I have just disembarked at a train station outside London, when I spot the tall, thin, bespectacled man in a woollen jumper smiling at me from the opposite platform. We shake hands and climb into his polished black Lexus, me anxiously trying not to muddy the plush cream mats while the driver, one of the world’s leading theoretical physicists, chats about property prices in this well-heeled part of the world.

Professor Sir John Pendryspeeds me to an immaculately kept bungalow; the sitting room and study are decorated not with equations but with framed photographs that he himself has taken, courtesy of the digital camera that he carries everywhere in his briefcase. The scenes – Isles of Scilly landscapes and sunlit doorways in South Kensington – reveal a decent eye. “It’s all about the geometry, the visuals,” he explains of his photography. Only later, when transcribing our interview, do I realise how similar his response is when I ask him to describe his approach to theoretical physics: “I think in geometry; I always like to have pictures in my mind.” This unique clarity of vision has enabled John, 68, to ‘see’ and solve mathematical challenges in physics across a staggering breadth of subject areas, from surface science to optics to the completely new discipline of metamaterials, which he largely invented.

During the next two hours, he sheds his initial formality, turning into a gracious, candid and amusing interviewee. Of his 2004 knighthood, the first bestowed on a serving Imperial physics professor since Sir George Thomson received one in 1943, he says: “I regard it as a great honour but I never have it on my badge at scientific meetings. You have to be careful not to ponce around calling yourself Sir John all over the place.” The breadth of his work was also memorably celebrated in 2008 during a three-day ‘Pendryfest’ at Imperial, where he has worked since 1981 as Professor of Theoretical Solid State Physics, following stints at Bell Labs in the US and Daresbury Laboratory in Cheshire.

The metamaterials for which he has become so well-known are artificial materials whose effects derive from their physical structure, not their chemical make-up. In brief, they are engineered from collections of microscopic structures that, at a larger scale, do unexpected things to electromagnetic waves, such as deflecting them. Such materials can theoretically be used to bend light around an object, rendering the object invisible – a 2006 finding that led to him being lauded in the international press as the inventor of a Harry Potter-style invisibility cloak. His achievements have attracted attention from many quarters: a presentation on the cloak to the American military research agency Darpa resulted in a job offer – rejected, of course – paying considerably more than a professorial stipend, and certainly enough for several more luxury cars. He has also been a consultant for Marconi; the filing cabinet in his fastidiously tidy study, where we are shuttled away for the interview, is stuffed full of old patents he wrote while consulting for industry.

Not that his other major pieces of work have been dull. In 2000, he published a short but explosive paper in Physical Review Letters explaining the theoretical possibility of a perfect lens. It built upon work done nearly 40 years earlier by the forgotten Russian scientist Victor Veselago, who suggested that a material with a negative refractive index – something never seen in nature – could produce an almost magical lens capable of creating images at a resolution finer than the wavelength of light being used.

He recalls: “One day I decided to do the job properly, and found something that Veselago hadn’t noticed: that you could arrange things so that the focus was theoretically perfect. It turns out that the lens was so simple that anyone from Maxwell’s time onwards could have solved it quite easily, even a third year undergraduate.” Really? “Yes!” and it only took him a day? “One morning!” he chuckles, leaning back in his chair. “It’s just that nobody asked the question – amazing, isn’t it? That’s why people thought I’d got it wrong.” That day, John emerged from his study to tell his wife Pat, a Cambridge-educated mathematician and now retired Inland Revenue adminis-
Imperiality, it is likely that he will also match John will not comment on the possibility of 5,000 citations for the paper. While small as a speck of dust on this table but see something anomalous, it may be as

When you make something by yourself, that's the thing. Your PhD problem will only last a few years, but the number of people working on the same problems will continue to grow. So you have to be careful not to get too attached to your own work. It's a bit like being a composer – you can't just play all the notes you write. It's a bit like being a composer – you can't just play all the notes you write. It's a bit like being a composer – you can't just play all the notes you write. It's a bit like being a composer – you can't just play all the notes you write.

As a theorist you travel much more lightly, have less to carry and less to protect. You are not so tied to your specific tools or equipment. For someone who's not used to it, it can be quite an adjustment. But I think it's worth it. It's a great way to live and work.