# Breakthroughs do not Follow Evaluation Metrics

The problem is not a shortage of talented researchers. It is a system that rewards stability rather than risk, says **Prof. Wojciech Fendler**, a specialist in biostatistics and translational medicine and former president of Poland's Medical Research Agency.

**Why has no scientist working in Poland received a Nobel Prize in the natural sciences for so long?**
WOJCIECH FENDLER: That is a difficult question. Scientists of Polish origin were winning Nobel Prizes even during the period of the partitions, when universities in cities such as Wrocław and Poznań operated within entirely different political systems. We also see many researchers from Poland reaching the highest levels of international recognition once they begin working in environments that are more conducive to ambitious science, usually in Western Europe or the United States, where they have greater autonomy, easier access to collaboration, and fewer administrative burdens.

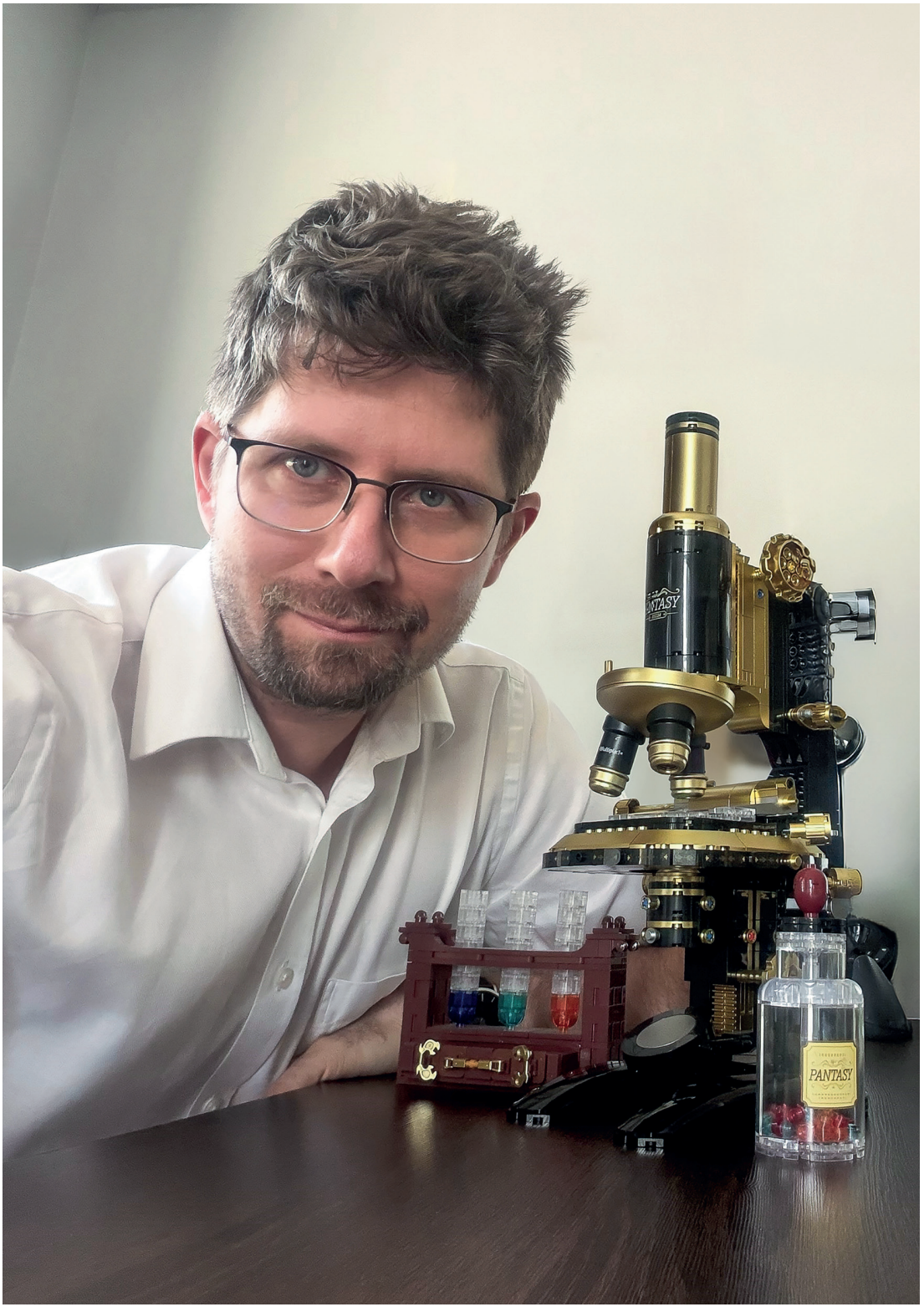
To me, that suggests the problem is not a lack of talent. The problem is the environment in which that talent is expected to flourish.

**Why are those same researchers often unable to develop their careers in the same way in Poland?**
The reality is that we are still dealing with the consequences of several lost decades. While Western scientific institutions were expanding and integrating into global networks, we were behind the Iron Curtain. That meant limited access to scientific literature, fewer opportunities to travel, and far less exposure to international exchange.

Those gaps are difficult to close, especially when funding remains inadequate and the system is largely satisfied as long as formal requirements are met. Publication slots are filled, evaluation exercises are completed, and most institutions receive top ratings. The problem is that strong performance in a bureaucratic assessment framework does not necessarily translate into science that competes at the highest international level.

**Has that created a culture that discourages ambition?**
In many ways, yes. We have built a system of indicators that brings ambition to an end remarkably early. At the same time, we have become very effective at preserving the status quo. The goal is to ensure that the system remains stable and that most institutions remain comfortably above average. But if almost everyone is above average, then the metric itself has ceased to be meaningful.

Funding is another major issue, as is the way that funding is distributed. People often point to the overall science budget, but most of that money goes toward salaries and maintaining infrastructure. Major discoveries usually emerge from competitive grants awarded by organisations such as the National Science Centre, the National Centre for Research and




**Prof. Wojciech Fendler**

A physician and scientist and a researcher in medicine and translational biology, he is a professor at the Medical University of Łódź. His expertise includes diabetology as well as research on biomarkers and modern diagnostic methods for chronic diseases. He is actively engaged in the development of medical innovation and the application of research in clinical practice.

Development, the Medical Research Agency, or the European Research Council.

Across Europe, many breakthrough discoveries are linked to ERC grants because they allow researchers to pursue ambitious and inherently risky ideas. In Poland there is simply too little grant funding, and what funding does exist is spread across a large number of institutions and research groups. The result is that everyone receives a small piece of the pie.

In the natural and life sciences, that has very real consequences. You cannot conduct modern research without sophisticated equipment, expensive reagents, and a strong team. We have talented people, but we often lack the tools they need. In science, those tools are not only equipment. They are also funding, autonomy, and the ability to make decisions quickly without worrying about procedural obstacles at every step. Too often, researchers spend more energy navigating administrative requirements than thinking boldly about scientific questions.

Just as major breakthroughs in business often emerge from people willing to challenge existing assumptions, scientific breakthroughs frequently come from individuals or groups prepared to take risks and depart from established ways of thinking

There is also a broader reluctance to move beyond familiar and comfortable approaches. Rather than challenging that mindset, the system frequently reinforces it. The result is a combination of lost time, insufficient investment, poorly designed performance indicators, and incentives that reward caution rather than ambition.

**People have been calling for reform for years. Why is the system so resistant to change?**

Because science operates within democratic societies, while scientific excellence itself is not democratic. Just as major breakthroughs in business often emerge from people willing to challenge existing assumptions, scientific breakthroughs frequently come from individuals or groups prepared to take risks and depart from established ways of thinking. But a system designed primarily to serve the largest possible number of people and preserve institutional stability will not naturally reward that behaviour.

Instead, it tends to prioritise consistency and minimise disruption. Researchers who stand out, whether through unusual ideas or unconventional approaches, often create complications for the system.

In practice, many scientists spend one part of their working life producing the publications required to satisfy evaluation frameworks and another part trying to do meaningful science, assuming they still have enough time and resources left. That balancing act requires a great deal of coordination and institutional support. Without such support, the system itself becomes the main focus rather than the scientific question.

If a university tells you that you should produce additional publications because your previous papers were worth one hundred points rather than one hundred and forty, where is the space for a project that may take five years to generate meaningful results?

Researchers are expected to produce a steady flow of papers every year because that is what the evaluation framework rewards. Yet transformative discoveries rarely emerge according to an annual reporting schedule. Science does not operate on the same timetable as bureaucracy.

Some institutions understand this and give researchers greater freedom. But from the perspective of university management, the safest strategy is often simply to comply with the rules and live off public subsidies. Allowing someone to spend several years pursuing an ambitious project that may ultimately fail is seen as a significant risk. As a result, what is rational from an administrative perspective often turns out to be deeply irrational from a scientific one.

**And yet there are research groups in Poland that manage to rise above the limitations of the system. How do they do it?**

The pattern is fairly consistent. A talented Polish scientist spends time at a leading institution abroad, works alongside researchers operating at the very top of their field, gains independence, and eventually returns to Poland. Crucially, they then find an institution willing to give them the freedom to work on their own terms. At that point, they can bring back not only a specific research topic but also an entire way of thinking about science.

This is how a number of successful research teams have emerged, including groups behind commercial ventures such as Scope Fluidics and other biomedical initiatives. These are people who gained experience abroad, returned home, and built on that experience, often through spin-offs and translational projects. Their universities or institutes at least stay out of their way and, in some cases, actively support them.

Several ingredients are essential in that process: an excellent mentor abroad, an opportunity to continue developing the work after returning to Poland,

and institutional support strong enough to help navigate administrative barriers. If any one of those elements is missing, the whole mechanism can break down very quickly.

The lesson is fairly straightforward. First, researchers had to go where the funding, infrastructure, and scientific momentum already existed. My generation was the first to build careers within a grant-based system that offered at least some opportunities to compete internationally. Even so, the resources available are still not sufficient to create the critical mass needed for truly transformative research.

It is possible to build a good team. What is much harder is creating a stable and dynamic environment capable of tackling difficult scientific questions over many years.

**In biomedicine, can major breakthroughs come from a single institution, or do they inevitably require international collaboration?**

That depends entirely on the type of research.

Clinical studies are almost always multicentre projects by definition. They are often national or international in scope and tend to be extremely expensive. Research into molecular mechanisms is different. In highly specialised areas, a single well-equipped team can accomplish a great deal. In some cases, concentrating expertise in one place can even be an advantage because it allows researchers to explore a problem in exceptional depth and move quickly.

In practice, there are three common models. There are large clinical consortia, projects distributed across multiple institutions, and projects led by a single group with limited external support. The right model depends on the scientific question being asked.

There is no universal rule stating that excellent science must always be international or must always be concentrated within a single institution.

Time is another important factor. In the United States, researchers often move much faster. Rather than spending two years building a new cohort from scratch, they may join forces with groups that already have relevant samples or datasets. Methodologically, that approach is not always ideal, but it is faster. And speed matters.

Sometimes the winner is not the team that assembles the perfect dataset but the one that finds the most effective way to use the resources already available.

**Where is Poland particularly strong in biomedicine today?**

We have a very strong haematology community, both in adult and paediatric medicine. Researchers in that field collaborate effectively, share expertise, and conduct large multicentre studies. They publish in leading journals and have had a tangible impact on the treatment of leukaemias and lymphomas. It is a good example of a discipline in which institutions recognised early on that no single centre could recruit enough patients to answer important questions on its own.

We also have pockets of excellence in cardiology, as well as strong work on biomarkers that benefits from access to large patient populations. Advanced therapies are developing rapidly, including gene therapies, cell therapies, CAR-T treatments, and regulatory T-cell approaches. In these areas we are already seeing projects that go beyond publication and move toward genuine clinical application.

Across almost every area of medicine, you can find individual teams producing excellent work. What is more difficult is identifying a single specialty in which Poland is clearly recognised as a global leader. We have a network of strong research groups rather than one discipline that the world automatically associates with Poland.

At the same time, Poland has become a major player in clinical trials. We rank fifth in Europe and ninth globally, which is a significant achievement. The challenge is that we often serve as participants rather than leaders. We provide patients, data, and infrastructure, but we are less often the ones designing studies, coordinating international collaborations, and setting the scientific agenda. That is the role we would like to play more often.

**Which areas of biomedicine are most likely to produce discoveries on a Nobel Prize scale?**

The biggest breakthroughs usually occur when researchers uncover fundamental biological mechanisms or develop tools that can be applied across many different fields. Think of PCR, DNA sequencing, or CRISPR. Nobel Prizes are rarely awarded for successfully applying an existing technology to a single disease. More often, they recognise discoveries that open entirely new avenues of research.

In Poland, we are generally stronger at innovative implementation than at generating those foundational breakthroughs. We take existing technologies and biological insights and use them to solve specific clinical problems. That work is enormously important, but it is less likely to lead to a Nobel Prize. It is excellent translational medicine rather than the kind of discovery that reshapes multiple disciplines at once.

There is a great deal of interesting work taking place in genetic diseases, cancer biology, and the study of molecular mechanisms. These are also fields that require substantial investment and sophisticated infrastructure, something we still often lack. A good idea alone is not enough. You also need sequencing technologies, analytical platforms, bioinformatics expertise, skilled personnel, and stable funding. Without those elements, even the most promising concept may never reach its full potential. ■