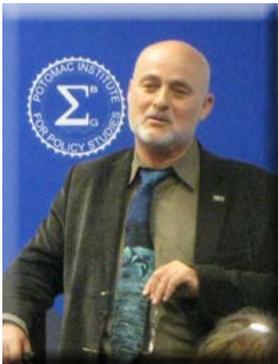
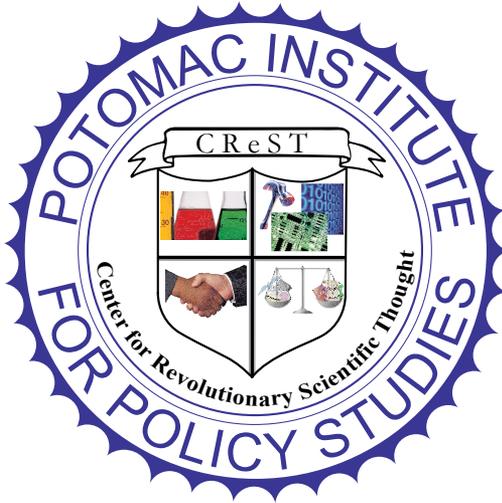


CReST BOLD IDEAS SEMINAR



**FEATURING
DAVID BRIN**

APRIL 8, 2013



**POTOMAC INSTITUTE FOR
POLICY STUDIES**
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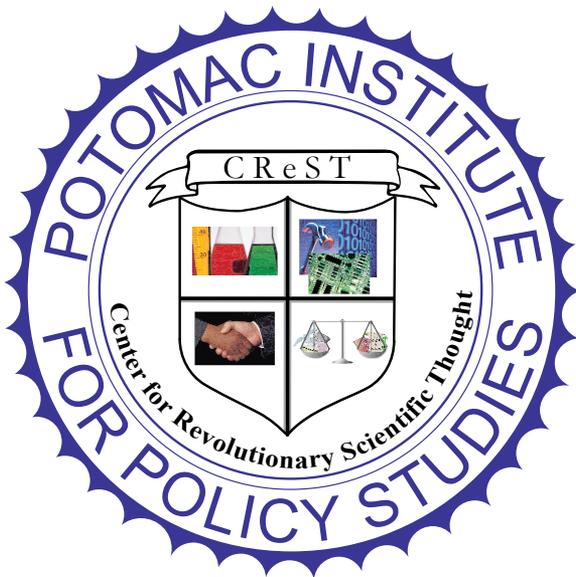
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CReST BOLD IDEAS SEMINARS

The Center for Revolutionary Scientific Thought (CReST) at the Potomac Institute for Policy Studies is an eclectic group of researchers and fellows dedicated to the study of novel and emergent ideas that could drive revolutionary changes in society. In addition to other studies and products, CReST hosts seminars and conferences designed to find and foster bold ideas in science and technology that address the most trying challenges facing our society. A bold idea is more than just a good scientific discovery, and more than an innovative idea. A bold idea is one that can influence the future in terms of human endeavors and can profoundly change how societies live and work. It can impact communications, learning, conflicts, or our lives. Bold ideas transform how we view the world and interact with one another and with systems. Notable scientists and technology thought leaders discuss their concepts in the Bold Ideas forum series to an invited audience of science and technology decision-makers in agencies and departments across the US Government, industry, and academia.



AGENDA

MODERATOR

MICHAEL S. SWETNAM

CEO and Chairman, Potomac Institute for Policy Studies

FEATURED SPEAKER

DAVID BRIN

Scientist, Futurist, Author

David Brin is a scientist, tech speaker/consultant and author. His new novel about our survival in the near future is *Existence*. A film by Kevin Costner was based on *The Postman*. His 16 novels, including *NY Times* Bestsellers and Hugo Award winners, have been translated into more than twenty languages. *Earth* foreshadowed global warming, cyberwarfare and the world wide web. David appears frequently on shows such as **Nova** and **The Universe** and **Life After People**, speaking about science and future trends. His non-fiction book – *The Transparent Society: Will Technology Make Us Choose Between Freedom and Privacy?* – won the Freedom of Speech Award of the American Library Association.

David Brin's website: <http://www.davidbrin.com>.

EXECUTIVE SUMMARY

THE FUTURE GOLDEN AGE

Washington, DC- David Brin, a world-renowned science fiction author and the first speaker for Bold Ideas seminar series at the Potomac Institute, brings a different perspective when looking towards the future, or what he refers to as, “The Golden Age.” Brin firmly believes that humans are holding back due to a crisis of confidence, but technology and science can help solve a majority of life’s hard problems.



During the seminar, Brin reminded the audience that humans now have powers that, centuries ago, only gods possessed. Light with a flick of a finger and flying in the sky were once supernatural ideas. Humans have changed the structure of society from a pyramid arrangement, where only a few ruled, to a more leveled field – from clans and tribes to multi-organization networks. Technology is the “game changer” of the future. Achievements, such as LED lights and medical advancements show how technology has enhanced humanity’s state of living. According to Brin, we are currently living in the “Age of Amateurs.” Humans educate themselves using technology – they no longer require professionals or experts for every problem they may face.

Brin discussed how the future could progress in many different ways. On the one hand, he could see humanity continuing to innovate and adapt to problems facing our world. On the other, we could be cause our own destruction through environmental care-

lessness or nuclear war. Humanities capacity for right and wrong, civilized or uncivilized, was displayed on 9/11. An enemy of the people did the unimaginable, and everyday-Americans stepped up and risked their lives to help their fellow man.

Brin stressed that humans should not be afraid to take risks. Humans set laws that limit risk, thinking they are protecting themselves, but in reality it is banning technology for the future. Laws should be used to monitor competition, to level the playing field so new players can emerge. Brin expressed that, instead of humans being afraid of what the government sees they should be more interested in adding light and transparency; most information age dilemmas are solved by more light, not less.

As we continue in the 21st Century, problem solving will require four elements. The first two are already happening: art (visualization, simulation, games, openness) and anticipation (analytics, modeling, data gathering and accountability). The other two are still needed: resilience (agile communication, self-organization, transparency, dispersed expertise) and discourse (analytic tools, dispute resolution, better interfaces).

To conclude, Brin surmises that humans have a hard time adapting, but in the long run they always do.

SEMINAR TRANSCRIPT

Mike Swetnam: It is with great pleasure that I welcome you to the first in a series of seminars entitled “Bold Ideas” here at the Potomac Institute for Policy Studies. The Potomac Institute is a think tank specializing in science and technology policy issues, bringing together business and government in independent thoughtful discussions of technology issues facing our society. We are well known at the Potomac Institute for a number of things, including the study of terrorism, technology trends, and national security; under that light we try very hard to invent new, revolutionary, and hopefully inspiring ideas that address how science and technology is changing our world. This year we have begun an effort by creating a new academic center, the Center for Revolutionary Scientific Thought (CReST). We have put together a group of revolutionary thinkers to address some of the hardest and thorniest issues of our time. Hopefully, this effort will result in interesting, novel, and useful ideas that will address science and technology issues and make life better for mankind.

As a part of the CReST effort to search and find novel ideas to inspire all of us into thinking about the problems of our day in a larger context, we have created a speaker series of which this will be our first. We hope it will be a fun event, in which we find the most broad, thoughtful, imaginative science and technology speakers we can, from all over the world. We’ve come here today to talk about how broad ideas about science and technology might be applied to every thorny and difficult problem that faces mankind. The purpose of this series is to broaden our thoughts and help us get out of the land we operate in all the time. In other seminar series we feature national security speakers, former secretaries of defense, and former national security technologist talks regarding the world we live in. However, in the Bold Ideas seminar series we are bringing people in front of you like science fiction writers and actors; people who spend their life thinking about the future in contexts

that might make us think of the world a little differently, in ways we haven't before.

I am very proud today to open up the Bold Ideas seminar series with David Brin. David Brin has been associated with our Institution, I'm proud to say, for quite a while. Twelve years ago he helped us keynote our "Out of the Box" conference looking at what technologies might change the world in the decade ahead. I think the speech that he gave that night, when we dig it out, was more insightful about coming technologies than the summary report of that conference. I am very proud to say that David, from time to time, contributes to things we are doing at the Potomac Institute and he is the perfect keynote for this speaker series. He has thought about the issues of science and technology and how they are affecting our society for quite some time. He has written, as most of you should know, many science fiction books, most notably *The Postman* and *Earth*. He has also written some non-science fiction books that talk about how our society has become far more transparent with data making knowledge about people across the web. David has thought long and hard about the real issues with science and technology and has long been called upon by members of our government to advise them on how these trends will affect our lives and our national security. I know that today, you as well as I, will be once again inspired as well as impressed by his coverage of the topic and his ability to stimulate us to think a little bit differently. With that, it is my privilege to introduce my friend, David Brin.

David Brin: Thank you Mike, and thank you all for coming today. It is a privilege to be in our Nation's Capital this time of year. I took my wife, son, and daughter down to tidal basin where, alas, the cherry blossoms weren't quite popped. You locals will enjoy a real show next week. I'm glad our parents weren't so angry in 1942 that they'd listen to fools, wanting to cut those trees down. It illustrates a key point: that we need to approach the future calmly and remember – always – that tomorrow will be different.

Your enemies today may become your friends. Some human virtues will remain true, of course, even when our descendants are part-metal or silicon. I hope they will still love and laugh and know kindness in whatever they use as hearts. But superficialities – like most of those that vex us today – will crumble, ground to dust by time.

Indeed, *change* is the core attribute of our era. I deal with it daily, wearing both my “hat” as a science fiction author and in my work as a scientist and technology pundit. Instability can be both exciting and unnerving. We are riding – surfing – upon a tsunami of changes and it does little good to peer myopically just one year ahead, then assume all will remain still, after that. The future is coming and the future’s future, after that! It will best be dealt-with in clear-eyed calm and courage.

Alas, in our culture today, we see what can only be called a *crisis of confidence*. A nation that has accomplished spectacular things over the course of 200 years and ridden wave after wave with stunning adaptability, seems now to prefer recriminations, dogmas and anger over utilizing our great, national talent – that of pragmatic negotiation and problem-solving. On both the far left and the far right we hear strident voices of nostalgia and regret, calling for a renunciation of rapid, technologically-driven change. Even the vast majority of Americans – those in the moderate middle – seem convinced, when most things are actually quite good, that our nation is on some path to hell.

This attitude may be so much more important a problem than any set of particular issues, e.g., budget deficits, genetic engineering, online privacy, vaccination scares, terrorism, gene modified foods, or even climate change. *Will we... can we... maintain fealty to the American modernist experiment?*

Let’s put it in a truly Big Perspective, one spanning 6,000 years.

TAKING THE BIG PERSPECTIVE

“How did they survive?”

Imagine someone in a future age, perhaps your descendant, wondering aloud about *us*.

“How did those people of the early 21st Century manage to endure?”

“More than endure – how did they thrive and overcome every pitfall, learning step-by-step to make a better world?”

Consider this irony. Even to *have* descendants will require that we find our way past a vexing range of troubles and pitfalls that lie just ahead – threats to society, humanity, possibly even life on Earth. If denizens of that near-future turn out to be healthy, prosperous and wise – members of a Human Civilization befitting the name – it will surely be due to some impressive footwork performed by their predecessors.

Performed by *us*, as we hurry across the intervening arc of crisis.

And hurry we must. Despite the trepidation of those who fear tomorrow, nostalgia won't prove helpful. Slowing down is no option. Nor can we afford to make very many mistakes along the way.

There is one hope. A method that has proved increasingly effective for several generations.

We must get better at seeing where we are going.



This is a hard perspective to take on – pondering decades ahead – especially for people like us, who feel immersed up to our necks in sticky, immediate problems. Yet, who can deny that a chief feature of our era is the raucous flood of *change*.

You see it in the news, in our rapidly-shifting technology, and in the vocabulary used at sober policy gatherings where sages from government, business and academia toss about words like *robotic weaponry*, *artificial intelligence*, *nanotechnology*, *designer genes*, *augmented reality*, *viral warfare* and countless other turns of phrase that come straight from science fiction novels of the recent past.

No prior generation devoted so much time and effort to planning, forecasting, investing, making bets, or preparing for times to come. We avoid using the word “predicting” – but doesn’t it lie at the core of all these activities? Forget silly horoscopes and TV psychics. Instead look at all the solemn insurance agents, actuaries, loan officers, fund administrators, estate planners, intelligence analysts.

Almost any kind of manager has been hired in large part to project the next, best policy for his or her institution. Success comes with being right a bit more often than others. Science fiction is just a small part of this vast sub-economy, pondering potential changes that lie a bit farther ahead.

Still, even after investing vast resources and effort, we continue to be boggled. “Tomorrow” remains a terribly cryptic and difficult concept. The best theoretical physicists admit that they cannot even properly define *time*.

Nobody has a crystal ball. Not even a so-called “futurist.” Despite having made a few notorious or noteworthy forecasts, I am as subject to shocks and rude surprises as the next fellow. Having been raised during an age of nuclear confrontation that left many of us feeling helpless – as our ancestors feared Armageddon – I sometimes wonder how we survived at all.

One answer may be that modern men and women aren't quite as helpless as their forebears. Experience has given us some effective tools for dealing with change – *anticipation*, *resiliency*, and *accountability* – that will be among the focal points of this talk. Moreover, these traits may be enhanced in coming years, if we overcome their age-old enemy – the all-too human penchant for clinging to unwarranted assumptions. In other words, our tendency is to see only what we want to see.

Robert Wright, in *The Moral Animal*, talks about evolutionary reasons why human beings became such excellent liars, making up stories and striving to convince people they are true. We're especially good at lying to ourselves, rationalizing and indignantly defending notions that have little basis in fact.

How many crimes were perpetrated by individuals completely convinced that they were right? How many errors in statecraft were committed by leaders who excluded criticism? How many of us find ourselves cornered by mistakes that, in retrospect, should have been obvious or easy to avoid?

Instead of attempting the impossible – trying to predict what's to come – let's take on a less ambitious task. Here we'll re-examine some entrenched assumptions that tend to constrain our thoughts, channeling and forcing them to conform, limiting their flexibility and reach.

Assumptions that may prevent us from spotting pitfalls as we charge into dangerous times.

ZOOMING BACK IN A BIT

In the vast majority of human cultures, if folks believed in any notion of a golden age, they placed that favored era in the *past*. A long-ago and lamented time when people were better, knew more, were closer to the gods and more virtuous... but then fell from that high level, that state of grace, because of hubris, sin, or some other grievous error. The stories differed, but not the underlying

look-backward mentality. Basically the same grouchy thread of nostalgia ran through almost every culture and era. Except for just a few – especially ours.

How are we different from other civilizations? Impudently, we place our notion of a “golden age” in the future! Sure, it will be hard, but our aim is to raise children who will be better than ourselves, living in an incrementally better world, one that they aim, in turn, to improve for their own kids. Most of us take this value system for granted, unaware of how revolutionary that notion of *look-forward* improvability is... and how hard to keep up!

The tug of the *look-backward* mentality is powerful. It appeals to millions who have a nostalgic streak – a basic and frequent personality trait. You see this notion pervading American culture today because this curmudgeonly look towards the time flow of wisdom seems rooted in human nature. In some parts, it manifests as a rising tide of doctrinally purist religiosity, or the romanticization of earthy or eastern mysticisms, or just petulant crabbiness that everything was *better when we were young*. Given my own background and profession, the symptom of nostalgia I naturally find grating is the rising popularity of *fantasy tales* set in feudal settings, relishing the drama of kings, elves, wizards, and all that sort of thing.

Why such fascination with a beastly way of life, that our ancestors rightly and desperately fought to escape? Because feudalism is exactly how our ancestors spent 99% of their lives. In any civilization that had agriculture and metallurgy, big males would pick up metal implements and *take* other men’s women and wheat. That was the natural form of human government across almost every culture that had written means to pass along their stories. Indeed, we are all descended from the harems of guys who pulled off that trick, winning for themselves extra descendants.

But the feudal “attractor state” does have competitors. Above all, we’re members of the first culture in history to make it an article of faith, imbued in our basic institutions and mythology, that any

“golden age” will come in the future. Something that we’ll build through good will and hard work and improving skills. And if not us then we will build the people who will build that world. A rambunctious, (and according to most past world views) heretical, hubristic-radical notion...

...that actually has some support in scripture! A notion that I had the amusing pleasure of foisting upon some members of the so-called “singularity movement.” (link: <http://tinyurl.com/3lbyyv>) These are the folks who take belief in human improbability to the far-opposite extreme! Who assert that our modernist experiment will transform everything within just one generation, turning common-clay humanity into beings indistinguishable from gods!

*How many of you know about this idea called the Singularity? You should be aware of this, because in some ways you are already living in one. It starts with the clear fact that we are learning more and more about the world, at so fast a pace that the curve of human knowledge is skyrocketing upwards (like the curve of the equation $1 \text{ over } x$, as x approaches 0; in other words – exponential growth toward infinity). This correlates with Moore’s Law – the doubling of computational power we see every 18 months. So, there are those out there (I call them *cyber techno transcendentalists*) who believe we’ll overcome nearly all of our mortal frailties, including the limits of life span, within the next 20 to 40 years!*

Now, sure. At the extreme, it sounds just as kooky as the nostalgia-mystics out there. Still, before you chortle, let me ask, how many of you have ever *flown through the sky*? How many of you have entered a room and *made light happen with your fingertip*? (Brin gestures like a god hurling lightning from his index finger.)

Next time you go into a dark room; flick the switch with drama, *like that*. It’ll make the simple task more dramatic and enjoyable. More appreciative of the miracle. Go ahead, enjoy thinking: *I have the power of Zeus!*

Indeed, you do. Next time you are in an airplane go “weee!” Why not? Is that any crazier than sitting in a slender aluminum tube hurtling across the sky in comfort, while traversing a whole continent that challenged Lewis and Clark for two years... and refusing to notice? It’s that sense of enjoyment, *feeling* like you’re a member of a culture that’s riding an unprecedented wave that you shouldn’t be denying yourself. Yet millions do that, refusing to enjoy, or even notice, the routine miracles of this civilization. Or worse, like the amazing Internet, taking them for granted. Is this partly behind this decline of confidence in ourselves and our problem-solving skills? An illness that is potentially deadly to the Republic and to the civilizational experiment of which we are a vital part.

Let’s get back to that past 6,000 years, when most golden ages are said to have lied. Throughout all that time, most human cultures were *shaped like a pyramid*, with a few kings, priests and oligarchs lording it over ignorant, toiling masses below. This was the natural human social order, and it was very fiercely defended by those on top. And the lords couldn’t have pulled it off alone. They hired song and dance men – like me – or priests or whatever – to justify the situation. To explain to the peasants: “Not only does this guy’s sons get to *own* your sons and daughters, but it’s *good*, it’s right, it’s proper.” And people, more often than not, accepted it.

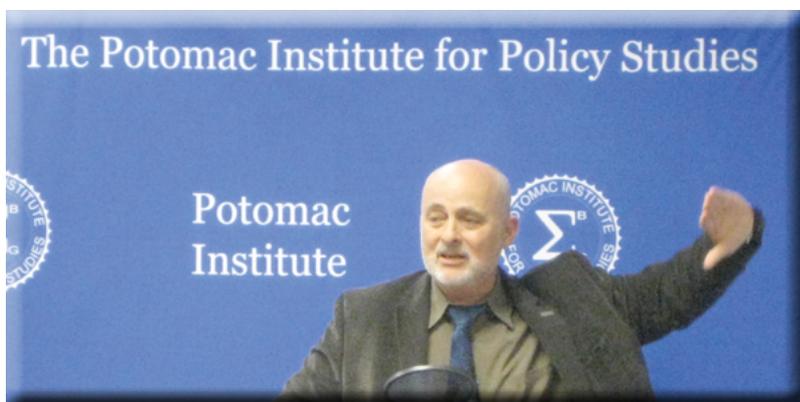
This is perhaps *the* standard human pattern. Indeed, looking at the skyrocketing social stratification going on today, who can doubt that the old pattern is making a comeback? Well? And why not? It’s the way things always were. Devotion to a king feels more natural than the complex interactions of democracy. Indeed, I am truly amazed that our alternative approach was ever allowed, or that it has lasted more than two hundred years.

There are a large number of unique aspects to our experiment. It is the most complex society ever created, with inputs and mechanisms and sub-systems that use many methods, ranging from joint, cooperative endeavors mandated by democratically-elected representative government to innovative capitalist enterprises, to the autonomous-yet-interdependent strivings of families and the

dreams that roil separately in hundreds of millions of individual human minds.

No *dogma* or *doctrine* can encompass this fabulous, makeshift machinery. Indeed, our parents and grandparents of the Greatest Generation – fatigued with failed dogmas after the Second World War – decided to stop using those mental cheats, concentrating instead on practical improvements. On making the good parts work even better... and jettisoning or repairing the bad.

That is one way of looking at some of our self-improvement campaigns. Like overcoming habits of pre-judging people – or prejudice – based on some class or race or sex they happened to be born in, a reflex that *all* previous societies wallowed in, wasting mountains of human talent and potential. Another such project at steady improvement was education, creating the greatest universities on the planet and young scholars who are likely far better than their test-score reputations imply. And the greatest campaign of all, subsidized willingly by most of us, called science. The spectacular accomplishments of this Grand Experiment, and many of its components, cannot be denied. Though, As Edward Tenner pointed out in his book *Why Things Bite Back: the Tragedy of Unintended Consequences*, we do have to be constantly critical, taking what worked, and making it work better.



Because there may be very little time. Because if the Singularity – or something like it – truly *is* taking off then we are going to have to be very agile people. We'll have to judge in real time whether to accept the blandishments of those who say “slow down, you move too fast; renunciate that path.”

Before simply dismissing such folk as nostalgic fools and cowards, it's fair to point out a few things. First, that only a few versions of a “technological singularity” would result in a future with normal-looking organic humans (our heirs) walking about in charge – enhanced, perhaps, but still masters of their destiny. Other versions foresee us creating AI or *artificial intelligences* that in turn swiftly design newer, better AIs, in an accelerating cascade that might supersede this version of humanity, either by conquest or through the more natural replacement of one generation that gives way to the next, bewildered by the brilliant aliens they have engendered and unleashed... their children.

Or there may be no such inheritance at all! Not if we blow it. As I describe in *The Postman* – and as other authors keep warning – there are a myriad ways that humanity's advanced, forward looking civilization might end, with or without AI.

How many of you have read Jared Diamond's *Guns, Germs, and Steel*? And his more recent book, *Collapse*? Fascinating stuff, though it can be daunting and depressing to read about how past civilizations failed, sometimes at their very peak. I don't think Diamond was quite as comprehensive as he thought, and not every collapse was for reasons ecological. Still that potential failure mode often did topple our ancestors. We who now have tools for looking ahead.... we do not have ignorance for an excuse.

While I do urge folks to read his books in order to grasp the scale of our challenges, Professor Diamond does ultimately represent the curmudgeonly wing of nostalgists I spoke of, earlier, because after skillfully laying down several severe challenges, he then gets around to prescribing how to *fix* them; at which point it's always the same dolorous “wisdom.” To step *backward* from whatever di-

lemma we face. To renounce the enlightenment's individualistic brashness and ambition. *Go back to older wisdom*, is the nostalgic motto. Refuse the pell-mell rush forward.

We are seeing this more and more from both left and right, especially in the United States. Sure, I deem one of those two political wings to (at present) be crazier and more dangerous than the other. (Forty years ago it was the reverse, especially if you include the USSR.) Still, it is intriguing how the most extreme leftist and rightist elements share a common thread of personality, expressing melancholic preference for the past. Both distrust of the essential modernist notion; that most problems can be dealt with through good will, negotiation, relentless innovation, reciprocal competition, compromise and accountability. These traits might result (as they have so far) in the vigilant finding of solutions. And then more answers, leading to the need for more, because inevitably this decade's clever "solution" will cause unexpected consequences that must be dealt-with, in turn. It's a scary dance to move forward under those circumstances. Pedaling pell-mell into the future. No other civilization managed the trick for as long as we have. Is it plausible we can continue? Is it possible the nostalgists are right?

REASONS TO LOOK UP

Here's a recent, under-reported item: in thousands of corporations, agencies and businesses, accountants have declared this *the year of the LED light bulb*. The tradeoffs of energy savings versus declining bulb cost have crossed a line. They are ripping out fluorescents and incandescents in buildings all across America. Next year it'll be your turn; I've already changed-out the high traffic areas in my home. This boost in efficiency will be an "intermediate level game-changer." Like the rapidly-improving economics of new, improved versions of solar power. Another, possibly even more significant breakthrough: Lockheed just announced that they believe they can develop, using the "graphene" miracle stuff we've been hearing about, desalinization equipment 100 times as efficient as

the current polymer based reverse osmosis filters; another potential game changer in thirsty parts of the world.

Can we truly keep this dance rolling forward? As a science fiction author, as a technologist and as a scientist, clearly I'm destined to be biased. What I do know is that – if we stand still – we cannot continue the trend of the last 50 years, having ever-higher percentages of the children on this planet grow up in homes with electricity, running water, sanitation, sufficient food, and going to school. Right now that fraction has passed three quarters, the highest it's ever been in the history of the race.

(In a followup since this speech was given: in May 2013 *The Economist Magazine's* cover story "Towards the End of Poverty" described a worldwide transformation: "*In his inaugural address in 1949 Harry Truman said that "more than half the people in the world are living in conditions approaching misery. For the first time in history, humanity possesses the knowledge and skill to relieve the suffering of those people." It has taken much longer than Truman hoped, but the world has lately been making extraordinary progress in lifting people out of extreme poverty. Between 1990 and 2010, their number fell by half as a share of the total population in developing countries, from 43% to 21% – a reduction of almost 1 billion people.*")

The litany of success goes on. Just as Dr. Stephan Pinker, in his book *The Better Angels of Our Nature*, laid out the blatant evidence for what a number of us have been saying for quite some time; that *per capita rates of violence* across the world have been plummeting every decade since WWII. Even the recent, terribly unwise wars in Iraq and Afghanistan, which were devastating to our US economy, were nevertheless waged in a manner unlike any other conflict. Standards are changing as war starts to look more like heavy-scale SWAT team action than mass armies pounding and flattening everything in their path.

Let's step further back and consider where it all might lead. Some are proclaiming the imminent arrival of that Singularity we spoke of

earlier, so let's go back to it, in more detail. The underlying notion is that Moore's Law – the doubling of our capabilities and computational power every 18 months – will eventually reach the point – sometime in the next 15 years – when you'll be able to cram into a head-sized box more floating point operations than we have synapses in our human brains. When that happens, some believe that artificial intelligence will automatically ensue, and *that* box will design the *next* box, which will rapidly design the next one and so on, with mental capabilities that take off exponentially. So inevitable do some fellows like Ray Kurzweil believe this to be, that they claim we may only choose *which type* of artificial intelligence is going supersede us. Will it be a kind that stomps us flat – the whole Terminator or Matrix thing?

Will it be one that pats us on the head, fixes all our problems and then patronizes or ignores us? Will we have to get used to being a lower form of life? That's Bill Joy's joyless vision of a future where we are not the top of the food chain.

Or will it be as some of these transcendentalist folks – like Kurzweil – foresee: a forward rush that we can partake-in, one that brings us along for the ride. Perhaps we'll get *augmentations* that feed our brains automatically to a degree that makes the internet look like nothing; where we attain god-like capabilities, possibly even immortality. Or else we might spend a reasonable time in squishy, organic form, then *upload* into robotic bodies, or even more capacious cyber realms. It's all made to sound so rosy and perfect... and fore-ordained, as if by natural law.

Well, whenever I am around these guys, I sound like you're thinking right now; it ain't going to be that easy. For example, we won't be doubling the human lifespan, not right away, not even if we starve ourselves. (See <http://www.davidbrin.com/immortality.html>) As for getting smarter, that's already happening on a modest scale. IQ scores have been rising – gradually but steadily – for three generations; it's called the Flynn effect. Our children are smarter than us, at the basic level of potential... though whether they're being lo-

botomized by Twitter and Facebook is another question that I wrestle with my 16 year-old every single day.

Audience Member: Who's winning?

David Brin: Ask whichever of us is still around in 30 years.

I was going to mention one additional big-picture item than the Singularity. What could be bigger than the prospect of either becoming gods or being left in dust by intelligences of our own devising? As an astronomer and as a science fiction author, I have to wrestle with what's called the *Fermi Paradox*.

How many of you have heard of it? Surely you've heard of SETI, the *search for extra-terrestrial intelligence*. Out in California, Microsoft billionaire Paul Allen funded the Allen Array of radio telescopes, to look around and listen for signs of alien intelligence on the radio waves crisscrossing our galaxy. Now, I have been a big supporter of SETI all my life. I've also published papers criticizing some facile assumptions that folks often make about this topic.

One of the biggest early assumptions was that searchers would instantly find great big *tutorial beacons* blaring messages to welcome newcomers like us, proclaiming "Yoo-hoo new life forms, here is your guide book how to overcome all your awkward, dangerous, adolescent problems, like nuclear war, poverty or disease." You can see why so many idealists yearned for this outcome; but it didn't happen.

Instead we face something called the Great Silence, or *Fermi Paradox*. All the estimates suggest that our galaxy should be positively teeming with technologically advanced civilizations, and yet there are no traces or even inklings that anyone is out there at all! At least none so far. Of course, the silence may end tomorrow! But until then, it's a puzzler. And so everybody and his uncle is trying to come up with excuses!

One was the suggestion that “planets are rare.” If only a few stars had planetary systems, that sure would explain the paradox! But that explanation has been demolished in the last decade and a half. In just the last 15 years, we’ve gone from zero known extrasolar planets to *thousands*. (Thanks to new instruments like the Kepler spacecraft.)

Contemplate that accomplishment for a minute. Wow! Say to yourself: “I am a member of a civilization that did that!” Wallow in that statement. Let it roll over you. The only fact I find *more* stunning is that most of our fellow citizens can learn such things – that they paid for – and don’t give a damn. Both facts are equally amazing.

All right, planets are common, but maybe life is more difficult to get started than we thought. Sure, every year we go a little farther along the complex chain toward developing life in the lab, and each point along the chain seems pretty easy. But who knows. Some step further along may be the tough part. The fluke that only happens on a rare occasion, explaining why Earth is unique.

Or life may happen easily, but *intelligence* is the difficult thing; this one has some support. Ponder this: every year we find that some of the brightest animals on this planet are smarter than we thought they were. Not just chimpanzees and dolphins (who I talk about in some of my science fiction novels) but also crows, parrots, sea lions, prairie dogs; all with some semantic ability and tool use that we thought was all ours, just 30 years ago. But here’s the key point. All of them seem to be crowded against a *glass ceiling* that Darwin didn’t seem to want to let them get through. *You may come close to sapient intelligence, but rise no farther.* That is, with one glaring exception. We crashed through that ceiling; we crashed through big time!

Is our level of intelligence the rare thing? I could go on for hours, discussing evidence for both sides of the argument. If it is, then we may someday find the galaxy teeming with life, but no one quite at our level.

Which brings us to an important aside. One of the bright (if scary) possibilities that folks are talking about these days is *mental enhancement*. This is something we are going to have to deal with, and possibly very soon. The ethics of such enhancement will be complex and fraught with dangers.

What if mental enhancement and/or life extension prove to be possible and effective, but they are very expensive, or kept secret, or restricted to a few? In previous human cultures, the lords and priests convinced themselves they were inherently superior. It is a natural delusion to cling to, justifying uneven opportunity, in societies shaped like pyramids, with a few dominating the many.

It was smug delusion then. But what will happen to our society, if a day comes when it is really true?

Contrast that pyramidal society with our own system of only 200 years, which is shaped like a *diamond*, with an empowered middle class outnumbering and outvoting both the rich and the poor. That's never happened before. And the implications of that altered social shape are astounding. Indeed, it is perhaps the biggest salient feature of our unusual civilization.

Think about one aspect of the old pyramid. What could you do about the *poor* when they were a gigantic base, wide and deep as an ocean surrounding little islands of wealth. What were your options except fight like hell to protect your little island? Jesus said the poor will always be with us; they are like the air, the sea. When society is a pyramid, you don't even imagine the possibility of poverty going away.

Ah, but under the diamond, poverty is no longer a vast sea. It became a bitter *lake* surrounded by affluence. And you can imagine draining a mere lake. Suddenly it is something that we can try to address – and as we saw earlier, that is exactly what is happening, as we speak!

That diamond, it should be our flag. It represents everything positive and different about our civilization, which accomplished more in a few generations than all the pyramid shaped oligarchies throughout the ages. But it's under threat all the time. Every generation of our parents and our grandparents and so on were threatened by attempts to return to that ancient pyramid. As I said, what if intelligence augmentations were restricted to the rich, and what if life extensions were? All these things that are glimmering possibilities that these techno transcendentalists proclaim will bring an egalitarian Singularity, they seldom think about how this acceleration of increased power might lead us to be like Icarus flying too close to the sun.

Should we give up because of the Icarian possibility? Or might we keep our heads, like Daedalus and fly from prison to freedom? Well you know how I feel about that.

Like everything else, this bears upon that old Great Silence in our sky, because all of the things we might do wrong... those things might be repeated across the cosmos. If you parse out the so-called Drake equation, accounting for all the factors that lead to us – planets, life, intelligence, technology and then the factors that might whittle down the number of extra-terrestrial intelligent species, such as self-destruction, nuclear war, environmental carelessness...

...or forms of society that wouldn't care about space, and who never become a spacefaring people exploring the universe. These pyramidal social structures were far more obsessed with conservatism; with protecting the privileges of the elites than they ever were about research and potentially destabilizing technologies....

...then what does it all add up to? It may very well be that we have *lots of neighbors* out there. They just formed very conservative, hierarchical, pyramidal social structures. It's been the nature of our civilization. As a matter of fact the last time a society like ours was tried, it was Periclean Athens. And when that experiment failed, the surrounding oligarchies made damn sure it wouldn't be tried again for 2,000 years.

SOME EXAMPLES

Now, I prepared a set of slides for you folks to illustrate a few points. But since I wanted to save time for questions, let me instead just make an announcement to wind things up. For you see, there are those in our civilization who are trying to resist the tide of depression and gloom... in fiction, in politics and in mass culture.

One ongoing effort can be found in foundations like the Potomac Institute that maintain avenues of communication for ideas, like this discussion series.

Another new effort is a little thing that we have just started at UCSD called the **Arthur C. Clark Center for Human Imagination**. Very exciting. It's going to involve all the neuroscience and cognitive science communities that we have there, studying in conjunction with artists and authors and all of that, what human imagination is. How to leverage it, teach it, and then help people to tell the difference between what they imagine and what's true.

And that is a big part of what we'll need, in the future, in order to navigate the minefield toward a horizon filled with hope.

So... how about some questions?

Audience Member: Dr. Brin, you alluded to *augmented reality* several times, and I want to get your thoughts on the dystopia in which our fixation on the virtual world rubs out our connection to the physical world? I am kind of thinking of that Star Trek episode where the civilization evolved to pure brains and they had these withered bodies. They had to hijack the crew in order to have physical experiences.

David Brin: Robin Hanson, an economist not far from here at George Mason University, is making special studies of what might be the logical economics of downloaded personalities. If they could make copies of themselves inside massive computers over and over again, what might work and economics be like? I deal with the abil-

ity for us to make copies of ourselves in *Kiln People*. We are exploring that space. Phillip K. Dick did it all the time.

Audience Member: David, you started off the talk with the commonly held belief that the good old days happened in the past, whereas your premise is that it's really in the future. I would contend as one of the alternatives to the good old days is today. If you accept that the question is, "Is the future now? (this is only one alternative, there are many more), then, is the future really driven by commercial product planning by visionaries or is it driven by spontaneous serendipity?"

David Brin: Oh wow, that is a meaty question. I don't like dichotomies. I often refuse dichotomies. Look let's get back into that context again, the big picture is the *Fermi Paradox*. I am in favor of finding out what's going on in as diverse a way as possible, so that we have a wide stance, because we are going to be making a lot of mistakes. When the anthrax plague was sent around this town right after 9/11, what did we count on? We counted on the ratio of skilled professional biologists, disease biologists, to the ratio of the one horrible guy who knew what he was doing. We are going to encounter that more and more as time goes on, because more and more the means of destruction will be democratized; this ratio has to keep rising. When that does happen it's not going to just be the skilled professionals who are going to be able to deal with this. You are going to need a large periphery of people who know what they're doing. Then the question is, "does this increasing ratio of sane to insane skilled people converge?" And we don't know. There may be a form of fusion power that one 16 year-old could blow up the planet, and that may explain why we don't see anybody out there. My general tendency is to believe that the solution in that case is an even more open world, in which the neighbors of that 16 year-old will tattle on him. We are starting to see that we are going to need something like that, because of what's already happening with a lot of angry 16 year-olds. I don't have to spell it out.

Audience Member: One of the assumptions that you seem to be making is that this approach to the Singularity is human-driven.

What if it's not? What if it's one of the laws of nature that things evolve in that way and no one has a clue what happens at the Singularity, like a black hole?

David Brin: Well, teleology is the belief that things have a preordained course. Marx was a master of teleology, another was Ayn Rand, his greatest disciple. I don't believe that things are teleological. If you take the Singularity and you juxtapose it with the *Fermi Paradox*, then what you need is something that is so teleological that it sucks everybody in. Robin Hanson and several others of these brainy guys believe that the thing that sucks you in is innerspace. That life inside these computers, the subjective world of these computers, is so alluring, so attractive, you are so brilliant when you're in there that you don't care about the outer cosmos, and the last thing you would want to do is leave and become – in effect – lobotomized.

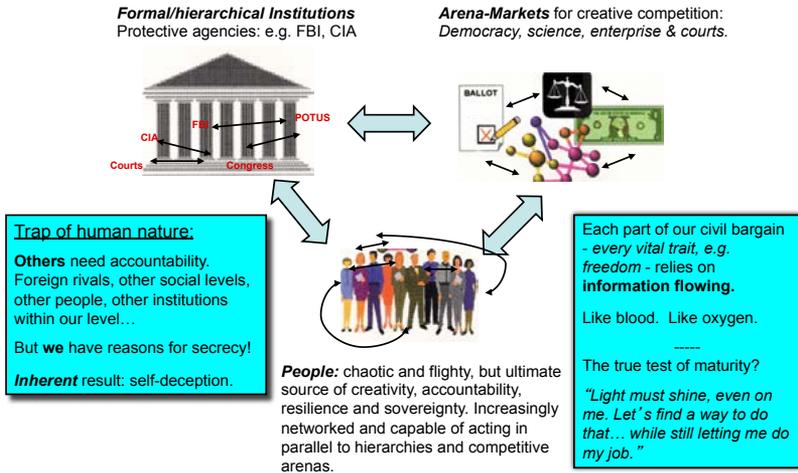
Audience Member: By the way, Fermi told me, while he was alive, that the speed of light is really the limit, and that it essentially makes all traffic to distant planets a good story and good literature, but not to be expected.

David Brin: There is a problem with that, and that is Fermi's colleague, John von Neumann, worked out the mathematics for whether or not you could (and you can do this) send, slower than the speed of light, a space probe to another star system that is sophisticated enough to find an asteroid, melt it down, make copies of itself, fuel them, and send them on their way. Such a probe's daughters and theirs would fill the galaxy within a few million years.

Audience Member: That's someone who was even smarter than Fermi and that's hard to do. I listened to von Neumann a number of times, and I never had a chance to talk to him.

David Brin: Well my new novel has many of the ramifications of this and the different variations. But the point is, that if you can make these von Neumann machines, we've calculated out that it will only take 3 million years for them to fill the galaxy. 3 million, that's an eye blink.

Information flow among society's three levels... and within each level.



Audience Member: I think you would probably agree that society at some level of abstraction is principally an information processing system. Do you agree with that? I thought it was interesting that your segregation of the series of the platforms you call arenas. I thought that was very interesting. In our current system that's where a lot of the information gets processed if they are operating correctly. Unfortunately, at least two of those platforms, probably three from your list of four, seem to be operating very badly at the moment, and particularly in opposition to your theory of transparency, but also badly in other ways. In particular, finance seems to have figured out how to hack the rest of the system.

David Brin: Oh it's scary in so many ways. I think that artificial intelligence might arise spontaneously and its very similar scenario to Terminator – to Skynet, only it's not a military device. The military believes strongly in knowing where the off plug is. High Frequency Stock Trading Programs: there is no area of artificial intelligence research that is getting a tenth as much money as is being poured into that, and it's all being done in secret. It's all being done with

vast attention to incredible increases in speed, augmentation and voraciously adding elements wherever they can grab them for free. With a programmed ethos that is diametrically opposite to Asimov's three laws – totally predatory and heretical. I believe that there is one major reason to institute the .001% totaling tax, and it has nothing to do with making money or hating Wall Street, it has to do with protecting us from that being the source of AI.

Audience Member: Well the reality of course is trivial to knock down high frequency trading. Actually, price formation in high frequency trading is what I studied at the Santa Fe institute; trivial to knock it down as you say with transaction tax and not a very large one. But of course that can't happen when politics has been hacked by finance, right?

David Brin: Well the Europeans just did it, and so the excuse against it is toppling. Then you start getting into the territory that I did in my novel *Earth* talking about “The Helvetian War”, which is the world's developing nations versus Switzerland and the banking havens. It sounded like a cool little “this-will-never happen” myth in a sci-fi novel. But two days ago, it was announced that 100 reporters around the world have spent a year massaging the biggest super Wiki leak ever from all the bank havens. This was something that appeared almost directly out of *Earth*.

Audience Member: Yeah, I am waiting for that list to actually be published. They have given us a few highlights, but they haven't given us the whole list yet.

David Brin: Why should they publish it when they can be bribed like hell not to?

Audience Member: The bottom line is, what do you think about the need for the citizenry to somehow rise up and force serious institutional reforms in the nexus of both finance and politics?

David Brin: Well, there is one simple thing and that is Lawrence Lessig's proposed reforms of political financing. If we could get that through, the incentives for politicians to have to spend 50% of their

time raising money would be substantially reduced. Look, a majority of Congressmen and women, who actually feel in their hearts that they are sincere people, would feel more liberated to engage in, I think, positive sum politics.

Audience Member: Well as you said it's if, I would gladly entertain any wagers on what's the possibility of that program being enacted.

David Brin: But, you see I took wagers on whether or not when push came to shove, Obama and the Republicans would do something about the deficit, and I believe that in the next nine months they will. And this despite the fact that I think that one of those two groups is stark gibbering insane and the other is center-right.

Michael Swetnam: With that I suggest that we continue the conversation over some wine and some food. It can only get better, but before we do that, please join me in thanking David Brin not just for the last hour and a half but, at least for me personally, for several dozen hours of intellectual stimulation that your books have brought to my life. Thank you very much.

SPEAKER BIOGRAPHIES

MICHAEL S. SWETNAM

CEO and Chairman, Potomac Institute for Policy Studies



Michael Swetnam assisted in founding the Potomac Institute for Policy Studies in 1994. Since its inception, he has served as Chairman of the Board and currently serves as the Institute's Chief Executive Officer.

He has authored and edited several books and articles including: "Al-Qa'ida: Ten Years After 9/11 and Beyond," co-authored with Yonah Alexander; "Cyber Terrorism and Information Warfare," a four volume set he co-edited; "Usama bin Laden's al-Qaida: Profile of a Terrorist Network," co-authored with Yonah Alexander; "ETA: Profile of a Terrorist Group," co-authored with Yonah Alexander and Herbert M. Levine; and "Best Available Science: Its Evolution, Taxonomy, and Application," co-authored with Dennis K. McBride, A. Alan Moghissi, Betty R. Love and Sorin R. Straja.

Mr. Swetnam is currently a member of the Technical Advisory Group to the United States Senate Select Committee on Intelligence. In this capacity, he provides expert advice to the US Senate on the R&D investment strategy of the US Intelligence Community. He also served on the Defense Science Board (DSB) Task Force on Counterterrorism and the Task Force on Intelligence Support to the War on Terrorism.

From 1990 to 1992, Mr. Swetnam served as a Special Consultant to President Bush's Foreign Intelligence Advisory Board (PFIAB) where he provided expert advice on Intelligence Community issues including budget, community architecture, and major programs. He also assisted in authoring the Board's assessment of Intelligence Community support to Desert Storm/Shield.

Prior to forming the Potomac Institute for Policy Studies, Mr. Swetnam worked in private industry as a Vice President of Engineering at the Pacific-Sierra Research Corporation, Director of Information Processing Systems at GTE, and Manager of Strategic Planning for GTE Government Systems.

Prior to joining GTE, he worked for the Director of Central Intelligence as a Program Monitor on the Intelligence Community Staff (1986-1990). He was responsible for the development and presentation to Congress of the budget of the National Security Agency, and helped develop, monitor and present to Congress the DOE Intelligence Budget. Mr. Swetnam was also assigned as the IC Staff representative to intergovernmental groups that developed the INF and START treaties. He assisted in presenting these treaties to Congress for ratification. Collateral duties included serving as the host to the DCI's Nuclear Intelligence Panel and Co-Chairman of the S&T Requirements Analysis Working Group.

Mr. Swetnam served in the US Navy for 24 years as an active duty and reserve officer, Special Duty Cryptology. He has served in several public and community positions including Northern United Kingdom Scout Master (1984-85); Chairman, Term limits Referendum Committee (1992-93); President (1993) of the Montgomery County Corporate Volunteer Council, Montgomery County Corporate Partnership for Managerial Excellence (1993); and the Maryland Business Roundtable (1993). He is also on the Board of Directors of Space and Defense Systems Inc., Dragon Hawk Entertainment Inc., and the Governing Board of The Potomac Institute of New Zealand.

DAVID BRIN

Scientist, Futurist, Author



David Brin is a scientist, speaker, technical consultant and world-known author. His novels have been *New York Times* Bestsellers, winning multiple Hugo, Nebula and other awards. At least a dozen have been translated into more than twenty languages.

His 1989 ecological thriller, **Earth**, foreshadowed global warming, cyberwarfare and near-future trends such as the World Wide

Web*. A 1998 movie, directed by Kevin Costner, was loosely based on **The Postman**.

Brin serves on advisory committees dealing with subjects as diverse as national defense and homeland security, astronomy and space exploration, SETI and nanotechnology, future/prediction and philanthropy. His non-fiction book – *The Transparent Society: Will Technology Force Us to Choose Between Freedom and Privacy?* – deals with secrecy in the modern world. It won the Freedom of Speech Prize from the American Library Association.

As a public “scientist/futurist” David appears frequently on TV, including, most recently, on many episodes of “The Universe” and on the History Channel’s best-watched show (ever) “Life After People.” He also was a regular cast member on “The ArciTECHS.” (For others, see “Media and Punditry.”)

Brin’s scientific work covers an eclectic range of topics, from astronautics, astronomy, and optics to alternative dispute resolution and the role of neoteny in human evolution. His PhD in Physics from UCSD – the University of California at San Diego (the lab of nobelist Hannes Alfvén) – followed a masters in optics and an undergraduate degree in astrophysics from Caltech. He was a postdoctoral fellow at the California Space Institute and the Jet Propulsion

Laboratory. His patents directly confront some of the faults of old-fashioned screen-based interaction, aiming to improve the way human beings converse online.

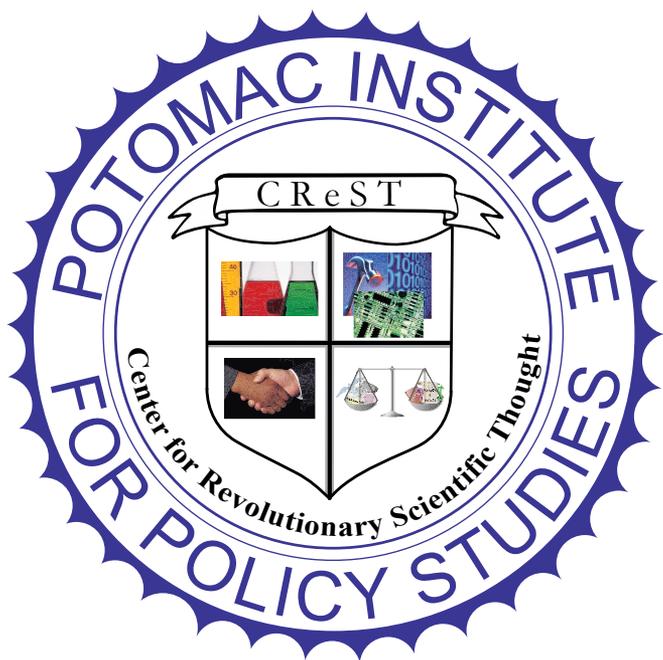
David's novel *Kiln People* has been called a book of ideas disguised as a fast-moving and fun noir detective story, set in a future when new technology enables people to physically be in more than two places at once.

A hardcover graphic novel *The Life Eaters* explored alternate outcomes to WWII, winning nominations and high praise in the nation that most loves and respects the graphic novel.

David's science fictional *Uplift Universe* explores a future when humans genetically engineer higher animals like dolphins to become equal members of our civilization. He also recently tied up the loose ends left behind by the late Isaac Asimov. *Foundation's Triumph* brings to a grand finale Asimov's famed *Foundation Universe*.

As a speaker and on television, David Brin shares unique insights – serious and humorous – about ways that changing technology may affect our future lives. Brin lives in San Diego County with his wife, three children, and a hundred very demanding trees.

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