



Royal Society of New South Wales
Bicentennial Dinner — 24 June 2022
The Great Hall, The University of Sydney

CHOOSE YOUR FLIGHT TO THE FUTURE

Dr Alan Finkel AC FAA FTSE FAHMS

READY TO FLY

Earlier this evening we heard an eloquent description from the Society President, Susan Pond, of the significant contributions of the Royal Society of New South Wales. And what a high-impact journey it has been over its 200-year existence!

The last time I spoke at this Royal Society, many years ago, my topic was the future of work. Other pundits in the symposium predicted that by now, automation would have destroyed the jobs market.

In contrast, I predicted that despite the inexorable changes, demand for jobs would stay strong. I was right! So, I have earned the privilege of taking you on a journey into the future.

Speaking of journeys, I recently went on my first international flight since Covid-19. Looking out the window as we started our descent into Los Angeles, I saw proof of the historical progress.

From 30,000 feet, the highways and traffic, the high-rise buildings and the agricultural fields completed a tapestry unimaginable 200 years ago.

I was reminded of a story that John Bertrand, Australia's famous America's Cup captain, told me of the day in 1983 when he was at the White House to be awarded the prestigious trophy.

President Ronald Reagan's Chief of Staff, James Baker, told John about the time the President flew to Moscow for nuclear disarmament talks.

President Reagan sat for hours thoughtfully looking out the window as they flew over Russia and descended into Moscow.

On landing, Reagan turned to Baker, "James, the economy of the USSR is not nearly as strong as they claim."

"Why do you say that Mr President?"

"Because there are hardly any trucks on the highways."

Reagan was right. The USSR's self-vaunted, centrally managed economy was near collapse.

President Reagan got to fly on the very special aeroplane known as Air Force One.

Tonight, thanks to an arrangement between the Royal Society of NSW and Qantastic Airlines, I can offer you an extraordinary flight on another very special aeroplane.

The clue to the uniqueness of this offer is the flight plan: we depart Sydney, and we arrive in Sydney.

We take off at 10 PM tonight and we arrive at 10 AM tomorrow, but in 2052!

Thirty years from now.

That's at least 10 federal elections you'll miss.

No passport or visa required – all you need is a sense of adventure.

So, please join me – you will not have another chance until the 300th gala dinner of the Royal Society of New South Wales.

FIRST FLIGHT

Take off.

More than eleven hours and a good sleep later, the pilot announces, "Passengers, we will soon be landing in Sydney, in the year 2052. The time is exactly 9:35 AM; please set your watches. Unfortunately, when we land, your smartphones will not work on the 12G network."

"Look," Peter Shergold observes, pointing out the window. "Huge swathes of burned forests stretching out in all directions. And the highway traffic is surprisingly light."

"I wonder why?" the Honourable Justice Brian Preston ponders, just loud enough for me to hear.

After a smooth landing, we meet our guide at the terminal, a friendly young man named Tim.

As he directs us to the autonomous van that will take us to the Opera House, Tim says. "It will be my honour to answer any questions you may have."

"Climate change," the Honourable Gabrielle Upton inquires. "It's now two years past 2050. Did the world get to net zero? Did Australia?"

"Neither" answers Tim.

"While there was progress in the 2020s, Australia, Europe and America didn't manage to scale up fast enough.

In Europe and America, the failure was a consequence of the pan-European war that began with Russia's invasion of Ukraine."

"In Australia, industry and government failed to engage local communities and landholders, making the construction of new transmission lines and wind farms difficult."

“Meanwhile, operators could not afford major maintenance of their coal fired power stations and they started to fail. Electricity prices skyrocketed. There were riots.”

“The government wound back its targets and continued to support oil for transport and coal for electricity. Progress has been slow.”

“What about health?” asks Attila Brungs.

“Not great,” says Tim. “In particular, the H2ON35 bird flu pandemic that started in 2035 was a disaster. In just six years, 150 million people died worldwide. Hospitals were overrun, and the global economy was set back a decade.”

“Because investment in science had been at historical lows beforehand, scientists had little to build on. Disinformation led to protests, and blockades of vaccine facilities in most countries.”

“It took more than four years before the first truly effective vaccine appeared.”

“Antibiotics?” asks Peter Baume.

“We never found new classes of antibiotics and the traditional antibiotics are no longer effective,” replies Tim. “Nowadays, infection is a leading cause of death. If you’re infected, it’s not pretty.”

“How’s the Royal Society of New South Wales?” asks Susan Pond.

“Never heard of them,” replies Tim.

“Wait! Stop! I want to go back,” Susan cries.

“I agree!” the Honourable John Dowd exclaims, and everyone chimes in, “Back to the airport! Back to the airport!”

At the departure lounge, our pilot greets us anxiously.

“Oh! I’m so glad you’re back early – there’s been a terrible mistake! An error in the flight computer sent us to the *wrong* future!”

We rush aboard and take off on our return journey. Hours later, we arrive at Sydney just before midnight on Saturday the 25th of June 2022.

As we disembark, a Qantastic Airlines flight steward apologises profusely for the error and gives each of us a free ticket for another flight to the future.

“But be quick,” she says. “Departure is in 30 minutes.”

SECOND FLIGHT

Take off.

More than eleven hours and a good sleep later, the pilot announces, “Passengers, we will shortly be landing in Sydney in the year 2052. The time is exactly 11:35 AM; please set your watches. Unfortunately, when we land, your smartphones will not work on the 12G network.”

“Look,” Anne Maria Nicholson observes, pointing out the window. “Lush forests and fields of farmland stretching out in all directions. And the highway traffic is heavy.”

“Remarkably so,” John Hardie concurs.

After a smooth landing, we meet our guide at the terminal, a friendly young woman named Tina.

As she directs us to the autonomous van that will take us to the Opera House, Tina says. “It will be my honour to answer any questions you may have.”

The van accelerates rapidly along the entrance to a freeway filled by a phalanx of sedans, trucks and one-person bubble cars moving very fast, with hardly a space between them.

“*We’re going to crash!*” I gulp. But suddenly, an opening appears, and we slip in, snug between a giant truck and a midsize sedan.

“Oh, I’m sorry,” says Tina, seeing us turn pale. “You’re our first visitors from the past. I should have realised you didn’t have smart cars and convoys in the 2020s. A smart convoy would never allow an accident to happen.”

“Climate change,” Saul Griffith inquires, changing the subject. “It’s now two years past 2050. Did the world get to net zero? Did Australia?”

“Oh yes,” says Tina. “Australia aced it. There was great progress in the 2020s, which built momentum and ensured progress in the 2030s, too.”

“What worked best? Here, and overseas?” asks Ross Hynes.

“Well, here the 2050 net zero target was legislated, and everyone worked to achieve it,” Tina replies.

“Also, the designation of the 2032 Brisbane Olympics as the Sunshine Games had a galvanising effect. Heating, lighting, and transport in the stadiums and athletes’ villages were powered by solar and wind, or hydrogen from renewables.”

“Had you heard of hydrogen back then?” Tina asks.

“Actually, ahem, yes!” I mutter, ironically.

“While the Sunshine Games started as a marketing slogan,” Tina continues, “it quickly became an inspiration. Science had shown the need to reduce emissions fast. And since nearly three quarters came from coal, oil, and natural gas to produce energy, everyone rightly focussed on the energy system.”

“Through intense investment in solar and wind farms, transmission lines to connect them, rooftop solar, batteries and a sophisticated digital control system for the electricity grid, we developed a reliable zero emissions electricity supply.”

“As it was increasingly deployed, we were able to progressively switch off the coal and gas generators.”

“It’s a different world, now,” Tina continues. “Some historians say that humanity has transitioned from the Industrial Age to the Electric Age.”

Shifting her attention beyond the energy sector, Tina explains that eliminating other emissions was difficult. These included carbon dioxide from cement production, and methane from landfill and from agricultural waste such as animal manure and rice stalks.

“The biggest challenge was methane from belching cows and sheep,” she reflects.

“Environmental movements to ‘go vegetarian’ or ‘go vegan’, and even the ‘eat kangaroo’ movement, made small contributions but never achieved critical mass.”

“Two major innovations solved it,” Tina recalls. “One was the introduction of seaweed as a food supplement to suppress methane burps – sounds too good to be true, but it works.”

“The other was synthetic meat that tastes just as good as nature’s original.”

“My grandfather, Alan Finkel, told me he had his first synthetic burger in 2022. I think he referred to it as an Impossible Burger, and he really enjoyed it. He said he expected it to taste like a veggie burger, but it tasted like the real thing!”

“Anyway, Australia achieved net zero in 2047.”

“Europe got there early too, while the U.S. and Canada are almost at net zero, as is most of South America and Africa. China and India will probably make net zero by the end of this decade.”

Pointing outside the van, Tina calls out: “Do you recognize that?”

“You bet,” replies Pamela Griffith. “The Opera House. But there are so many stunning new buildings.”

“Look at that one leaning out over the water without support! It must be 100 storeys high and cantilevered a hundred metres! What construction material is strong enough to support that!”

“Nothing from 2022,” Tanya Monro offers, “they must have invented metal alloys far stronger than anything we had.”

“The architecture is amazing,” Tanya continues, “and it’s terrific to see so many leafy green zones. Which makes me want to know about global warming. Tina, what about global temperatures?”

“That’s not so good,” Tina replies. “The global average is now two degrees above the preindustrial baseline. There was simply too much inertia in the system.”

“The number of fire hazard days is well above the average of last century, and flooding is more common,” she adds.

“On the positive side, new building codes have improved the thermal performance of houses, and ultra-efficient heat-pumps help people to live comfortably year-round.”

“Also, we are very excited about the roll out of the machines that remove carbon dioxide from the air so that it can be buried permanently underground. The cost has fallen dramatically, and in a century, we’ll probably reduce atmospheric carbon dioxide by at least 50 parts per million, to what it was in the 1990s.”

“You know,” I say, “in 2022 Australia was already a solar electricity superstar. The main impediment to expanding wind and solar was that landowners fought against transmission lines carving up their properties. How did you solve that?”

“Well, we took advice from the social scientists,” said Tina. “Based on their research, companies learned to work with local communities to minimise the impact and offer fair compensation. Occasionally, short sections of the transmission lines went underground. Problem solved.”

“Wow,” I say. “Social scientists! Who would have thought?”

“The roll out of solar and wind electricity boomed,” continues Tina. “And so did industry. Low-cost electricity helped boost manufacturing along the east coast of Australia.”

“What’s more, renewable hydrogen and ammonia, and zero emissions iron and aluminium, became successful exports that replaced our declining coal and natural gas exports.”

“Other resources boomed as well. Last year, in 2051, we had record exports of copper, iron, lithium, nickel, graphite, manganese and rare earths.”

“Land use challenges do remain, but companies have learned to listen to environmental and social scientists, and work with local and indigenous communities. The companies provide sustainable local jobs and restore abandoned sites to good condition.”

“Australia’s sovereign wealth fund is over \$2 trillion. Politicians fight over how to spend the interest,” she grins.

Tina goes quiet, giving us time to absorb it all. The cars and trucks around us are silent and driverless, all battery or hydrogen electric. Then, suddenly, a familiar and really annoying noise grows louder and goes screaming past us.

“A motorbike exhaust!” Paul Jeans marvels. “How can that be?”

Tina grins: “There’s a loophole in the zero emission laws. That motorbike is running on synthetic jet fuel, same as aeroplanes. It has zero carbon dioxide emissions but massive audio emissions!

“So, Tina,” asks Barney Glover, “are you saying that science, engineering, logic, and planning, prevailed over emotion, selfishness, greed and ideology? Who would have thought?”

“Yes,” says Tina. “Things worked out better than expected. But there have been setbacks, like the H2ON35 bird flu pandemic. It raged for 10 months from August 2035.”

“It came on faster and harder than the Covid-19 pandemic of your time, it was incredibly contagious.”

“More than five million people died worldwide in the first two months. But by then its genome had been sequenced by labs in Parkville, Suzhou, and Oxford, and the world’s 17 mRNA factories started to ramp up vaccine production.”

“The global death rate peaked at month four, and within 10 months it was effectively zero.”

“Speaking of medicine: in your time, you were worried about antimicrobial resistance, am I right? Well, new strains of antibiotics were developed, the most successful being one that destroys

bacterial membranes. The first was approved in 2026 and was an immediate success against golden staph and vancomycin-resistant bacteria.”

“These new classes of antibiotics allowed older antibiotics to be used less frequently, so resistance rates fell.”

“Something from your time that *didn't* work were mind-machine interfaces – you know, where you drill a hole through the skull and implant electrodes. Testing in animals showed the brain rejected the electrodes within a few weeks. And besides, the Silicon Valley companies developing them couldn't find a single human volunteer for the brain surgery.”

“What's happening in the rest of the world, Tina?” asks Duncan Ivison.

“Well, the collapse of the United States was averted by constitutional reforms following the Florida riots. They copied compulsory voting from Australia, thereby minimising unrepresentative, radical outcomes. And they adopted the two-round presidential voting system used in France, thereby ensuring the people of America elected the presidential candidate truly preferred by the majority. Who would have thought?”

“Social media manipulation by criminals, enemy states and corporations got really bad for a while, until the Banana Six smartphone came along. It had a super powerful chip that did all the AI processing on the phone itself. Now no-one has to share location data or searches, so targeted advertising doesn't work.”

“Eventually, most countries passed laws making companies responsible for the content of messages on their platforms. Defamation lawsuits spread like wildfire, and social media companies went bankrupt. Those that survived were transparent and responsible.”

“Tell us more about science,” asks Veena Sahajawalla, “has it thrived, or suffered?”

“Depends on who you ask,” Tina says. “Federal Government funding for R&D is 3.5% of GDP, which is probably double what it was in 2020.”

“And the states?” asks, Christina Newman, “are they investing, too?”

“I don't know about the other states,” replies Tina, “but back in your time the New South Wales Government released a 20-year R&D roadmap, and, I'm not sure, but I think that successive governments have updated it every five years since then.”

“What about scientific advice to government?” asks Kathy Belov, as she glances up at a flock of school students swooping overhead in autonomous quadcopters.

“There's a system of advice to ministers, including a Rapid Research Information Forum, plus short and long-form reports produced on-demand. They're all well-funded and publicly available.”

“And the Chief Scientist?” Cathy Foley tentatively asks.

“Do you mean the Chief Scientific Advisor to the Prime Minister? She's listened to and well-funded. Very popular, too.”

“Hallelujah!” whispers Cathy, with a quiet smile she carries for the rest of the trip.

“Tina,” asks Brigid Heywood, “tell us about universities. Have they survived, or were they replaced by a single, online global mega-university?”

“Somewhere in between,” replies Tina. “There *are* online mega-universities, using artificial intelligence instructors to each teach 20 million students or more. But there are only three worldwide, and they mostly specialise in second degrees.”

“Could you elaborate?” Brigid probes.

“Well, young people doing their first degree go to university as much for the social experience as the learning experience, and online didn’t give them that.

“Most universities have returned to fundamentals, like enforcing prerequisites and creating enticing campuses that encourage students to attend and study.”

“They also teach students to use their BS detectors to filter everything they read and hear.”

“There are some good things happening in schools, too. For example, students are taught analytical thinking, so they’re able to distinguish evidence-based theories from conspiracy theories.”

“And every Australian school has a subscription to Cosmos magazine, with the result that students are well aware of the role of science in the world around them.”

Wilson da Silva blushes, proudly.

“What about royal societies?” asks Susan Pond, in anticipation. “Does the Royal Society of New South Wales still exist?”

“Interesting question,” replies Tina. “Were you involved way back then?”

Susan winces, then nods.

“They’re doing well,” continues Tina. “Their speciality is live presentations by charismatic experts,” she explains. “The experts tour the capital cities, hosted by the local royal society. It turns out that audiences enjoy attending live presentations much more than watching speakers online.”

“Things have worked out much better than I expected,” observes Robyn Williams. “I’m so glad I took this flight. As an authority on the 21st century, Tina, what do you think worked best?”

“Mr Williams, before I reply, can I say how much I enjoyed my undergraduate class, called *Lessons from the ABC Science Show 101*? I’m so honoured to meet you!”

Robyn’s cheeks redden.

“Anyway, in my opinion,” continues Tina, “what worked best was the realisation in the late 2020s that pursuing perfection doesn’t deliver.”

“Another contributor was the *National Science Meets Economics* conference in 2027, where scientists accepted that scientific advice has to co-exist alongside economic considerations, while economists accepted that economics advice has to factor in science. From then on, politicians could listen to the experts without having to choose sides!”

“You are so well informed, Tina,” observes Mark Scott. “Where did you learn so much?”

“I studied modern history at the University of Sydney,” she replies, and Mark smiles.

“Ahem, may I have your attention? Your attention please!” says a hologram of the pilot, suddenly appearing before us. “Passengers, we need to return to 2022 soon, before the time portal closes. If we are too slow, we’ll be stuck in 2052!”

Sitting in the seat next to me, Emma Johnston, white as a ghost, whispers: “Alan, I think I’ll stay. This future is fantastic.”

I tell her I’m tempted to do the same.

“But Emma, we can’t. We need to go back to 2022, to ensure this future happens!”

Emma pauses for a moment. “You’re right, Alan. There’s a lot to do!”

We sit silently, pensively, on the way to the airport.

DISEMBARKING IN THE PRESENT

We rush aboard and take off on our return journey.

“Alan,” says Jude Rae, 12 hours later as we disembark the Qantastic Airlines aeroplane under a sunny Sydney sky on Sunday, 26 June 2022. “I put my smartphone on flight mode while we were in the future, and I took lots of pictures. Let me show you.”

But they’re all blank.

Distinguished guests, my challenge to each and every one of you is to help deliver the future we all want.

Miracles don’t just happen, they are the result of intelligent, concerted effort.

May the Force be with you.

And may the Force bring continued success to the Royal Society of New South Wales.

Thank you.

PROTAGONISTS (present in the audience)

- 1) Anne Maria Nicholson Author, Journalist, Arts
- 2) Attila Brungs Vice-Chancellor, UNSW
- 3) Barney Glover Vice-Chancellor, Western Sydney University
- 4) Brigid Heywood Vice-Chancellor, UNE
- 5) Chennupati Jagadish President, Australian Academy of Science (represented by AAS Council Member Veena Sahajwalla)
- 6) Christina Newman Deputy Director, Office NSW Chief Scientist
- 7) Ross Hynes President, Royal Society of Queensland
- 8) Duncan Ivison DVCR, University of Sydney until April 2022; Philosopher
- 9) Emma Johnston Incoming DVCR, University of Sydney, July 2022
- 10) Gabrielle Upton, the Hon Member for Vacluse; Parliamentary Secretary for Premier
- 11) John Dowd, the Hon International Commission of Jurists Australia
- 12) John Hardie Past President, RSNSW
- 13) Jude Rae Artist
- 14) Justice Brian Preston, the Hon Chief Judge, Land and Environment. Court, NSW
- 15) Kathy Belov Professor in comparative genomics, Uni Sydney
- 16) Mark Scott Vice-Chancellor, University of Sydney
- 17) Pamela Griffith Artist; Mother of Saul Griffith
- 18) Paul Jeans Chancellor, University of Newcastle
- 19) Peter Baume Emeritus Professor, Distinguished Fellow RSNSW, medicine
- 20) Peter Shergold Chancellor, Western Sydney University
- 21) Robyn Williams Science Journalist and Broadcaster
- 22) Saul Griffith Author "The Big Switch"
- 23) Susan Pond President, RSNSW
- 24) Tanya Monro Chief Defence Scientist
- 25) Wilson da Silva Former co-founder and Editor-in-Chief, Cosmos Magazine

PROTAGONISTS (not present)

- 26) Cathy Foley Australia's Chief Scientist