

Hybrid PhDs: Integrating Biomedical and Educational Research

Michael Y Schakelaar

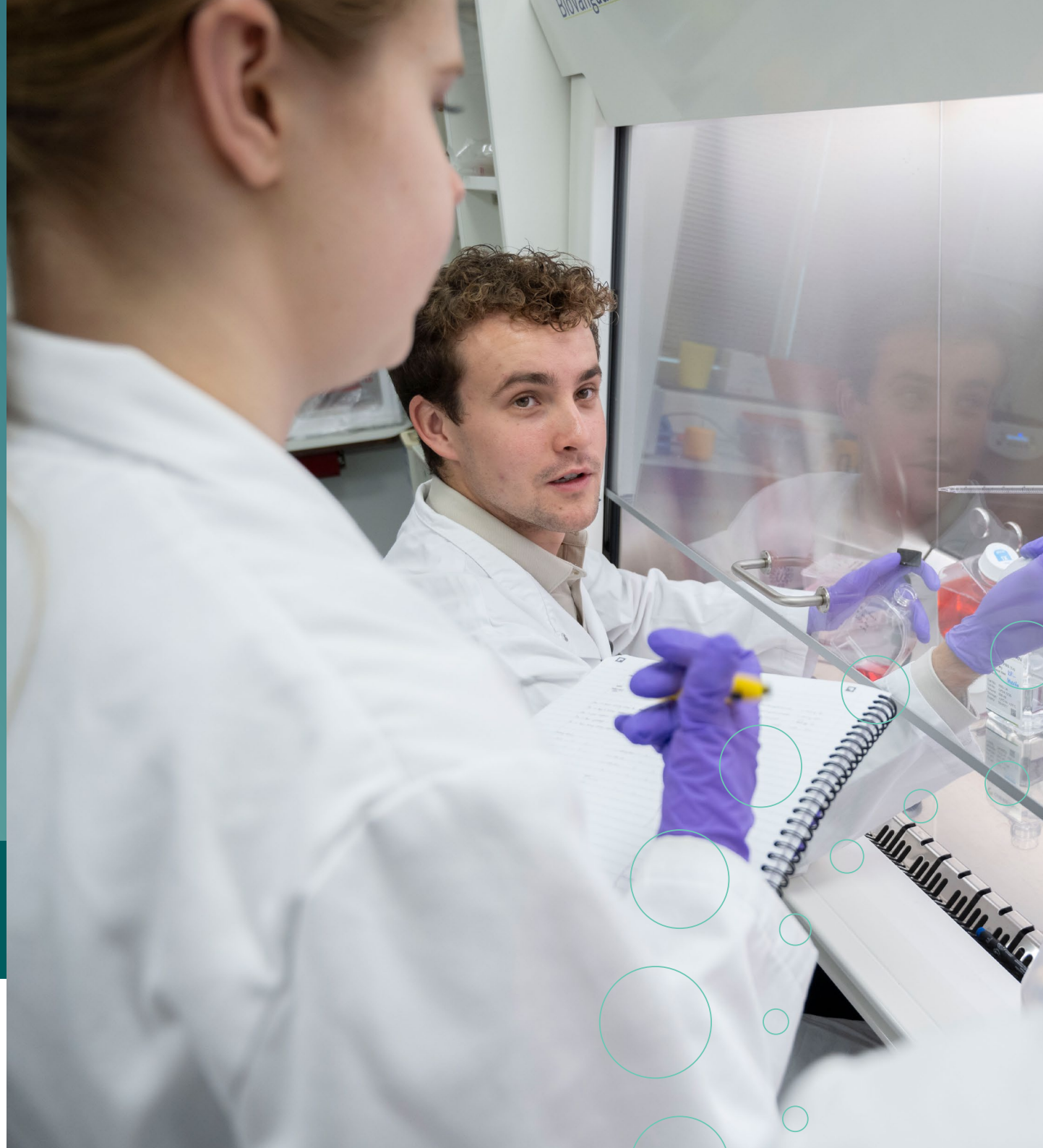
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EDUCATION & TRAINING

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Hybrid PhDs: Integrating Biomedical and Educational Research

Biomedical science-based PhDs are often research-focused, designed to hone a candidate's expertise in a specific field. However, subsequent careers in university settings frequently entail substantial teaching responsibilities, with PhD graduates unprepared for the dual roles of researcher and educator. Hybrid PhDs aim to better equip graduates for academic careers by integrating highly specialised scientific knowledge with educational research. PhD candidate Michael Y Schakelaar of University Medical Center Utrecht (Utrecht University), The Netherlands, provides an outstanding example of how this can be achieved.

A Novel Approach to Doctoral Studies

A doctoral degree (known as a PhD) is the highest level of education that can be achieved. PhDs can be structured in various ways, usually according to the discipline in which the research is undertaken. In scientific fields, PhDs generally involve intense research surrounding a research question, culminating in practical skills, academic papers, and a thesis.

A common career path for those wanting to stay in academia involves postdoctoral research, teaching, or a mixture of both. At the time of graduation, PhD candidates will have established in-depth knowledge in their specialised field, but many will have little to no didactic experience with only a limited understanding of educational research. This is problematic because scholarly teaching is typically a considerable and demanding requirement, particularly in the early stages of an academic career. This is compounded by scientific communication experience during a PhD being primarily restricted to interactions with other academics. As such, recent PhD graduates may lack skills in translating their specialised knowledge into smaller, digestible concepts necessary for an educational setting or for effective communication towards society.

Integrating educational research with health sciences is a novel approach, particularly in the field of biomedical sciences. One showcase example is Michael Y Schakelaar of the University Medical Center Utrecht (Utrecht University) in The Netherlands. His PhD exemplifies this integration, where his time is equally divided between biomedical and educational research. This balanced approach prepares him to pursue a career involving both cutting-edge biomedical research and scholarly and evidence-based education, an opportunity typically lacking in doctoral studies. Michael and his mentor, Professor Niels Bovenschen, believe that

training PhD candidates in two disciplines, such as these, creates T-shaped professionals who can be described as multifaceted professionals who build bridges between disciplines and collaborate effectively.

How the Approach Works in Practice

As a PhD candidate in the Graduate School of Life Sciences at Utrecht University, Michael dedicates half his time to the 'Infection and Immunity' programme and the other half to the 'Life Sciences Education Research' programme. His biomedical research focuses on immunotherapy in medulloblastoma, the most common malignant paediatric brain tumour. Ongoing projects involve investigating pathways related to cell death (apoptosis), an important pathway in cancer progression. His work also involves exploring combinations of viruses that target cancer cells (oncolytic virus therapy) with treatments that enhance the immune system's ability to fight cancer (immune checkpoint therapy and cellular therapy).

Synthesising Biomedical and Educational Research

Michael has developed large-scale laboratory practicals and other hands-on activities. One example is his immune checkpoint practical, which illustrates his synthesis of biomedical and educational research. Large cohorts of undergraduate students from varied programmes, including Biomedical Sciences, Medicine, and Care-Health-Society, designed their own practical by choosing a specific laboratory technique, immune checkpoint pair, and cell/tissue model. An immune checkpoint pair consists of a



receptor on immune cells and its binding partner, which regulates immune responses by activating or inhibiting them. The cell/tissue model describes the system involved in this immune response. The goal of this practical is to explore whether specific molecules that control the immune system are present in different tumour and immune cell samples. Students can choose to either confirm a literature result or innovate biomedical research.

Importantly, the results and knowledge gained from this practical exercise are entered into a database, making them accessible to biomedical researchers for investigating potential medical treatments. This provides students with practical experience and allows them to contribute to vital biomedical research early in their academic journeys, providing a tangible connection between their studies and real-world applications.

Michael's educational research further includes evaluating education in so-called Student Research HUBs. These are dedicated innovation spaces, each with specific expertise, where students can perform authentic, 'non-cookbook' research, allowing the freedom to lead inquiry-based experiments. One example is the course continuum 'A challenge-based interdisciplinary undergraduate concept fostering translational medicine' recently published in *Biochemistry and Molecular Biology Education*.

In this study, translational medicine (TM), a field of biomedicine that relates bench (i.e., laboratory research) to bedside (i.e., patient care), is delivered to undergraduate students. Usually, TM isn't taught during undergraduate programmes, although it facilitates the development of a range of important transdisciplinary skills, such as communicating effectively and thinking critically. Students reported that they had progressed in these skill areas and were more motivated because their work felt relevant and important, involved patients, and provided a realistic view of biomedical research.

Another publication, this time in the prestigious journal *Nature*, focuses on [implementing international collaborations within research-based education](#) and illustrates how Michael's initiatives within his PhD can provide students with a robust, hands-on educational experience while contributing valuable data to the scientific community.

Should Hybrid PhDs Become the Norm?

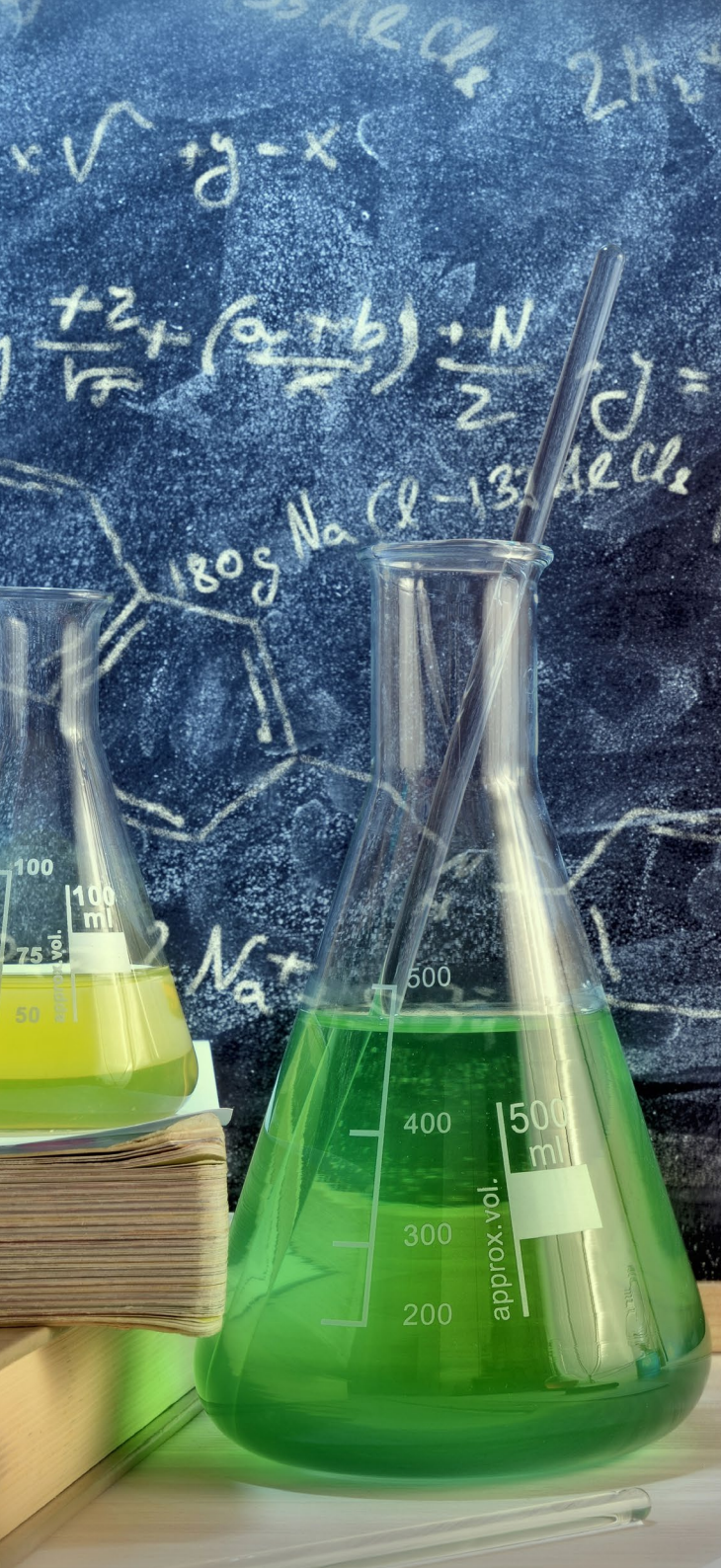
Michael's research synergy is created by implementing his biomedical research within research-based educational settings. For example, he has shown how relevant and meaningful biomedical data can be obtained whilst simultaneously teaching important academic skills through the immune checkpoint practical.

Although many PhD candidates who want to stay in academia are required to teach, most may not be prepared to do so scholarly and evidence-based after completing regular PhDs in their chosen academic field. Thus, should this be the desired career of a PhD candidate, access to this integration of teaching and educational research within their PhD would provide a unique opportunity to enhance their professional background while contributing to relevant scientific research, resulting in a more holistic, comprehensive skill set to carry into an academic position.



Integrating educational research with health sciences is a novel approach, particularly in the field of biomedical sciences.





MEET THE RESEARCHER



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Michael Schakelaar is a PhD candidate at University Medical Center Utrecht (Utrecht University) in the Netherlands. Since September 2022, Michael has been working towards completing a hybrid PhD, comprising 50% biomedical research into immunotherapy in medulloblastoma, and 50% educational research into academic skill development. In 2022, he obtained his MSc degree in Biomedical Sciences (cum laude) from Utrecht University. He is the (co-)author of several peer-reviewed scientific publications. Michael describes himself as spontaneous, driven, enthusiastic, and involved. He enjoys being challenged and insists on delivering high-quality work.

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Dr S van Geelen, Utrecht University, Netherlands



PRIZES

Best Research Proposal, €15k, 2019; Bachelor course Pathology. Topic: PLN^{R14del} Cardiomyopathy



FURTHER READING

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