a whole bunch to kind of do thematic searching of the physics literature and so on.
It's, when we're looking for exotic effects that may reveal the discreteness of spacetime, as something like Brownian motion revealed the discreteness of matter back, well, 180 years ago, nearly 200 years ago now.
Although it wasn't noticed by people who cared about those things until about 120 years ago. That's sort of a lesson for us now, of can one search the literature thematically to find weird

effects that people didn't know what they were caused by back then, because they didn't have kind of a paradigm for thinking about them.
So, you know, I'm kind of hoping that we'll be able to understand more about sort of experimental implications of our physics project, whether that's to dark matter, whether that's to features of strange gravitational lensing, whether that's to features of quantum computer kinds of things that one can investigate. Sort of the limitations of quantum computers may turn out to be revealing some very important features of, kind of, the underlying structure of physics, throughout our physics project.
these are things where I really want to kind of figure out these kinds of experimental implications, and I'm hoping
That, if we're really lucky, there'll be experimental implications where we can say, yeah, actually there was an experiment done in 1982 that addresses that question.
That's the better case, if we can find that experiment. The worst case is, well, actually, to solve that, you have to put, you know, telescopes on the far side of the moon, and that's just going to cost a billion dollars or something to make happen.
That's the, that's the less desirable case. The more desirable case is also where you don't have, sort of, the sociological issues of, kind of, people wanting a result to come from an experiment, not wanting the result to come from an experiment. If the experiment was already done, the chips have already fallen, and it's just a question of seeing what happened.
So anyway, another big thing for me is experimental implications of our physics project. Also. I'm kind of tracing a lot of things in foundations of biology. I've been interested in, well, why does biological evolution work? Made a lot of progress on that. A lot of things about the nature of living matter, and kind of theories of bulk orchestration, of understanding sort of how molecular biology, being able to make sort of general statements about molecular biology, rather than specific statements about particular mechanisms and so on. And I've also gotten interested in things about self-replication and sort of origin of life kinds of questions, partly because I realized that those questions are more significant to kind of global
in a sense, computational metaphysics than I had imagined they were, and we're going a bit off track from business innovation and managing life, but just to say something about that, the main question is, I've realized the importance of, kind of, observers like us
in having laws of physics that are like the ones we see, but I realized that if there was only one observer, if there's only one of us in the world, it would be hard to have a notion of objective reality. It's important that there are many of us
who perceive more or less the same things, so that that means we have this feeling that there is an objective outside of us, reality to things, that's shared by all of us. But in order for that to be the case, you have to have some mechanism, like self-replication, to have lots of us, so to speak. And I think that that's more important to, kind of, the origin of observers like us than I had originally imagined, and it sort of is a mixture of, kind of, biological questions and more, in a sense, in the end, physics and philosophical questions to understand how that works. So that's another… another one of my
projects.
Right now, I'm working on the P versus NP problem, which I, as I mentioned, I actually thought about a bit in the 1980s, and have a bunch of new insights about it, and have been making rather interesting progress on that.

It's a… it's a more complicated question than people perhaps give it credit for, but there are some interesting things, I think, that one can say, and that happens to be something I'm… I'm working on right now.
Other things that, I'm interested in hoping to do. I'm… I'm hoping,
We have a project at Wolfram Institute for doing, kind of, computational metaphysics and understanding, sort of, the philosophical implications of our physics project. I'm kind of hoping that we will be able to pull in a bunch of professional philosophers to kind of help answer questions, and I've kind of made up a list now of, sort of, prompts
like… how does what we've done about the Rulliad relate to Leibniz's monadology, for example? And these are things where it's a question of understanding enough of, sort of, the historical strands, threads of philosophy to relate them to what we're doing now. I'm sort of hoping that that's a place where I'll do some of the lifting, but other folks will help with pieces that I
find pretty hard, because I just don't know
you know, something like, you know, Immanuel Kant, for example. I know fragments of what he had to say about philosophy that relate in all sorts of interesting ways to things I've done, but, you know.
Oh, a couple of years ago, I thought, you know, people have been telling me enough about, your stuff relates to what Kant did, I thought I'd better just get a copy of Kant's Collective Works. Collective Works. It's a whole shelf.
And I certainly haven't read that. And even reading small fragments of his more famous works, they're very hard to read, I think, for anybody, but particularly for me.
And so I'm sort of hoping to get, help with that.
There are some other things that I'm hoping to do that, have to do with this field of ruliology, studying simple programs and what they do, something I've been interested in for
for, well, nearly 50 years now, and the… it's… it's something where I really want to develop that field.
And, whether it's making a rulological society to sort of collect efforts in those directions, whether it's making a rulological museum of the science and art of what one can do with ruliology, all of these kinds of things are things that I'm… I've been thinking about and hoping to make progress on.
There are some other projects that are more of a… of a…
sort of, I don't know what they are, an educational nature. There's a book that I started a few years ago called Introduction to Computational Thinking that I think is something that is an important thing to provide as kind of a foundational course for college students and so on. I, frankly, haven't had much time to work on that, and I also was not completely happy with the direction it was going on.
in, and sort of the level of depth that I was ending up getting to, I think I need to find a different level for describing things so that I don't… so that I'm not writing a 2,000-page book there. But that's something I'm… I'm hoping I'll have a chance to work on. Also.
in terms of those kinds of projects, well, another scientific-type area that I'm really hoping I'm finally going to get to is studying, kind of, economics and social science using the kind of foundational computational methods developed for our physics project. I've been steadily collecting material and
a knowledge about those kinds of things, and I'm almost ready to actually start making serious models, and trying to sort of understand what I think are some of the foundational questions in

those kinds of areas. But, so that's something I'm hoping to get to in the next few months. Then…
Well, another area that is,
I don't know, I suppose at some level recreational, but it's also in… it's also kind of helpful to me in many ways, is historical projects that I've been interested in doing. And so, one project that's been a bit postponed for the last couple of years is the… the long history of neural networks, kind of
neural networks, people think, oh, that's a very modern thing, but actually, they definitely date to 1943, and I think they date right back into the 1800s, and I've been sort of trying to disentangle how people came to be, you know, have the ideas that they had about neural nets. Part of what got me into that was realizing that I think some of the foundational ways that people approach neural nets aren't the only way you can do it.
probably aren't the best way to do it, particularly when it comes to thinking about whether you're using continuous mathematics or discrete mathematics to study neural nets and so on.
let's see, what other personal projects do I have? My gosh, there are, there are a bunch of things that have to do with,
Well… a very basic one that I maybe will even get done before the new year, is I've,
I've just got a lot of material that I've collected about a lot of kinds of things, and as I say, some of it is well folded into particular projects I'm doing, but some of it isn't really, and it's been sort of collected in a slightly more random way, and I really want to organize that so I know these are definite projects I'm thinking of doing, I'm going to set this up so I can pay attention to the particular things that are needed, and some of the things where I'm just going to decide that's going
in my archive folder.
And I'm just not gonna get to that.
And,
They're actually… well, okay, another project that I have that's been postponed for a few years now, I have very extensive personal archives, both during the sort of purely digital era, that really, for me, my sort of peak of paper production was around 1984, and after that time, my paper production went progressively down, and everything went sort of born digital.
But I have about now half a million pages of scanned documents from my… so mostly from my life before 1984, and that includes a lot of historically interesting, scientific material correspondence with all sorts of people, things that I did, things that people gave me, and so on. And I've been wanting to expose that as a kind of public archive. Part of what has held me up is the pure mechanics of how you do that.
And we have started a few years ago to develop a kind of archive handling system based on our kind of symbolic representation of things and our notebook technology. It was quite lovely, but it didn't get finished. And that's another thing that I would like to finish.
And part of the idea there is that I have a huge amount of raw material in my archives, but the question is to kind of tell… to knit that together as historically relevant threads
And, you know, kind of the way one imagines doing that is it's like you have a virtual box of material, and you're copying pieces from the virtual box into a notebook, and then annotating the things that I sort of remember about how those different pieces fit together. Because, in a sense, there's a lot of metadata that right now is just

my memory, that tells one how these different pieces relate. And it's, it's, you know, when one looks at, you know, back at photographs and so on, it's, you know, I can, like, I'm looking at photographs in,
from 30 years ago or something. Now, it's like, I can remember the context of that photograph, but
It's just in my memory. And, if one wanted to kind of… if anybody else was interested in looking at this, there wouldn't be enough information for them.
So that's another project. I'm sure there are many more projects that I'm not immediately remembering. When it comes to technology projects at our company, as I say, there's… we have this global project list, few hundred projects.
That's an important thing for me in my attempts to manage the company well.
That, you know, we have about 800 employees, and we have a few hundred projects, and one of the challenges for me is to get sort of a global picture of what we're doing, and where we're putting emphasis, and so on. And the global projects list is about the right granularity for me to be able to do that.
We actually have two pieces. We have a project list and a process list. The project list
is sort of things that have a beginning, a middle, and an end. There's a project, it might take 2 years, it might take 3 months.
it's not a project that's going to take one day, usually. That doesn't make it into the global project list, but it's something where there is an end to the project. It will go into some kind of maintenance mode, it won't be a thing where the same kind of team that had to put the energy into it to get the project done, that same team won't need to be on the project. It can be a different team that's sort of maintaining the
Things on an ongoing basis.
the process list… Is a newer thing for us.
And the importance there is to understand when we are maintaining a thing, what are the resources that are going into maintaining that thing? And, you know, does it actually make sense anymore? In that process? When is it that there needs to be any kind of review of what's going on? You know, we'll have some website, and it'll be like, well, this needs to be reviewed every couple of years, or this needs to be reviewed every quarter.
Or this needs to be reviewed when we have a new version of our main product.
These kinds of things. And also, realistically, there's sort of a tieback between people we have, progress reports they're generating, and what the process list says we should be doing.
And it's kind of, like, if there's… it should be the case that we can know, we can tie back between this is… this is what this person says they're doing, this is what the process list says we imagine we're doing, does that tie together?
When it comes to the projects we're doing, it's, well, we have a lot of projects. There's a lot of, kind of, mainline, core development of just our, sort of, long-term mission of making the world computable, inventing the algorithms to do that, collecting the data to do that, and so on.
There's… there's lots of work in that direction.
There's also a fair amount of work
in the things we need to do to package the technology we have and make it smoothly deliverable in all sorts of different server environments and different organizations and so on. There's also, at our company, our company has much more emphasized R&D over, kind of, commercial operations. I think we're finally streamlining some more of our commercial operations.
Which is a way overdue kind of thing to do, and that's a… that's a big project.

There's also kind of the whole story of, sort of, AI. Well, we've been, sort of, involved in what one can call AI for close to 40 years now. I've been involved longer than that.
But there's sort of a, what do we do with kind of the new things that everybody's so excited about with neural nets and so on, and we've made a certain amount of use of that technology, a place we can use that technology, there are places where we can contribute to that technology, there are places where we need to understand whether that technology can contribute to things we're doing, whether we can contribute to that technology.
So we have a fair amount of effort in our company along those lines, although it's always a challenge to know, you know, what should you bet on at any given time
And what's… what sort of hype versus what's real, what's, you know, where should you go with things? You know, it's… it's a… I'm sort of, right now, one of the things I'm trying to figure out is there are interesting things we can do with kind of high-level versions of,
High-level symbolic language for robotics.
is now the right time to do it? Or is this kind of like the story of something like virtual reality, where we started doing things with that in the 1990s, and then it died out, then it came back, then it died out, and so on?
You know, when's the right time to really put effort into something where the effort you put in is effort that builds on what you are strong at doing, rather than having to build a lot of infrastructure that at some point will just get built in the world at large without any effort from you. But it isn't,
it's something where, sort of, you know, I was, I was just earlier today, actually, for a reason that we were, well, we were actually
collecting, training data for some folks who are interested in enhancing Waltham language training, for LLMs, and we're like, what are all the assets that we have for, of large amounts of orphan language code? I remembered this thing called our library, which was a thing that was for distributing Wolfram language code, or what was then we called Mathematica code.
back in the late 1980s, Mathematica first came out in June of 1988, but we were all interested in distributing things to people, code to people, in 1989. How did you do that?
Well, we had… this was before the web.
And so, we had, things where
we would, send out CD-ROMs every so often. We had a thing where you could, send email and get sent back an email response. We had even something which never got fully deployed that was, a,
A mechanism for,
Mechanism for using, interactive voice response on phones, where you would call, and you would, sort of,
you know, go through menus and things to pick what you wanted, and then something would get sent to you. I'm now a little bit hazy on how that was actually supposed to work. But all of those things, we built a bunch of that stuff. We built the whole mechanism. We had a thing called MathSource, which was a CD-ROM-based distribution mechanism. Of course, all of that could go away once the web arrived, and one was able to do things that way.
I mean, it's interesting, there are a number of projects I've tried to do in my life, or thought about doing in my life, which I didn't do, and sometimes maybe it's a pity.
I mean, back in, what was it, 1991, I had this idea of sort of collecting a global email directory of everybody in the world, more or less.

And part of the way you could do that at that time was, you could use, when you… you could see computers that were exposed to… to the internet.
you could do things, you could use the finger demon to actually see who are the people logged in on that computer, so you would start generating lists of names and so on. And I kind of had this idea that that would be an interesting thing to do. I had some young person sort of assigned to work on it. They didn't do a great job, and the project never happened. I suppose it might have turned into an early version of LinkedIn had it actually happened.
But it didn't happen, and I myself was kind of busy at that time diving into my big science project that became my book, A New Kind of Science, and so I wasn't really emphasizing that.
Actually, it reminds me of two other projects. There was another project, this must have been 92 or 93,
I had a thing, I called it the information exchange, and the idea was, it was a, a way of, kind of exchanging
kind of computable, paper-like material, essentially what we would now call computational assays. I mean, we had our notebook technology that we developed in 1987, and this was kind of a streamlined way of exchanging those kinds of things. A little bit different from kind of the archive project of my friend Paul Ginsberg.
and that had already existed at that time, but this was something where it was sort of exchanging computable kinds of things and providing, I suppose, a more organized version of the web, which was… I guess the web was sort of emerging at that time, but hadn't fully emerged by then.
And, there are lots of these projects. Well, not lots. There are a small number of these projects that have been left by the wayside. Another one was a project… this must have been in, who? When was this? 2010 kind of time frame? 2011. It was a project
It was…
well, its internal code name was NoNet, K-N-O-W-Net, and it was intended to be a kind of a LinkedIn-like thing
for science and other kinds of, research-type people, of sort of how you get your kind of personal homepage on the web, with, with kind of a standardized way of having all of your, kind of. publications and things like that. Again, a project… I sound… I sound like I'm… I'm kind of complaining, and I am to some extent, because that was another project that was delegated to a group of people, and they didn't do a good job, and it didn't get done.
And you know, what is the takeaway from that?
you know, perhaps the takeaway was I wasn't so into that project that I really wanted to put a lot of my own effort into it.
To really make sure it happened. And, you know, it is a… it is the quintessential problem of delegation that, you know, there is a loss associated with delegation. And sometimes, when you're very lucky, and I've been lucky enough to have a lot of people who do this
In our organization, you delegate to them, and they do a better job than you possibly have done. But often there is a certain loss in delegating, and there is a… particularly when you're defining something new, where you have this idea for how it should work. You delegate it to somebody, and they maybe don't have quite that vision, and then it just doesn't get done unless you are, sort of, walking through the steps to make it happen.
I mean, I know, for example, in the development of Wolf and Alpha, I had a very good team of people working on that, but it was still the case that there were plenty of moments where people were just saying, it's impossible, we just can't do it, it's… there's no way to go forward. And the main thing that I suppose I could add was, look, I think we can do it.

you know, have the confidence to believe that one can do it, and then, okay, the other thing I personally get to add is actually solving the problem and saying, well, what about this? Or maybe not solving it myself, but having the right conversation to elicit the solution from whoever is at the front lines working on it.
Well, anyway, the, that's a long response to,
questions about, my goals for 2026. I'm… I'm hoping
that we'll see lots of good technology from our company, lots of good science from our institute, and hopefully lots of projects that I personally can do. I'm sort of planning a few additional things…
I'm considering changing the way that I do some of these live streams and doing some more focused more directly on technology and on sort of the hands-on understanding of computation and computational thinking and so on.
I've been, thinking about a few things along those lines, which hopefully will start sometime in the new year.
Let's see…
Oh, gosh.
Let's see here… Brady is asking, does the biology work relate to P versus NP?
Gosh, the answer to that is complicated. Ph…
talks about MCSP, which I have never heard about. I don't know what that is.
So I have to look that up.
Oh, maybe it's… I would guess CSP might be Communicated Sequential Programs, but I don't know.
And, I see. This is probably about distributed computing and the relation to,
to that, and computational irreducibility, and so on.
Less so. The particular things I'm doing are less related to distributed computing, than some of the other things I've done. Interesting set of questions. Good thing to look at.
Aaron is asking, how useful have LLM-powered tools been for go-to-market functions like sales, sales strategy, and marketing? Do you think this will change in the next 3 to 5 years? Llms are really useful for things
related… well, actually, both sales and marketing. It's like…
Who might care about our products in this organization?
You know, can we… you know, can we do a really good job of figuring that out?
And the answer is we can do a much better job than we could before. That was a thing where a human had to go click on a bunch of links and so on, and now it's something where you can get an LLM to summarize and conclude, you know, is this actually somebody who's going to care about our products or not? And
when it comes to marketing, well, and other things, I mean, even the question of… there's a person who's asking about, you know, how… how can you use our technology to do this particular thing in distributed computing?
Well, it now becomes much easier to do sort of the thematic searching of, hey, well, let me show you some resources that might be relevant to helping to understand how to do that. I think…
that there are things we've built, there's a lot of tools we've built internally, and are building internally for doing these kinds of things. I know there are lots of companies that exist that sort of say, we'll sell you tools to do this. Our experience has always been it's better to build it oneself, given, particularly in our particular case of having the kind of technology stack.

that we have, and having a bunch of requirements that are different, and also, frankly, having some kind of, I don't know whether I'd call it ethical, but, but
you know, things about what are we going to do with people's data, what are we actually going to do, how are we going to not have this be kind of pooled with a bunch of other data in somebody's cloud server somewhere? I mean, I've kind of taken the very strong point of view That, we shouldn't do things that we would be embarrassed to have done at some point in the future with respect to how we handle, kind of, interacting with customers and so on.
I'm not sure that…
all of those good things that we've done over the years, they have no doubt cost us a lot, but I feel like they're the right thing to do, and it's, you know, it's how we like to do these things.
I think that, There's a,
You know, so I, I would, I would fully expect you know.
The question of, of sort of identifying
who are relevant customers, what will they care about? Those are things where I think LLMs can be quite useful, and whether you build those things yourselves, or whether you buy prepackaged solutions, I think there's probably a fair amount of snake oil in some of the solutions that already exist for that, and but…
that's a, that's surely a useful direction. I think in terms of
strategy, well, you know, we've been very data-intensive for a long time, and it's always useful to, you know, is there a way that you can get the LLM to sort of
explain trends to you, be able to look things up and understand things. We haven't tried doing that.
I think, in any serious way, but for example, you could certainly imagine the LLM producing kind of an essay based on your terabyte of web analytics, being able to try and digest from that something that is a humanly useful conclusion.
Maybe without maybe, possibly, without you having to define the questions, just because it's like, well, it knows
You know, it knows, because it's seen a lot of other, kind of, people ask such marketing-type questions and a lot of other material on the web about that, that maybe, kind of, the conventional wisdom, it will be able to apply for you without you having to think through that conventional wisdom yourself.
I think we haven't done as much on that as we might do, but that's another kind of thing. I mean, I think, you know, other types of places where, sort of, what is the normal and customary way that things… people do some particular kind of thing? That's useful when you're thinking about pricing, when you're thinking about nomenclature.
for, you know, are we going to describe this as a such-and-such option, or whatever? It's like, well, what do other people say? And LLMs can be useful in kind of giving a thematic picture of what is the typical way that that's described. That's another thing I've found useful.
Let's see… The question here…
also from Aaron, what recent developments in your personal analytics efforts have been most interesting or surprising
What… which practices or trends have shown the greatest longevity? I have to say that archiving in a searchable way everything is the… is the most important thing for me.
I mean, the fact that I have all my archives of email and scanned documents and so on, and the fact that, you know, whenever I get a piece of email from the outside world.

into my email thread, into the email queue, comes a few seconds later, a piece of mail that sort of shows all the hits for that person in my past archives. That's really useful. It's kind of like, do I… have I heard from this person before? Do I know who this is? Oh, yes, this person, you know, I'd interacted with them a bunch in 2010, and I sort of vaguely remember, but I don't really remember.
But here's the information on that.
that's… that's been… I mean, I use that so many times every day, to just sort of enhance my memory. In terms of other kinds of personal analytics, I mean, I'm measuring lots of other kinds of health data and so on.
I… well, okay, here's a… here's a weird one. This is… this is a… this is one of the stranger ones to… to even admit to, which is, I'd been meaning, like, a piece of data one can collect is continuous glucose monitoring. So, you know, I collect heartbeat and
steps taken and so on, but I've always thought, I don't want some invasive thing that's sticking into me and collecting some other information. I sort of realized that that's an inevitable thing. Eventually, when there's more accurate, you can collect data on your immune system and so on continuously, or metabolites continuously. That's surely a way to, to collect information that might be useful.
I'm very much a believer of you collect first, ask questions later, so to speak, because I've found that things where I'm, like, I'm really glad I collected, I kept that, I collected that information 30 years ago, now I can compare it with this. But anyway, I decided finally the latest technology of continuous glucose monitors is really very good, and it's like you just
Stick it on, and…
you know, inject it, and it stays there for 10 days or something, and you don't think about it, except that you have this app on your phone that shows you glucose levels. And, yes, I'm happy to discover that I'm not diabetic, which is good, but I already knew that. But here's the… here's the thing that I should barely admit to, because it's sort of embarrassing, but maybe interesting to other people.
is, you know, I have always had, you know, I eat
reasonably healthy stuff, but I'll eat a bunch of chocolate, and I'll… I'll eat, and I'll keep eating when I think I'm hungry, and so on.
having got this continuous glucose monitor, I realized that the internal signal that I had for, I think I should eat more. I'm, you know, my… I'm, I'm in a state where my body needs more food.
That I had that signal wrong.
that in fact, one of the things that I thought was, oh, I should eat more, it'll make my stomach feel more settled, and I'll be a happier person, was actually a signal that my glucose level was going up.
So, it was, so for 50 years, I probably misread that signal, and the result of kind of having the… both the data and somehow the… the implicit accountability of what I eat shows up in the glucose levels that I produce.
In my blood, so to speak, is,
has had a very good effect, and over the last, I don't know, 3 or 4 months since I've been doing this, I lost a bunch of weight, and I've been eating a lot less. And I've been, kind of, maybe a little bit more energetic than I was before.

And it's kind of like, forget all these drugs and things, you know, it's kind of just getting a bit more information, at least for me, plus the utter embarrassment of realizing that the kind of internal signal
that I thought was, oh, I should eat more, was precisely the opposite, and I've had it kind of mixed up for 50 years. So that's been one of my little personal analytics hacks of recent times that I think has had a useful effect.
Other kinds of things. I mean, I find it… another thing that I find useful is the email that I get sent back every day that says how many keystrokes I typed, how many steps I walked, and so on. this is something where, I just, for some reason, some psychological reason that might be specific to me, the kind of, sort of pseudo-personal responsibility or something of seeing, yes, there's a record of what I did.
has an effect for me of, motivating me to do more in some sense. I mean, I think perhaps for other people, it's kind of like be in a group where you're each sending how many, you know, how much running you're doing every day. I'm, I'm less into that than I am in kind of getting personal feedback about that.
I would say that, oh, another… another very strange hack.
that I have, increasingly pursued for myself, is when I'm kind of working, if I record myself, as in, I just screen record, record my screen, you know, into a Zoom, you know, into the cloud with Zoom or something, for some reason.
it makes me work a little bit more coherently and consistently. It kind of makes me feel a little bit more guilty about goofing off for 10 minutes. It's like…
you know, I'm… I really feel like, oh, I have to pause the recording and goof off, and so on. And rather than… and otherwise, I'm going to kind of stay on task, on topic.
I mean, I've certainly found
in the things we do with our company, when we livestream our design review meetings and so on, I've found that I think everybody involved stays a little bit more on topic. And I don't, you know, whether or not people are watching it, that's not really the point. The point is there's a certain piece of, sort of, for me, at least, and I think for other people, a certain sort of personal accountability for the fact that you're recording these things.
Now, for example, things where it's just me sitting by myself, doing science.
you know, is one ever going to care about that? I don't know. Maybe if somebody, and I know this has happened a few times, if people want to know, you know, this particular thing that I wrote in this particular way, why did I come to that conclusion? Well, you can go back and roll back the video and find the exact moment when those words were typed, and you can kind of see what the things around that were. And perhaps for myself, I could do that, I haven't done that before.
I'm trying to remember, I've probably done that a few times, but not… it's not a common thing. But this kind of, you know, add accountability to oneself by the fact that one's recording everything somehow, I think, is a,
is one thing I've learned in recent… in recent years, I suppose. Let's see, what other things am I doing in terms of personal analytics?
That's all the things I can think of right now.
Let's see…
Let's see, it, oh, lots of questions here.
John asks, do you have any interest in starting new companies in the future?

Well, I'm starting a bunch of new things. I mean, we just started our Wolfram Institute, which happens to be a non-profit company. We're actually in the process of starting a company related to our efforts in AI and education, and hey, if you know any energetic entrepreneurs, send them our way.
But, that's… that's a thing where I'm… I'm sort of hoping that I'm not the energy source, I might be a little bit of the wisdom source, for that effort, but, hopefully I don't have to be the energy source for that effort. I think the,
The… the thing that,
in terms of, you know, if I had something where I thought that…
Well, let me say the following. The company, and it's really a cluster of companies that we have, it's a feature of having private companies, that it ends up being sort of a cluster of different companies in different countries and different, particular sort of applications and so on, but they're all part of one group of companies, and
The fact is, most things that I imagine doing technologically fit in those companies, and so most things that I imagine doing, we already have the infrastructure in those companies, and the resources, and so on, and so, you know, I tend to do things which fit into those companies, and those companies fit the things that I want to do.
Now, that is… occasionally there are exceptions, like, for example, this AI education effort that has to do with AI-based tutoring for courses and so on. It's really… the market is somewhat different from our current market.
And the kind of… the rhythm of that company is somewhat different. I mean, that company, if it goes the way it's supposed to go, will be a company that kind of soaks in a fair amount of investment money and does a bunch of things that we wouldn't do at the speed that it will do them from our main company. Our main company, private company, doesn't have outside investors.
It's not something where we get to sort of immediately switch on. We spend a very large amount of money building this whole structure.
Our education effort is one where we are planning to go that route.
I have some misgivings about that, I have to say, because my very first company that I started in 1981 was a venture capital funded company, and that wasn't its best feature, by a long shot.
That was a feature that kind of derailed it, I suppose, from at least the things I thought it could have done.
And ended up doing different things instead that were much less interesting to me.
And I have to say, even though I have many friends who are in the venture capital business, it's a hard business, very hard business. I think the, I haven't been a client, so to speak, for that in a super long time.
And so I have some… some misgivings about that. Now, as I'm sure, you know, the, the,
if I was CEOing
our education company, I would have misgivings if I were the venture capitalist who was funding it, because I would say, this person isn't going to go, you know, the 200% distance on this thing, they have too many other things going on in their lives, and they would be right about that.
And that's why, you know, you have to have people with real focus kind of,
sort of on these kinds of things. And so, as I say, for me, most of the things I want to do fit in the matrix that I've already created with our sort of group of companies, and there are rare cases

where it's something sort of spinning out from that, and I think that's a thing that really has to be under somebody else's leadership.
Because I've got enough things that I'm doing, and while I might be the chairperson of one of these companies, I'm not going to be at CEO.
I mean, we've had a number of initiatives over the years. We have just a great collection of things that can and should be spun off as separate companies from our company, but frankly, we've had a lack of
entrepreneurial, energy to make those things happen, and we… about who one was it?
15 years ago now? 10 years ago? Hmm, 15 years ago.
we were about to kind of create a fund to be able to spin off companies from our company, but the person who was going to lead that effort kind of bailed out at the last minute, and I was like, I'm not going to do this, so drop it on the floor.
Which is always a difficult thing. I mean, I have to say, when you get a project, and there's something… I mentioned a number of projects which I haven't done over the years, and often haven't done them because there was somebody else who was, quote, supposed to do them, and for some reason or another, they didn't get them done.
And the question then is, do you dive in and save it, or do you let it drop on the floor?
And I have to say that my increasing tendency, for me personally, has been just drop it on the floor. Because it's one of these things where if one had the energy from the start to really push it, I would be the person leading it.
And if I'm not leading it, it's kind of a sign that it isn't something I was top of, you know, top of my list to do, and if I get into the situation of saving somebody else's project, I'm, like, going to be growling all the way, and it's not a thing that I want to do.
There's a question here from Ollie.
Is there a… by the way, back to John's question about interest in starting new companies, as I say, most of the things that I'll do fit into our existing company. There's an interesting question of whether folks of my stage of life are kind of in the, oh, you should start a new company.
still feeling pretty energetic, I'm happy to say. Perhaps even actually more energetic than I've felt in past years, which is… which is nice. Long may it continue.
I certainly feel like I have the energy to do things like start new companies, but that, for me, is channeled into starting new projects. They don't need new companies, so to speak. But if I had a more, sort of, clean slate in terms of the things I was already doing, then yes, they would be new companies. But one thing to explain
Is when you start a new company from scratch, there's all this infrastructure you have to build, all these, kind of, all this cultural
stuff you have to develop in your company. I'm noticing this with our institute. It's kind of funny for me, because, you know, I've been used to running a company with hundreds of people in it for… for more than half my life now.
And,
now we have this institute, which has started off with a very small number of people, and I'm kind of laughing at myself, because there are things where it's like, I'm just kind of imagining or saying to people, oh yeah, let's just do that. And I'm realizing there's nobody to do it in that organization. It's too thin to have those kinds of functions in there. It kind of reminds me when we hire people at our company who've been used to working for companies with 100,000 employees.

Then they come to our company with only 800 employees, and the thickness of the systems that we have is much, much thinner.
than the thickness of systems that exists in a 100,000 person company. And so it's kind of like, oh, but somebody else will do that. Well, no, they won't. Not in our company. That's, you know, that's for you, the person, to actually do.
And, you know, there's sort of an interesting trade-off of what's the stuff that is best to have people do it themselves versus stuff that is best to delegate. You know, I've noticed that, for example, when people come to work at our company, and they've been working in academia, let's say.
They come to our company, it's their R&D people, and they're, like, amazed at all the stuff to do with systems and computers and so on, there's, like, a whole team that just deals with that. It's not something the person themselves has to deal with.
But then there are other things, like, oh, I don't know, let's say you're writing code and you're going to… and there's documentation to write. No, there isn't a team of independent technical writers who are going to pick up the scraps from what you did and write about it, because I've found that's not an efficient thing to do. Much better to have the person who really understands what they created write about how that works.
Than to kind of delegate it on to a technical writing team.
And so, you know, there are, for our company at least, the set point of what do the principles, so to speak, do themselves versus what gets delegated to another group. We've tried to hone that over the years, and certainly there are plenty of things where I say, look, I'm just going to do this myself.
And that includes things where it might seem like very much a, like, you can't be serious that the CEO is actually going to do that, like writing some sentence on a website, or debugging some problem that people have not been able to debug. But the truth is, it's vastly more efficient
And more useful for, sort of, mentoring and educating other people about what to do the next time.
If I just dive in and do it, do it, rather than saying, hey, you guys should be doing it, you know, it's delegated to you, just make it happen. I've been explaining that, you know, there are cases where it has been sort of a, I'm just delegating it.
And then… then one doesn't say, you know, if it's something which is a spin-off kind of thing that isn't a core, critical path kind of thing, if the delegation doesn't work, it doesn't work, and you have to drop the thing on the floor.
In any case, I think the main point I was trying to make there is, it's a complicated question. At what point in your life do you even think about starting companies?
I mean, there are people who, you know, sometimes I deal with a lot of startup companies, and I'm…
I sort of… one of my hobbies, in a sense, is advising startup companies, and I found that very interesting, and I think it's very satisfying when you can give, sort of, a small piece of advice, and that turns into a big… a big win, so to speak.
But, you know, they're definitely… you can tell, and sometimes my… my advice to startups has been, this is the wrong time of life for you to do this startup. You just shouldn't do it.
Which might sound like one of those very negative things, but I think, you know, there are times in people's lives where people have been like, oh, I should be doing something, why don't I do a startup? But their heart just isn't in it, and it's not going to work.

And they would be much better off just defining something different that they want to do, and not just thinking, oh, because I did a startup before, I should do a startup again.
And there are people where there's… there's just too much, you know, this…
Too much else, too many other constraints in their lives, there's too much…
oh, you know, I've got to pay for the this and the that, I can't have no salary for a while, these kinds of things, where it just doesn't make sense. It's just… it's going to cause
sort of, there's going to be too much, kind of, stress caused by the other things pulling from other parts of somebody's life. They're not going to be able to concentrate properly, and starting companies and having them succeed is a lot of work.
It's, you know, I think that the kind of the effort of making a new thing happen, going from nothing to something, you know, you get
For somebody like me, I've gone from sort of nothing to something many, many, many times in my life. I know what the sort of rhythm of doing that is, but every time, there's a big push you have to make.
It just doesn't work if you say, hey, I know exactly what to do, I just press the buttons and everything will happen. Never works that way. I mean, I'm one of these people who maintains a high degree of internal optimism, so I never think about, oh my gosh, this is going to be such a huge amount of work. Do I really want to get into this? I'm like, I know how to do this. I can get it done. I don't really think that hard about,
you know, the, it's going to be a lot of work, I'm going to have to push very hard. I mean, sometimes when I'm trying to assess, should I do this project or not, I do think about that. But when it gets into doing it, it's just like, I'm gonna do this. Whatever it takes, I'm going to do it.
And I think that's part of, you know, if you're in that mindset, whatever it takes, I'm gonna do it. Then you're kind of in the, time to start a, you know, time to think about starting a company.
Whereas, if it's like, oh my gosh, you know, like, for example.
I'll, see people who are like, oh, I'm trying to start a company, but, you know, I have to be done by 5pm every day to go and do this and that and the other thing.
And it's like, then you shouldn't be starting a company. That's not the, that's not the mindset, it's not the level of focus and energy that one needs to do that.
Because it is something that… it's a… it's a difficult, almost reptilian-level thing that one has to do to really push, push, push to make something new happen.
And, it's not for everybody, and it's not for everybody at every stage of life. I've been lucky enough that, for much of my life, I've been sort of in a…
in a state where I feel like I can push to get new things to happen, and it helps that a lot of new things I have pushed to have happen in the past have worked out well, but one of the things for me is, and for everybody, I think, if you say, oh, I got this one, this one is easy.
that's the one you're going to fail on. It's… for me at least, and I think for other people, I've seen this many, many times, it's kind of like, it has to be the case that the next thing you do is a reach. Or at least you feel it's a reach.
If it's too easy, it's… you're just not going to have the emotional commitment to it to really make it work. I think that's, that's my impression, at least.
Let's see…
Ollie asks, is there a business opportunity in managing archiving for people and businesses?
Absolutely. What exists right now is… is pretty…

often very low-tech and kind of crummy, and for organizations and libraries and sort of professional archives and so on, very expensive, and so on. There absolutely is, if anybody wants to try and start a company based on the archiving technology that we have.
I'm all for it. There's… it's kind of a mixture of technology and services, because you end up having to do things like, you know, you come in somewhere, and it's like, we've got 100 bankers' boxes of material. What are we going to do with this?
well, you know, it's got to be scanned, you've got to organize the scanning of it, you've got to figure out how do you get, sort of, metadata set up, and so on. And, you know, that's one side of it, but you have to have the base technology. We more or less have the base technology. It should be packaged better, and so on. And then there's the question of how do you present it? You know, if it's an archive that's going to be a public archive available on the web, how do you set that up?
If you're going to have permission structures, how do you set that up? I mean, a not uncommon thing to want to do for personal archives is to say, I'm putting this stuff out there, I only want it to open up for the world 100 years after I'm dead, or something like this. Or I only want it to open up for the world, I only want it to be visible
to, you know, my kids at this time, or I only want it to be visible
to these people at this time, or this is the condition and so on for that to happen. There's a certain amount of, sort of, rather interesting computational contract, computational law kinds of things, and
the pure technology of permissioning that you need to solve for those types of things, but all of this is absolutely doable, and I think people would find it, really quite useful to have these capabilities. I mean, I've been,
involved in a few efforts to provide this kind of technology that other people have done. I think there's a great opportunity to do this in a nice, streamlined way. And by the way, in modern times, sort of my concept of it is we built a bunch of the core technology, but then there are modules. Once you have the core storage technology.
Then there are modules, like, you know, read my documents and put them in a timeline.
figure out, you know, how these documents are threaded together. These are things that, with modern AI techniques, you can expect to do, but you have to have all the plumbing in place. It's not one of these things where you just say, throw the AI at it. It's like, yeah, you can in principle do that, but until you have the robot that's taking out your banker's boxes and, you know, putting all these weird pages that are in different orientations and so on into a scanner.
You know, until that happens, you're going to have to have built the infrastructure before you can go apply machine learning to go figure out how to put the timeline together. I mean, I think that what's of particular interest, probably, is the creation of, essentially, computational history for people and organizations.
just tell me my story, so to speak. Now, this is done to some extent with photos. There's decent technology now for doing that, but can you do that for documents and emails and other archived material? Well, that's a thing you can imagine doing. It's like, well, somebody was asking here, you know, can I summarize 2025? I'd like to be able to just tell my…
computational historian, my robot historian, so to speak, go summarize my 2025 for me. That would be a nice thing to be able to do. And it's certainly within the scope of what's technologically possible now, but there's a bunch of infrastructure that doesn't exist and could exist and should exist.
Let's see…

Jonathan asks a… a sort of random factual question. Have I met Ray Kurzweil? And if so, what did you discuss? I knew Ray fairly well. He lived, near where I lived for many years. I… I sort of lost touch with him after he,
went off, he'd been… he'd been, like me, he'd been sort of an independent operative with his own company for a long, long time, and then he kind of sold out, maybe a decade ago now, and I haven't been in touch with him since then.
The… I don't know exactly why he did that. Certainly, if it was, if it was me, I've led a much happier and more productive and interesting life for being able to, sort of, be my own boss, so to speak. But,
I think Ray once paid me the compliment of… I was bugging him about what, what it meant You know, what he imagined as superintelligence would be like, and he once paid me the compliment of saying that
for him, sort of talking to me about various kinds of topics was kind of his vision of what the superintelligence would be like. I think that was perhaps an easy way out of the real question, but it was sort of an amusing and amusing compliment, I suppose.
Let's see… There's a question from John here about
How do you stay intellectually curious over decades?
well, you know, I build a bigger tower of things that I've figured out, and tools that I've made, and from the taller you build the tower.
The more new things you can see, I have to say that for me.
a lot of the push is sort of internal. There are things I've wanted to understand forever and ever. But then when I kind of go out and about in the world and I meet people and so on, they'll tell me fragments of things that they've worked on that relate to those kinds of things. Sometimes they'll ask questions where I'm like, I should have answered that question.
You know, sometimes, many times, actually, I've asked questions of people who are sort of the world expert in XYZ, and sometimes the, you have to kind of set it up right to not have this happen, but sometimes the immediate response will be, oh yes, we answered that decades ago, that's an easy question, you know, that's a simple question. And often, I'm pretty sure it's not a simple question. I'm pretty sure it's a question
that the field, for one reason or another, just didn't ask. And, you know, it's… and sometimes I've had the weird, sort of embarrassing situation where somebody who's the world expert in this or that thing, you know, I'll keep pushing. I'll keep pushing. Wait a minute, I don't think that question's really been answered. And eventually they'll be like, oh my god, you're right, we never answered that question. How could we not have answered that question?
And they'll be all sort of embarrassed about the fact that their field didn't answer that question. I suppose for me, I have developed enough humility about these things that I completely expect that there'll be questions that somebody could ask me where I'm like.
gosh, I never asked that question. I should have asked that question. It would have been an obvious question to ask, given the kinds of things that I've worked on, but I didn't ask the question. And I think that, you know, that happens to me with some frequency, is another thing that helps sort of drive the kinds of things I think about.
I have to say that my interactions with kids through things like our summer program for high school students, and things that I do with some middle school students and other… and some college students and so on.

Those are great drivers for people asking questions that, like, you know, why didn't I ask that question? That's an obvious question, but I didn't ask it. Kind of the lack of baggage sometimes from younger folk
can help in kind of asking those questions. Another thing for me is the effort of explaining things, both in writing and in things like livestreams, often drives me to realize, wait a minute, I don't really understand that properly, or wait a minute, I wonder about this, I don't know the answer to that.
I have to say that I'm much more… I'm not a huge reader of… I mean, I look at summaries of things going on in science and in technology and so on. I'm not a huge, you know, open up my pre-print
list every morning and start, you know, spending hours going through it. I don't tend to do that. I tend to be much more driven by, I have a question that I've internalized, now I want to go find out what other people have said about it, and I'll go find things at that time, rather than being driven by, let me look at the latest preprints of the day.
If I was working on narrower kinds of things, I think that might be a lot more useful. I think if I was working in a particular area where there are, you know, 5 new papers a day.
then I might be looking at those 5 new papers a day, but if I look at the sort of full waterfront of things I'm interested in, it's probably 5,000 new papers a day, and obviously I'm not going to get to that, so I just sort of give up and don't try.
I think…
The, you know, a thing that helps one stay intellectually curious is when one makes incremental progress.
the things, you know, it's kind of like my current little project on the P versus MP problem. It's like, well, it's, you know, it's an interesting problem, one's been curious about it for a long time. I didn't think I'd have anything to say about it, but actually it turns out I do.
And that's kind of exciting, and it's kind of like, you might think it's almost absurd, you know, I've been working on fundamental theory of physics, foundations of biology, and so on. It's like, that's crazy, there's another sort of foundational problem that one's attacking. But you get into kind of a rhythm of these things, and the methodology that we've developed… well, really, the truth of the situation, I think, is this.
That…
A hundred years ago, a lot of methodology got developed for kind of formalizing things, and it got developed to a certain point
Then it made progress in physics and mathematics and other areas. It got a little bit stuck on things like Godel's theorem and so on. Then computation developed.
as, at first, kind of a methodology that builds on the existing paradigms, but the thing that it's taken me a really long time to properly internalize is, I started in the 1980s, I think I'm finally getting there now, is the extent to which computation as a paradigm is really a thing that changes one's fundamental way of thinking about things, and now I have a lot of ways to
to think about that in terms of things about the Rulliard and observers and so on.
And having really internalized those ideas, I'm beginning to see a lot of things that got blocked 100 years ago with the kind of, you know, the formalization got done. Checkmark. Now the question is, what is the sort of bulk consequence of that formalization?
And that's the part that one hadn't internalized, but one now can internalize, and so that allows one to start making progress in all these kinds of places that have been blocked for a really long

time, and frankly, it's really fun and exciting to do that. And so that's a big driver for, sort of, maintaining one's intellectual curiosity. It's like, look, I can actually do something here.
you know, if I look at the arc of my life, there was a period of time, probably in the, I would say, 2010s.
when I was doing a bunch of technology, but I wasn't really doing… thinking that much about science, and I wasn't sure I ever would again.
And then in 2019, well, 2018, actually, made some progress on a physics project that I've been sort of thinking about as a background thing. In 2019, a couple of young physicists sort of told me, you've got to work on this physics project, and we'll help you with it, type thing, and that really got me kind of energized to do that, and I've been kind of on a roll since then. So I would say that sort of, for me, I would like to have said I had sort of a continuous level of energy through all that time. I don't think I really did. I think it was a thing where something opened up, sort of a methodology and so on, opened up, and that sort of re-energized me in a rather major way in the science direction. I think that,
You know, so it's a few thoughts about maintaining intellectual curiosity. I mean, I think that the, you know, different people have different things that kind of float one's boat.
to me, you know, I'm just interested in figuring stuff out. I find it very aesthetically pleasing to see how a lot of these ideas fit together. It's really kind of exciting.
I have to say, if you… if you watched me actually doing things and, like, you know, making little discoveries and so on, I think it would almost be disappointing how unenthused I might seem, in the sense that I'm… I'm so used to kind of making
you know, little incremental discoveries, which sometimes aggregate into bigger discoveries, that I'm like, yeah, that's cool, but it's not like, you know, big, celebration and so on every time that happens. And I'm kind of like, oh yeah, okay, I got that thing done, right, okay, we're done, that's wrapped.
Two hours later, I'm starting on something new.
I don't tend to be in the celebrate that thing for a long time. Not because I don't find it very fulfilling and exciting, but more just because…
Because, actually, kind of the thing that tends to happen is, when something has gone well, I develop a lot of momentum from that success, and I like to kind of carry that momentum immediately into the next thing.
You know, I would say the other… different people are motivated in different ways, but when it comes to doing science kinds of things, I'm… I find myself, kind of… I think some scientists are sort of motivated where, I'm gonna get this first, before all the other guys get it.
I really don't care about that. It's… it's, for me, it's an internal motivation, and actually, if I feel like there are other people rushing towards this goal, I'm like, let me not do that. I don't want to do that. I don't like the kind of competitive dynamic, and so on.
I mean, the only thing that's kind of a kicker in that is
It's, you know, when one does do something.
And then somebody with, you know, and this happens too often in science, and you'd be amazed at how often and how egregiously somebody kind of rips it off in some way, or kind of ignores it when you know they didn't really ignore it, type thing. Then it gets run annoyed, and it's kind of…
That's the… that's the… that's the other side, whereas one's not saying, I want to, at least for me, I want to sort of win against the other guys. If the other guys steal it.
Then, that's kind of a big negative.

And so, for me, it's kind of like, I like to feel like I'm doing things where, yeah, I'm doing this, and this is… this is fun and exciting for me, and yeah, you know, I feel an obligation to do it. not…
it's not like I can do it and nobody else can, and that makes me feel so cool type thing. It's more that, I feel like these ideas that I'm thinking about, you know, they've sat dormant, let's say, for a century, and I finally found them.
And it's like, I've got a responsibility to this, to actually develop it.
And I somehow feel like, you know, responsibility to the ideas, so to speak. It's a very strange thing to explain, that, that sort of drives one forward to do these kinds of things.
let's see, maybe I should go back to my day job here, but let's see if there are any other questions I might be able to
easily address.
let's see… Bunsen comments.
asks, does Steven think he has mellowed a bit as he has aged? He says, and now I'm curious who's saying it, I spoke to him a couple of times on the phone when he had moved from California to Illinois, because we had a mutual friend. He was so high energy back then, but now he is much more avuncular and approachable.
I think it's just because my hair fell out and the rest of it went grey. I think that's maybe the only avuncular aspect of the whole story. But no, I mean, people say that, you know, it's always hard to tell for oneself.
I…
feel like, I feel like I'm pretty high energy, but maybe I'm more measured in the way that I use that energy. I think in people,
I…
I've actually recently ended up reconnecting with people I knew, like, 50 years ago, and some of those people did say, you know, you were just sort of,
wasn't clear what was going to happen, because you were kind of so energetic and so on. I have to say, I'm not sure that's how I felt back then. I feel more energetic now than I did 40-something years ago or something. But maybe to the outside world, I'm more mellow. I suppose,
You know, Some things that have certainly happened are…
about, sort of, situations with people and things and so on. It's,
Well, actually, a couple of things to say.
I mean…
I think it's been important to my life that I've always been doing and having a portfolio of different things, whether it's, you know.
my kids, or my project, science projects, or the company, whatever else. There's sort of a portfolio of things going on. And that means that, at any given time, hopefully, there's
good stuff happening somewhere, even if there's bad stuff happening somewhere. And I think maybe in the past.
I've had less of a portfolio, and so it's been more like, hey, if there are things that aren't going the way they should be going, there's a lot more kind of focus on those things, and that's something that maybe is a thing that's been made easier for me.
The other thing is, when it comes to situations.
with people, things, whatever else. I've seen a lot of stuff by now, and
while it is always the case, particularly in dealing with people, it's like, you know, you think you've seen all the crazy stuff that can happen, but no, there's always an even crazier thing, or a

differently crazy thing that you haven't seen. And I think I have become probably calmer about just crazy stuff is always going to happen.
just get over it. And, you know, be slightly amused at things that happen. I… I was something… it was something my, my team was talking to me about
Oh, yes.
no, actually forgetting what it was, a couple of days ago, where, you know, I'm like, this is bad, we shouldn't have this happen.
And they're like, look, from a distance, it's pretty funny. And, you know, because it was so ridiculous, and such a stupid screw-up. And, you know, internally, for me, I was pretty much on that… on that, you know.
You know, on that plane of… of thinking, yeah, it's kind of funny, it's a totally ridiculous screw-up.
And whereas I think maybe in the past, I would have been really much more on the plane of, it's a totally ridiculous screw-up, and be annoyed about that, rather than, like, eye roll, you know, this is just the kind of thing that happens.
I think, You know, about approachability.
I have found, It's a funny thing.
Because… the… Long ago… well, okay.
One of the things that has been a real benefit in my life is I've interacted with a lot of different kinds of people.
Whether it's, you know, people you randomly run into somewhere, you sit next to on some random thing, or whatever else, or, whether it's people who are,
do very different kinds of things than you do, or their kids, or whatever else. For me, it's… it's been a real benefit to my life that,
I, I have, sort of.
had the experience of interacting with a very broad range of people, and I think that, certainly, I like to believe that I can, at this point, sort of have an interesting conversation with almost anyone.
And,
you know, on the rare occasions when I don't, I'm like, I'm blaming them, not me, so to speak. Because I really feel like there's… there's interesting things to discuss with basically anyone.
And I suppose it's… it's perhaps helped me, perhaps present as a bit more approachable that I… I have that expectation.
I'm certainly not afraid of, sort of, the interaction. I'm not like, what am I possibly going to say to a person who does something utterly different from what I do? And maybe, maybe does something that, you know, I'm not…
ideologically particularly aligned with, but I've learned, you know, I'm much more, kind of, you know, I really don't…
you know, that's not a thing that I'm going to set myself. Oh, I can't talk to this person because I think they don't agree with some aspect of some ideology that I have.
I'm prepared to talk to them. I might not do business with them or something like that, but, you know, to have the interaction is worth doing. It's worth understanding, really worth understanding. People who have just vastly different points of view than you do about certain kinds of things, it's always interesting to talk to them. If they won't talk to you because they say you're, you know, you're evil because you are…

you know, selling software, and I only believe in giving software away, or whatever it is, then it's a hopeless conversation. You know, and sometimes that happens, but…
it's, you know, I do believe it's very enriching to one to talk to people who have vastly different points of view.
And, to try to understand their point of view with some level of sort of humility about the fact that, well, one might be wrong, or at least one might be, you know, have set it up the way one has set it up, because that's the pattern of one's own life, but somebody else could have a very different pattern of their life.
And something quite different could make sense for them.
you know, I will say that, I think I… I like to think that I've always been fairly
sort of approachable and civilized with people. I had had the experience long ago, I had a friend named Dick Feynman, who was a well-known physicist, who had the reputation of being a super nice guy.
And this caused him so much trouble, because he would run into people, and he was a regular guy.
he was… I thought he was a nice guy, but he was also kind of a regular guy who got frustrated and got impatient and all these kinds of things. And when he would meet people who had the image that he was…
Mr. Super Nice Guy, and then he would do something that indicated he was kind of impatient. They were like, oh my gosh, he's actually terrible. You know, it's, it's, you know, it's all a fake type thing.
Which was unfortunate. And I… and I have to say that I, you know, for myself, to have kind of the… the… the,
the impression of being sort of not approachable, but to actually be approachable, is actually a much better deal than the other way around. I mean, I think that, you know, that's one thing to say. I mean, it is also to be said that,
you know, there are situations where one, you know, I find it's kind of like, how do you assess whether you have to be hard-edged?
And if you absolutely can't be hard-edged, and it freaks you out to be hard-edged, then that can be a problem.
And, you know, for me, I probably lead a happier day, week, whatever, if I never have to be hard-edged.
But, you know, sometimes it's the best thing all around to be kind of hard-edged.
And it's kind of like, how do you make the assessment
this is a case where I have to kind of jump into being, being sort of hard-edged. I have to say, a chap who I knew pretty well, somewhat older than me, now dead, I… I think his, his,
to somebody, his characterization of me that I always found somewhat amusing is, I don't… I won't… I won't claim any accuracy to this… this… this statement, but I just found it amusing at the time.
was he described me as sort of a strange mixture of a quiet scholar and Attila the Hun. I'm not sure that was fair.
But I thought it was amusing, and I think what that perhaps reflects is the fact that, yes, there are situations in which you have to say, you know, in which you have to say, look.
you know, this is a… this is a line that one has to draw, and no, I'm not going to get, sort of, pushed around in this or that way. You know, there's a… there's a domain that's reasonable, that I

think is… is… is sort of fair and reasonable, and then there's a, no, that's an edge, and I'm not going for it.
And I think that happens, you know, it happens in lots of kinds of situations, but it's something where, sort of, assessing
where you have to be, sort of, hard-nosed and where not is a very useful thing, and I'm not sure I always get it right.
And maybe my goalpost for that has moved over the years, I'm not sure. But it's, it's, you know, it doesn't really, you know, often, particularly with people.
there's a… you know, in situations where it's like, oh, you're just going to be agreeable, agreeable, agreeable, but actually, that's just going to lead you into disaster for both sides. It's just like, oh, yeah, it'll be okay, it'll be okay, it'll be okay. Well, actually, in the end, you have to decide, is this person going to do this job or not? Is this person, you know, there's got to be a… you know, everybody wants a certain degree of certainty in what's decided.
And that's something where you just have to, you know, you just have to dig in and make that decision.
All right, I think, that's probably… that exhausts my, my yattering for…
for today. I see a bunch of other, A bunch of other questions.
Which I hope I will have a chance to get to another time.
But, anyway, for now, thanks for joining me.
Talk to you another time.
Bye for now.