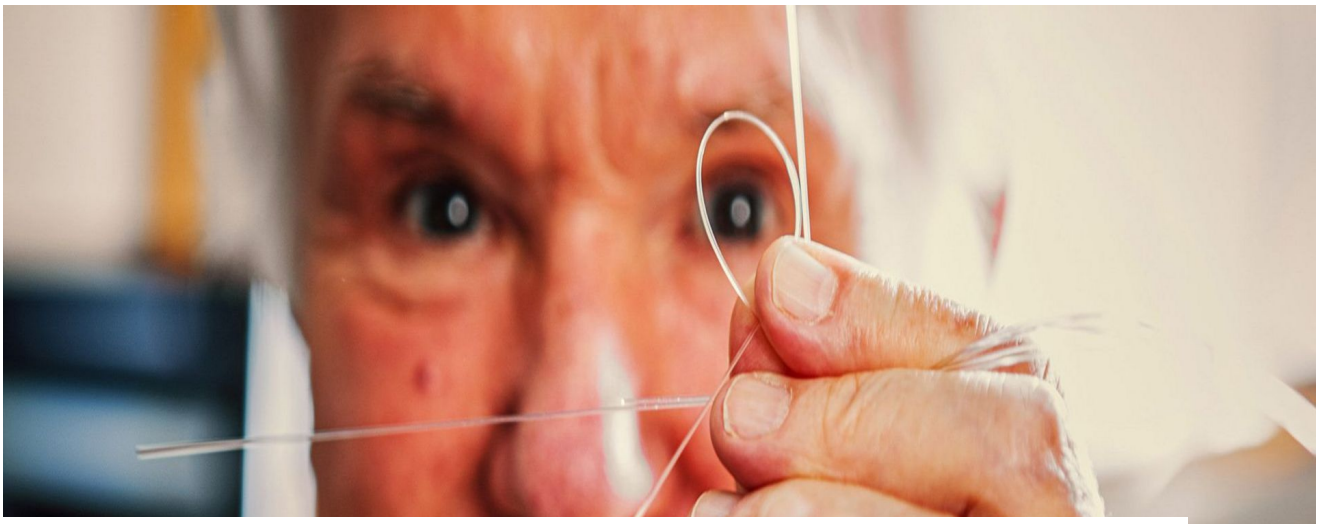


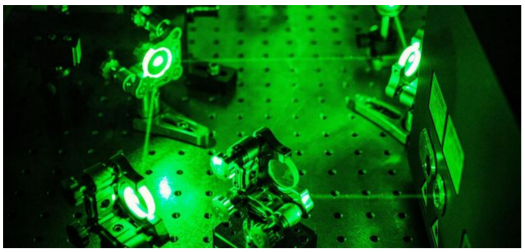
ATHANASSIOS KALIUDIS

Sir David Payne is one of the fathers of the fast Internet

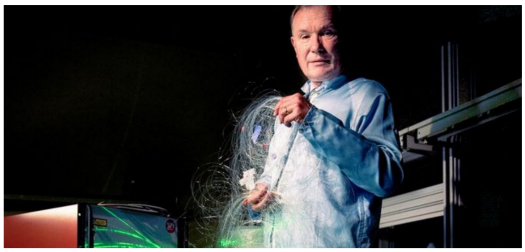
In September 2021, Sir David Payne received the Berthold Leibinger Future Prize for his pioneering research in the field of fiber optics. This makes the professor at the University of Southampton the eighth prize winner in this prestigious series.

If David Payne had been more interested in, say, horticulture instead of physics, we probably wouldn't be able to stream a movie this evening, hold video conferences tomorrow, or ever mine Bitcoins. (OK, the last consequence might be perfectly acceptible. And granted, video conferencing isn't always fun either. But hey: movies!) Since the 1970s, Payne has been conducting research in the fields of photonics, telecommunications and optical sensors. His teams repeatedly succeed in making important improvements in optical fiber technology.

Payne's breakthrough came in 1985, when he gave mankind the EDFA. This stands for erbium-doped fiber amplifier. The trick is that Payne managed to specifically contaminate silica optical fibers with rare earths, i.e. he doped them. This "impurity" amplifies the light in an optical fiber. For the first time, light signals could be sent through an optical cable over long distances without loss. Previously, after at the most a hundred kilometers, it was the end of the line, or time for an expensive electrical amplifier. All of a sudden, fiber optic cables became highly attractive - the starter's gun for the revolution in global telecommunications! It was not even ten years before the first submarine cable with Payne's EDFAs was laid between America and Europe. At that time, it was still mainly about making phone calls, so cable performance was measured in terms of the number of phone calls that could run over the line at the same time. In the old copper cables, it was in the hundreds or a few thousand. Payne's doped optical fiber alone manages hundreds of thousands. Today, we're talking about global data transmission on the Internet, and cable performance is measured in gigabits per second. In the 1990s, we started with single-digit values; now, thanks to techniques like wavelength division multiplexing, we're at 100 terabits per second. The Internet - a gigantic, invisible highway. And David Payne has replaced the old highway pavement with high-performance asphalt.



Sir David Payne was founding director of the Optoelectronics Research Centre at the University of Southampton. It is now one of the world's leading photonics research centers.□ (Source: Maximilian Schlosser/Berthold Leibinger Stiftung)



Pioneering research in fiber optics and fundamental work on the erbium-doped fiber amplifier: this is what Sir David Payne is known for. On September 24, 2021, the researcher was awarded the Future Prize of the Berthold Leibinger Stiftung. This makes Professor Payne the eighth recipient of the technology prize, which is endowed with 50,000 euros. (Source: University of Southampton)

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