

A Vision for the Future of the Department of Mathematical Sciences at AAU

Morten Willatzen and Viktor Rasmussen



Morten Willatzen

The following article is the transcript of an interview with Morten Willatzen, the Head of the Department of Mathematical Sciences, who assumed his position in August 2024. This interview offers students and teachers alike a closer look at Morten's vision for the department's future and his approach to the challenges currently facing the department.

Introduction

Viktor Rasmussen [VR]: To begin, could you provide readers with an overview of the inspirations and motivations behind your decision to take on the role of Head of the Department of Mathematical Sciences? How do these align with your perspective on leadership and its responsibilities? I realize that this is quite a broad question.

Morten Willatzen [MW]: Certainly, but it's also a question that allows for some detailed explanations. To start, I can say that I've always had two major interests: Scientific research, which has captivated me for many years, and my desire to help others progress. On that note, I've previously held formal leadership roles, such as Deputy Director at the former Department of Photonics Engineering at the Technical University of Denmark (today DTU Electro). This position involved overseeing research and teaching within a department of around 220 employees, including Ph.D. students. During my tenure there, I was inspired by the opportunity to push the en-

tire organization forward to address its key challenges. At that time, DTU Electro faced a unique set of issues: it was initially conceived as a research center, so external funding was a strength, but teaching was undervalued and lacked emphasis. This was not a satisfactory situation. Conversely, in my prior role at SDU (University of Southern Denmark), teaching quality was held in high regard, akin to the standards here at AAU. Adjusting to DTU's disregard for the importance of teaching was a challenge, but it was also a view shared by the university's executive board. Consequently, my main focus was to elevate teaching to a more central position. Returning to your question about leadership inspiration, I find it deeply rewarding to guide an organization towards a future where most of its members agree that progress has been made and goals are being achieved.

[VR]: Does this vision of progress include both the teaching and research profiles at AAU?

[MW]: Yes, you could even consider those as the innovative drivers of the department. At AAU, the situation differs significantly from my experience at DTU. Here, we need to focus on increasing external funding. Currently, this department achieves about 50% external funding compared to our base allocation for research, whereas external funding in other institutes typically ranges from 80% to 120%. Our goal is to move in that direction whilst maintaining our crucial role of teaching mathematics across the

entire university. This is a unique challenge that distinguishes us from many other AAU institutes.

[VR]: I believe most AAU engineers take at least part of our Linear Algebra course, not just students in programs under this department.

[MW]: It's funny that you mentioned linear algebra. Reflecting on my time as a student, I didn't grasp its full significance then. While I found it intriguing, I couldn't foresee its broad application across nearly every field of study, something I now appreciate. That said, I hope I've answered your initial question.

[VR]: You absolutely have. It's always a pleasure when interviewees answer even more questions than anticipated! On that note, could you elaborate on the challenge of positioning this department both within and outside AAU, possibly even internationally?

[MW]: The reality is that research operates on a global stage, whereas teaching tends to be more of a national concern. On the research front, however, we're in a worldwide competition, especially when it comes to attracting top-tier researchers. This is vital for increasing external funding, as strong researchers typically possess impressive CVs, prominent h-indices, and professional networks, all of which make them uniquely capable of steering their fields in compelling directions. We recently held a research evaluation workshop where we highlighted a major concern: our department lacks a well-defined research profile. Our website lists broad topics such as Algebra, Topology, and Statistics, but doesn't clearly identify individual researchers or their specific contributions.

[VR]: So you feel the department lacks a concretized research identity?

[MW]: I believe we do not communicate our research areas and unique skills clear enough today. Having a clear and well-communicated research profile is crucial for attracting external funding. Benefactors need a concise understanding of our expertise and why it matters. For example, we excel in areas like statistics and mathematical analysis, thanks to researchers like Jesper Møller and Arne Jensen. We also have talented younger researchers contributing to a balanced profile. Still, we need to improve how we present and communicate these strengths externally. This challenge is particularly pertinent to mathematical research, which often progresses in abstract terms and faces difficulties competing with fields like biology or physics when judged

on metrics like publication volume or h-index. While it's common for theoretical physicists to publish 10–20 articles annually, such numbers are unattainable in mathematics. This disparity poses a challenge when applying for external funding.

[VR]: Do you see collaboration—both internally within AAU and externally—as a solution to this challenge?

[MW]: Absolutely. Collaboration is central to our strategy. By engaging with key researchers across departments and fields, we can leverage our mathematical expertise to support projects that more readily attract external funding. This approach represents the way forward and ensures our continued relevance and contribution.

Resource Allocation

[VR]: Shifting focus slightly, I've spoken with some students in preparation for our conversation today. For these students, the issue of resource allocation, particularly in relation to our course portfolio, seems to be a growing concern. Do you have a vision for resource allocation in the department that differs from the current model?

[MW]: First of all, I appreciate that you've included the students' perspectives in our discussion. My engagement with students has always been valuable, even though it has admittedly been somewhat limited. Regarding resource allocation, I recognize that our department faces significant challenges due to our extensive course portfolio relative to the number of researchers we have. The primary challenge is finding ways to allocate more time for our researchers to focus on their research. This can be approached in several ways. For example, it is unsustainable to continue teaching courses in a traditional classroom setting when the number of enrolled students is too low—it is simply too costly, both in terms of time and resources. One potential solution is to shift some of the more specialized courses in our master's programmes toward a literature-based format. These courses are essential to our educational profile, but they need to be both sustainable and engaging. It's also crucial for the research fields associated with these specialized courses to capture students' interests. Communicating the purpose and significance of these courses to students remains a challenge—one that I personally remember grappling with during my own student years. Does that resonate with you?

[VR]: Absolutely! I've experienced that many

times during my education. As someone majoring in English and minoring in Mathematics, I often found myself uninterested in certain courses—until I had that eureka moment and realized their importance to my overall education.

[MW]: I think that eureka moment is more common than we might realize; in fact, it's probably the rule rather than the exception. And it's how it should be. Ideally, students should find the courses interesting themselves, as that naturally influences which ones become popular.

[VR]: While “budget cuts” are unpleasant words, I'd like to ask about the issues related to downscaling facilities, such as fewer group rooms and declining enrollment in the master's program. This is a pressing concern for students—do you have any thoughts on it?

[MW]: That's a very understandable concern. While it's important for our facilities to meet students' needs, we're currently facing challenges stemming from our recent move to this building. From the staff's perspective, the move from Skjernvej to Build has been largely positive. However, I'm very interested in hearing more about the students' perspectives. A key issue is that certain limitations—such as not being able to have a confidential conversation in my office—exist despite the overall appeal of the building. While I personally like the space, I'm aware that some students face challenges related to the facilities it provides. Unfortunately, there are no immediate solutions to these challenges, but I want to emphasize that it's important for students to feel welcome here and to minimize the distance between students and teachers as much as possible.

A New Performance Culture

[VR]: Do you see any challenges in attracting students to a more theoretical mathematics degree compared to a physics degree, which may seem more tangible and relevant in line with our earlier discussion on the nature of the research?

[MW]: Absolutely! However, I believe this challenge affects both mathematics- and physics-based programs. I think the issue largely stems from the fact that neither field is particularly easy to study. This doesn't align well with the current cultural emphasis on academic progression being as quick and effortless as possible. Today's goal often revolves around obtaining a good salary and position as efficiently as possible—a mindset that has never been central to mathematics-

based educations. Instead, these programs are more about the intrinsic enjoyment and intellectual fulfillment one derives from engaging with the field of mathematics.

[VR]: Do you see any ways to address these challenges?

[MW]: I do, but I'd like to first re-frame the conversation. Recently, we met with the principal of a gymnasium here in Nordjylland. She mentioned that participation in high-level mathematics electives has never been lower, making it difficult. Additionally, we're facing demographic trends showing fewer young people in the coming years compared to previous ones. Compounding this, politicians don't seem particularly interested in increasing education budgets. On the contrary, they are cutting our funding and pushing more young people toward business-oriented educations. This is symptomatic of the times we're living in. As I mentioned earlier, there's less interest in giving young students the time they need to immerse themselves in complex subjects and nurture their curiosity. When I was studying, we were allowed to accumulate as many ECTS points as we wanted. For example, at DTU, it wasn't uncommon for students to complete 400–500 ECTS points, compared to the 300-point cap today. This is entirely a political problem rooted in the premise that students must be pushed through the education system as quickly as possible to enter the workforce and start paying taxes. I fundamentally disagree with this premise, though it feels like a battle already lost.

[VR]: ... for now.

[MW]: For now.

[VR]: We're allowed a bit of hope.

[MW]: True. The new master's program reform put STEM fields under increased pressure. This is strange given the good job opportunities for STEM education.

[VR]: Do you see this as purely a political problem, or also as a consequence of how we teach these subjects to students in this new cultural climate?

[MW]: I don't believe it's an issue with how we teach these subjects in this department. Rather, it's a reflection of the broader societal culture I mentioned earlier. The value of taking time to deeply explore a subject and nurture curiosity isn't particularly rewarded today. Fields like mathematics and physics suffer under this mindset because the time required for reflection, both on the subject matter itself and on one's academic

and research trajectory, is being eroded by the rapid pace of life and constant distractions, such as those offered by social media. On the bright side, I can't think of another field besides mathematics that is better positioned to endure this cultural shift.

[VR]: True. Mathematics remains a crucial foundation for nearly every other research topic in the STEM fields.

Opportunities for Growth

[VR]: To avoid making this conversation into one of pure doom and gloom, I suppose there's also a sense of identifying opportunities within the department that come with your position. Could you elaborate on what opportunities you see?

[MW]: While I may not have thought through this answer in great detail, I'd say there's been a fair bit of randomness associated with my own career. While I might have laid out some sort of master plan for my career during my time as a student, the reality has unfolded in a an unpredictable yet highly interesting way. Since attaining my professorship at SDU in 2004, I never particularly aspired to become a department head. However, the opportunity presented itself, and I saw great meaning in helping others move forward while contributing to the progression of an organization. This aspect of the role appealed to me deeply. Interestingly, this contrasts with my own admitted lack of natural leadership instincts—if I may allow myself a bit of self-criticism. But, as we talk about this, it strikes me that this kind of motivation isn't uncommon among leaders when I've spoken to others in similar roles.

[VR]: Forgive me for making an assumption, but it seems to me that there's a little spark for didactics in Morten's heart?

[MW]: Yes, indeed! Whenever I write research articles, I enjoy adopting a tutorial-like style, guiding my readers step-by-step from a fundamental level. I dislike shorter articles that inevitably leave out critical nuances of the subject.

[VR]: Regarding the opportunities for forging a path forward for the department, don't you think there's a discrepancy here? Your aim to increase the research profile will inevitably reduce the time allocated to teaching, which, in turn, may limit students' ability to deeply engage with complex subjects.

[MW]: Are you suggesting that we're cur-

rently operating at over 100% capacity in this regard?

[VR]: Yes! I think we all wish we had more resources to work with—resources that might come from external funding?

[MW]: that's true, but let me elaborate a bit on how external funding offers a path forward. One significant advantage of external funding is that it allows us to hire additional staff, which can free up time for both research and teaching. If we assume a fixed number of courses that need teaching, successfully securing more funding could enable us to distribute the workload more effectively across a larger team. This would, in turn, create proportional opportunities for staff to focus on research and teaching alike. To be frank, I've never been part of a department where teaching occupies such a large proportion of time relative to research as it does here. While many staff members are eager to devote more time to their research, the current staffing levels and teaching obligations make that impossible. The reality is that AAU expects this department to handle a significant share of interdisciplinary mathematical teaching while also increasing the proportion of external funding relative to base funding provided by the state. This expectation cannot be ignored, and we must adjust accordingly to avoid potential consequences. Steering the department toward this goal is one of the key responsibilities of the head of the department.

[VR]: But does that mean teaching will become a less dominant part of the department's role?

[MW]: That narrative often arises, but I completely reject it. Teaching remains a cornerstone of what we do. However, we must acknowledge that external funding for research must grow. Currently, our external funding accounts for about 40% of our budget. AAU expects us to increase this to a substantially higher value to align with institutional goals. Achieving this balance is essential—not just for the sustainability of the department but also for ensuring that our teaching and research commitments complement one another effectively.

A Concluding Profile

[VR]: I think we've covered 10 or 12 questions in just five. Is there anything you'd like to add to complete your profile as the new head of the department?

[MW]: I'd like to share my personal jour-

ney leading up to my role at AAU. I earned my master's degree at AU and completed my Ph.D. at KU. After spending a few years at Danfoss, I served as a professor at SDU for 12 years. This was followed by a position at DTU and five years as a researcher at the Chinese Academy of Sciences before assuming my current position at AAU. I can genuinely say that my reception at AAU—and in Nordjylland more broadly—has been unparalleled. I attribute this to the unique culture of the region, including the university itself, with its welcoming environment and the refreshing air tied to its location on the outskirts of our kingdom.

[VR]: So, would you say that AAU, in particular, provides a conducive environment for fostering your values—allowing students and re-

searchers the time to dive deeply into subjects and reflect on their implications, in contrast to the current cultural trend of rapid progression and reward?

[MW]: Absolutely! Compared to, for instance, China, I find their hyper-competitive mentality less aligned with the ultimate aims of our field. I had students there who emphasized working 12 hours a day, and I had to convey one of my core values in response: I don't care whether you work 5 to 10 hours a day as long as you are productive, what matters more to me is that your efforts during those hours deepen your understanding and perception. It is through this depth of thought that true contributions to our field are made.