

Profile

Intellectual innovator

Former physicist **Nathan Myhrvold** has been many things – from Bill Gates’ right-hand man to the world champion of barbecue. He tells Martin Griffiths how he is now hoping to change the way the world invents



Inventive mind
Nathan Myhrvold.

Nathan Myhrvold has only ever worked for three people: first Stephen Hawking; then Steve Ballmer, current chief executive of Microsoft; and finally Bill Gates. “Each had more money and less formal education than the last,” jokes Myhrvold, “so I had nowhere left to go.” Maybe that is part of the reason that Myhrvold, a former physicist, left his job as chief strategist and head of technology at Microsoft in 2000 and set out on his own to revolutionize the intellectual-property market.

Myhrvold’s company, Intellectual Ventures (IV), does not make anything. Instead, it trades in ideas, specifically patents. Myhrvold has recruited a team of about 30 “senior inventors” to think for him – scientists, technologists and business leaders whom he thinks have not “sold all of their brain” in their day jobs. By bringing these talented people from diverse fields together for “invention sessions” at IV’s offices in Bellevue, Washington, Myhrvold hopes to stimulate new ideas that his team of lawyers can patent.

The approach seems to be working: IV files about 400 patents each year based on the ideas of its inventors. The model for making money from these patents varies. For what Myhrvold calls “evolutionary ideas” – incremental progress in areas that already have a large market – IV will usually license its patents to existing companies. But Myhrvold is more excited about “revolutionary ideas”, those that are at least five years away from commercialization and so might

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In person

Born: Seattle, Washington, 1959
Education: University of California at Los Angeles (BA, MS), Princeton University (MA, PhD)
Career: University of Cambridge (1983–1984), chief executive of Dynamical Systems (1984–1986), various positions at Microsoft (1986–2000), chief executive of Intellectual Ventures (2000 onwards)
Outside interests: cooking, photography
Family: married, two sons

be more suited to new spin-out companies. For their part, the inventors are paid for their time, and offered a share of any profits resulting from their invention.

Visionary or troll

One revolutionary idea that excites Myhrvold is the potential of metamaterials – new materials with structures that have been artificially engineered to have unusual electromagnetic properties, such as a negative refractive index (see *Physics World* September 2006 pp30–32). “At the moment it’s a zero billion dollar business – an answer in search of a question,” he says. “But we’re optimistic that the question will pop up and the answer will be valuable. If so, we’ll look very smart.” Sir John Pendry, a theoretical physicist at Imperial College London who last year revealed a design for an “invisibility cloak” using metamaterials, is on Myhrvold’s roll-call of in-

ventors. Pendry describes these invention sessions as “lively and sociable” and Myhrvold as “enthusiastic and energetic”.

More controversial, though, is the other side of IV’s business. The company buys up thousands of existing patents, often through a secretive network of “shell companies” designed to protect IV’s anonymity. This has led some to describe Myhrvold as a “patent troll” – a derogatory term for someone who hoards patents they never intend to use in order to sue large companies that infringe them. But Myhrvold shrugs off his critics. “They’re engaging in what psychologists call projection – they assume that what I’ll do is what they would do,” he says. He points out that IV has never filed a patent lawsuit, and that litigation is an inefficient way to do business. “It’s a failure of imagination to believe that litigation is what this is about,” he says.

A failure of imagination is not something that Myhrvold could be accused of. He is passionate about the power of new ideas to change the world. “Invention is a great thing to do, and the world doesn’t do enough of it,” he says. Indeed, he is critical of Silicon Valley firms for taking a short-term approach and failing to encourage research. Myhrvold’s enthusiasm for invention was the spur for him establishing Microsoft Research in 1991 and he is proud of, but concerned by, the fact that it makes him one of the few living founders of an industrial research laboratory.

Myhrvold feels that there is a wealth of untapped ideas in the world, and that IV represents a new way to harvest them. “Highly inventive people almost always create more inventions than they know what to do with – they don’t have time to take them seriously, file patents, or do the business work,” he says. “We make it very easy for inventors to have ideas that get traction.” He is delighted with IV’s output of patents in software, semiconductors, medical devices and many other areas, which makes it the 25th biggest source of inventions in the US. “If there were 100 more outfits like ours,” he says, “there would be a measurable change in technological progress.”

From Hawking to Gates

Myhrvold, 47, graduated from high school at 14. A decade later, he had two Masters degrees and a PhD in theoretical physics, before going to the University of Cambridge as Stephen Hawking’s postdoc. He says his research in quantum gravity was fascin-

ating, and that he misses it “to a degree”. As for Hawking himself, Myhrvold has nothing but admiration. “It is impossible to feel sorry for yourself while working with Stephen,” he says. “This guy has physical challenges that would crush the spirit of anyone, but they don’t crush his spirit at all.”

But after a year at Cambridge, Myhrvold took a leave of absence to help friends from graduate school found a software company in California, and he never came back. Dynamical Systems was bought by Microsoft in 1986 and Myhrvold went with it. However, Myhrvold has stayed in touch with physics and has strong views on the recent debate over string theory. He sides with critics such as Peter Woit and Lee Smolin, who argue that string theory has encouraged theoretical physicists to put all their eggs in one basket – and a basket that makes no testable predictions at that. However, he does admit some personal bias – he was Woit’s room-mate and used to house-sit for Smolin while he was a graduate student at Princeton.

Myhrvold’s distrust of string theory also reflects his tendency to back the underdog. He has donated \$1m to the SETI Institute, partly because he was impressed by its “heroic” efforts in searching for life elsewhere in the universe, work that has only a slim chance of success. “I always like to support stuff other people don’t,” he says: “Giving to the usual suspects has little impact.” Myhrvold also funds research into dinosaur palaeontology, and even does some research on the topic on the side. In 2000 he had a paper published in *Nature* on his co-discovery of a bird-like tail bone from a non-avian dinosaur in Mongolia. Most people’s hobbies do not end up being published in leading scientific journals, but then Myhrvold makes a habit of excelling.

A case in point is his passion for cookery, which led to him training as a French chef, working part-time in a top Seattle restaurant and winning the barbecue world championship in Memphis in 1991. Myhrvold is even working on a cookbook that will include a section on “physics for chefs”, which will cover using the heat-diffusion equation to explain how quickly a steak cooks.

With all these projects on the boil, Myhrvold admits that he rarely has time to sit back and relax. But his restless enthusiasm seems unlikely to pause for breath any time soon. As Pendry remarks in passing, “Have you asked him about his plan to salvage obelisks from the Nile?”

UK research

Cambridge physics breaks new ground

Ever since the days of Maxwell, Thomson and Rutherford, the University of Cambridge has been rightly recognized for the quality of its physics research. But physics at Cambridge, which is centred on the world-famous Cavendish Laboratory, is about to be boosted by the building of a new centre for the physics of medicine and a cosmology institute. The university is also making a string of new appointments in physics.

The centre for the physics of medicine is in fact just the first phase of a grand 20-year plan to redevelop the entire Cavendish Laboratory, which is currently housed in energy-inefficient buildings from the 1970s. Although details of the plan have not been finalized, it would – if approved by the university – involve knocking down the entire laboratory and rebuilding it at a cost of up to £120m.

Work on the £12.5m multidisciplinary centre, which is being funded by the government and the Wolfson Foundation charity, will begin next month. When complete towards the end of 2008, the centre – in the grounds of the existing Cavendish – will house over 100 postdocs and students, and be led by eight permanent staff, four of whom will be physicists.

Researchers at the centre will work on a range of problems at the interface between physics and the life sciences, such as studying the location and dynamics of molecules within cells, using pattern recognition to understand developing embryos, and examining how low-level noise can disrupt the way in which cells signal.

“Physics on its own can be very clever, but solving real problems relating to the quality of life adds a new dimension to the intellectual challenge and satisfaction,” says Athene Donald, deputy head of physics at the Cavendish, who is helping to set up the centre.

The Cavendish is also focusing on more traditional parts of physics. It has recently formed a new £6m collaboration in quantum physics with researchers from Imperial College London and Oxford University. Funded by the Engineering and Physical Sciences Research Council, the collaboration will be led by Peter Littlewood, current head of the Cavendish. The lab also plans to set up three new experimental groups – two in ultra-



Building Design Partnership

Bold vision
Cambridge’s new centre for the physics of medicine is the first phase of a plan to redevelop the entire Cavendish Laboratory.

cold atoms and one in fundamental semiconductor physics.

Other developments include an extensive hiring programme, which has already resulted in eight new lecturers being appointed in atomic, biological and high-energy physics. Three new professors will also be recruited, including Jeremy Baumberg – the current head of the quantum, light and matter group at Southampton University, who will be moving to Cambridge in the autumn.

Meanwhile, a short distance away from the Cavendish, contractors have already started work on a new £7.5m Kavli Institute for Cosmology, which is set to open in October next year. The institute is named in honour of Fred Kavli, the Norwegian-born physicist and philanthropist who set up the US-based Kavli Foundation in 2000 (*Physics World* November 2006 p13). A £4m endowment from the foundation will pay for a series of five-year “Kavli fellowships”, while the additional £4m costs of the building are being met by the university itself.

Bringing together as many as 55 existing Cambridge researchers, the new institute will be led by George Efstathiou, the current director of the university’s Institute of Astrophysics. He says that the institute will focus on four or five flagship projects that will include the study of the cosmic microwave background and the evolution of high-redshift galaxies.

“Kavli fellows will have complete freedom to do the research that they want,” says Efstathiou. The institute will be part of a network of 13 Kavli research centres around the world. And as the Kavli endowment includes funds for an outreach centre to complement the Cavendish’s already active public-outreach programmes, staff will soon have a lot to shout about.

D Jason Palmer

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