

Jeremie Poschmann: Data-driven discovery in human diseases through multi-omics profiling of the circulating immune system

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Genomic Psychiatry; <https://doi.org/10.61373/gp025k.0023>

Keywords: Multi-omics, circulating immune system, data-driven discovery, disease heterogeneity, immune profiling, patient cohorts

Dr. Jeremie Poschmann leads a research group at INSERM and Université de Nantes, where he investigates the human immune system with a focus on the circulating immune compartment. His work combines multi-omics and data-driven approaches to uncover immune mechanisms that influence disease susceptibility and patient outcomes, particularly in infectious and psychiatric conditions. Trained originally as a nurse, Dr. Poschmann entered science driven by a deep curiosity for the unresolved complexities of human biology. His career has taken him through Germany, Belgium, Canada, Singapore, the UK, and France, shaping his collaborative and cross-disciplinary mindset. A self-taught bioinformatician, he values independence in research and actively fosters a diverse and inclusive team. In this Genomic Press Interview, he reflects on pivotal moments in his journey including an early fascination with genome-wide discovery and shares how pre-existing immune states may help explain why individuals respond differently to disease exposure. Outside the lab, he finds balance through surfing and chess, which keeps his thinking sharp. Committed to translating research into real-world impact, Dr. Poschmann is equally passionate about mentoring emerging scientists and building a culture that supports innovation and integrity.

Part 1: Jeremie Poschmann – Life and Career

Could you give us a glimpse into your personal history, emphasizing the pivotal moments that first kindled your passion for science?

I was not especially interested in science in school. To be honest, I was a bit lazy and not particularly curious at the time. But I always liked mathematics. I was drawn to its clarity and how you could arrive at a solution that stood on its own, regardless of who you were or what you believed.

Things changed when I entered nursing school. I realized that the more I asked, the more there was to uncover and that, for all we know, so much remains unexplained. That moment of realization sparked something in me. Curiosity took over, and I found myself wanting to dig deeper. That was the beginning of my path to research.

We would like to know more about your career trajectory leading up to your current role. What defining moments channeled you toward this opportunity?

One of the earliest pivotal moments in my career was realizing the power of discovery research through "omics" profiling. I was working on ChIP-on-chip experiments studying RNA polymerase II in yeast, before NGS was available. I was struck that a single experiment could give you a genome-wide view of what was happening in the cells. From that data alone, I could start forming hypotheses. That ability to follow the data rather than impose a question on it was deeply compelling.

Another shift for me was when NGS became available. Suddenly, we could do genome-wide ChIP in humans in a single experiment. That blew



Figure 1. Jeremie Poschmann, PhD, Université de Nantes, France.

my mind. I remember thinking, *"This is it—this is what I want to do."* It was clear to me that the future of biology was here, and I was determined to be at the forefront of it.

The final turning point came during my postdoc. Each experiment generated massive amounts of data, and I constantly waited for bioinformaticians to analyze it. The delays were frustrating, and I realized they were not necessarily as driven as I was to analyze my data. So, I decided to take matters into my own hands. I began learning coding and data analysis independently, teaching myself the computational side of the work. I was fortunate to be surrounded by a strong bioinformatics environment supporting this transition. Looking back, that decision was transformative. It allowed me to run my projects independently, from experimental design to analysis and interpretation. This laid the foundation for starting my own lab with full independence.

Please share with us what initially piqued your interest in your favorite research or professional focus area.

What hooked me early on is the idea that data itself can lead the way. After seeing how much could be uncovered in an unbiased, genome-wide approach, I became fascinated by the potential to let patterns in the data guide the next question rather than relying on predefined hypotheses. It's





the interplay between exploration and insight where the unexpected becomes visible. There is something uniquely exciting about being able to ask, "What is the system telling us?"

What impact do you hope to achieve in your field by focusing on specific research topics?

My journey started in nursing, moved through developing genomic approaches in yeast, and has since progressed to doing omics profiling in patient cohorts. What drives me now is the hope of making it full circle. My dream is that one day, the discoveries I help make will be directly relevant to real patients. Whether identifying molecular signatures, predicting treatment response, or uncovering new mechanisms, I want the science I do to inform care, not just ultimately understanding. That is the dream.

Please tell us more about your current scholarly focal points within your chosen field of science?

My research spans various diseases, from host-pathogen interactions to psychiatric disorders. However, the common thread is the immune system, focusing on the circulating immune compartment. I work with blood because it is accessible and offers a dynamic window into systemic processes. I aim to identify molecular signatures and mechanisms linked to different disease states through a discovery-driven approach using various omics technologies.

A central hypothesis in my work is that pre-existing immune states significantly influence disease susceptibility and outcomes. I am particularly interested in how immune memory-like mechanisms contribute to heterogeneity. For example, why do some individuals exposed to the same pathogen, such as SARS-CoV-2, develop severe illness or die, while others remain asymptomatic or recover easily? These differences reflect a form of environmental imprint, an individual's personal immune history, that we can now begin to explore through functional genomics.

What habits and values did you develop during your academic studies or subsequent postdoctoral experiences that you uphold within your research environment?

Research has taken me across continents, from becoming a Nurse in Germany and studying in Belgium to doing my PhD in Canada, a postdoc in Singapore, and working in the UK before settling in France. Each place has taught me something different, not just scientifically but also in terms of how people think, collaborate, and approach challenges. I have learned to truly value those cultural differences and the distinct ways of doing things that come with them.

In my group, I foster that same openness. Diversity makes science stronger. I do not necessarily choose team members based on grades, I look for what makes someone unique, their experiences, mindset, and how they think differently. Those qualities greatly contribute to a more dynamic and original research environment.

At Genomic Press, we prioritize fostering research endeavors based solely on their inherent merit, uninfluenced by geography or the researchers' personal or demographic traits. Are there particular cultural facets within the scientific community that warrant transformative scrutiny, or is there a cause within science that deeply stirs your passions?

One profoundly troubling issue is the growing divide between permanent and non-permanent scientific positions in France and elsewhere. Increasingly, only principal investigators hold permanent roles, while postdocs, engineers, and technicians are hired on short-term contracts, often with very little security or long-term prospects. As a PI, this makes it incredibly difficult to retain talented people, not because of work or science, but because of structural instability and chronic underfunding.

This goes against the very nature of research. It is a team effort. Progress depends on continuity, shared expertise, and trust built over time. We should invest in our teams, not cycle through them. I believe strongly that if we want sustainable, high-quality science, we need to offer stability and recognition to *everyone* contributing to the work, not just those at the top.

What do you most enjoy in your capacity as an academic or research rising star?

Mentoring has become one of the most rewarding aspects of academic life. Watching students grow from their master's projects to their Ph. D.s and beyond is incredibly fulfilling. It's not just about guiding them scientifically but about seeing their confidence, independence, and curiosity evolve over time.

Outside professional confines, how do you prefer to allocate your leisure moments, or conversely, in what manner would you envision spending these moments given a choice?

Outside of the lab and family life, surfing is where I find the most joy and balance. It is physically demanding and mentally absorbing. Surfing requires grit, patience, endurance, and strength. You paddle hard, sometimes for nothing, but then a perfect set rolls in, and you must be ready to catch it. That mix of challenge and anticipation keeps me sharp and grounded. Also, being surrounded by nature out in the water, away from everything, offers a perspective I don't find anywhere else. It clears my mind, resets my energy, and reminds me to stay connected to the moment.

When I am not in the water, I also enjoy playing chess. It is a different kind of focus, but I can get fully immersed in it. Chess helps me slow down and shift into a reflective mindset. Each position requires me to reevaluate my prior decisions. I like the balance it demands between intuition and calculation.

Part 2: Jeremie Poschmann – Selected questions from the Proust Questionnaire¹

What is your idea of perfect happiness?

For me, it's something as simple as having a picnic with my family at the beach when we're traveling together, or being alone in the ocean, sitting on my surfboard, watching the sunset.

What is your greatest fear?

Right now, my greatest fear is the global rise of fascism and autocracy, while environmental issues continue to be neglected.

Which living person do you most admire?

Volodymyr Zelenskyy, for the way he transformed from a comedian into a steadfast defender of his people. I deeply admire his courage, adaptability, innovation, and strong sense of responsibility in the face of relentless pressure.

What is your greatest extravagance?

Taking a weekend off to go surfing on my own.

What are you most proud of?

That I have passed on my passion for travel and foreign cultures to my kids.

¹In the late nineteenth century, various questionnaires were a popular diversion designed to discover new things about old friends. What is now known as the 35-question Proust Questionnaire became famous after Marcel Proust's answers to these questions were found and published posthumously. Proust answered the questions twice, at ages 14 and 20. In 2003 Proust's handwritten answers were auctioned off for \$130,000. Multiple other historical and contemporary figures have answered the Proust Questionnaire, including among others Karl Marx, Oscar Wilde, Arthur Conan Doyle, Fernando Pessoa, Stéphane Mallarmé, Paul Cézanne, Vladimir Nabokov, Kazuo Ishiguro, Catherine Deneuve, Sophia Loren, Gina Lollobrigida, Gloria Steinem, Pelé, Valentino, Yoko Ono, Elton John, Martin Scorsese, Pedro Almodóvar, Richard Branson, Jimmy Carter, David Chang, Spike Lee, Hugh Jackman, and Zendaya. The Proust Questionnaire is often used to interview celebrities: the idea is that by answering these questions, an individual will reveal his or her true nature. We have condensed the Proust Questionnaire by reducing the number of questions and slightly rewording some. These curated questions provide insights into the individual's inner world, ranging from notions of happiness and fear to aspirations and inspirations.



Figure 2. Jeremie Poschmann after a surfing session on France's Atlantic coast, where he finds balance away from the laboratory. This passion reflects his philosophy of combining scientific rigor with personal renewal, as he describes surfing as requiring "grit, patience, endurance, and strength" – qualities that mirror his approach to scientific discovery.

What is your greatest regret?

I wasted a few years as a teenager and young adult, not knowing what I wanted and drifting without direction. Looking back, I wish I had used that time more intentionally.

What is the quality you most admire in people?

Unprovoked compassion.

What is the trait you dislike most in people?

Self-centered, me-first mindset.

What do you consider the most overrated virtue?

Intelligence

What is your favorite occupation (or activity)?

Surfing and playing chess.

Where would you most like to live?

Somewhere I can surf and do science in the same day.

What is your most treasured possession?

I don't know: I am not very attached to material things.

When and where were you happiest? And why were so happy then?

When I am in the zone, writing, thinking, or focusing deeply.

What is your current state of mind?

Focus on what I can change and leave the rest aside.

What is your most marked characteristic?

I can hold strong opinions but also change them quickly if the arguments change.

Among your talents, which one(s) give(s) you a competitive edge?

I am good at playing chess, and logical deduction and calculating options give me an edge in scientific reasoning and interpreting results.

What do you consider your greatest achievement?

Getting myself up from a lazy teenager to becoming a scientist.

If you could change one thing about yourself, what would it be?

To find the correct answer immediately, not at three in the morning.

What do you most value in your friends?

Friendly competition.

Who are your favorite writers?

Terry Pratchett.

Who are your heroes of fiction?

Sam Vimes, a Terry Pratchett character. He is a cynical but deeply moral policeman who always does the right thing, even when it is hard or thankless. He stands for justice in a corrupt world.

Who are your heroes in real life?

Ludovico Einaudi, for creating music that is both beautiful and deeply moving.

Jonathan Mill, for combining strong scientific work with real kindness and respect for his team members.

Jay Shendure, for his brilliant ideas and major contributions to molecular biology and genomics.

What aphorism or motto best encapsulates your life philosophy?

Daily action makes progress.

Better done than perfect.

Nantes, France

7 April 2025

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