Science in Amsterdam
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About

This 2016 overview gives an insight in the collaboration between the science faculties of the Vrije Universiteit Amsterdam (VU) and the University of Amsterdam (UvA). In this publication you can read about the joint highlights of 2016 in the field of education and in research. The overview also contains the interviews which were published in the series ‘Science Education at UvA-VU’, which highlight the joint programmes and joint degrees of the science faculties in Amsterdam.
Amsterdam can be proud of an education portfolio that covers the science spectrum in its entirety, say Peter van Tienderen (dean, UvA Faculty of Science) and Guus Schreiber (dean, VU Amsterdam Faculty of Sciences and Faculty of Earth and Life Sciences). Collaboration between the Amsterdam-based science faculties intensified in 2016. Wherever there was the opportunity to create added value, the faculties joined forces. This resulted in dozens of research collaborations as well as in, and this is unique in the Netherlands, close collaboration in education on a large scale.

**Jointly providing a broader range of education**

Researchers from VU Amsterdam teach in UvA degree programmes and vice versa. ‘This gives students a much broader range from which to choose,’ says Van Tienderen. ‘Our expertises complement each other, and together we increase the visibility of science in Amsterdam.’ Last year, the collaboration led to a joint Vision for Education and six joint degrees. ‘These degree programmes are offered by us jointly. If you graduate, you receive your diploma from UvA and VU Amsterdam. But also in other degree programmes we tap into the shared expertise of colleagues in Amsterdam.’

**Thematic flexibility**

Where research is concerned, there is a strong ambition for collaboration across different domains. This ambition is shared by researchers at the institutes and departments of Physics and Astronomy and Informatics at UvA and VU Amsterdam, but also evident from initiatives such as Amsterdam Water Science or Solardam.

Van Tienderen indicates why there are so many possibilities for collaboration: ‘A lot of the research by UvA and VU Amsterdam is complementary. Whether we are looking at fundamental questions in science or addressing the grand challenges of society today, together we can cover a much broader spectrum and reinforce one another.’

Thematic flexibility and mobility are essential, he adds. ‘Take Computer Science, which is dealing with an unprecedented increase in scale. In the past, only specialist industries required ICT expertise, but nowadays there is no end to the list of sectors that require modern informatics competences. Through collaboration, UvA and VU Amsterdam can respond to these developments more effectively and tackle new themes with greater ease.’

**Reaping rewards**

Collaboration between UvA and VU Amsterdam also adds appeal to other parties, Schreiber adds. ‘Researchers in Physics and Astronomy have been working together for years. The added value is also important to other research institutes; we see this for example in AMOLF’s and ECN’s participation in Solardam and the collaboration with ASML in ARCLN.’

Both deans see plenty of additional possibilities for collaboration in the future. ‘We are currently creating opportunities for cross-pollination, and look forward to the coming years when we will start reaping the rewards.’
Establishing Amsterdam as a great place to study science

For several years the science faculties of UvA and VU have been working together in research and teaching. With various joint programmes, exchange of lecturers and a shared vision on education, the collaboration has become of great value for students and staff, sharing expertise and facilities.

In 2016 our collaboration reached a high point with the start of six joint degree programmes in Chemistry, Physics and Informatics. More than 600 students signed up for one of these programmes, an indication that students are beginning to recognise Amsterdam as one of the best places in the country to study science. In 2018 we hope to offer the programme Bioinformatics and Systems Biology as a joint degree as well. An application for accreditation was submitted to the Accreditation Organisation of the Netherlands and Flanders (NVAO) in 2016.

In addition to attracting an impressive number of first-year students, many existing students in the programmes that were already offered jointly took the step to transfer their registration to the joint degree programme when this option became available. As a result, in the fall of 2016 we were able to award the first joint degree certificates to students in the Master’s programmes for Chemistry and Computer Science.

To make this happen, we undeniably came up against some challenges. Tolstoy already observed ‘What counts in making a happy marriage is not so much how compatible you are, but how you deal with incompatibility.’ In that respect 2016 was also a sobering year, bringing some of such incompatibilities to the surface. We learned that the great ambitions we have in creating synergy in our mutual relationship are realised with small steps forward, and that these small steps sometimes take a huge effort. It is thanks to these efforts by staff at our respective education service centres that administrative issues that come up are resolved swiftly and that the joint degree programmes run more or less smoothly.

Of course, this is also to the credit of the programme directors and lecturers, who are as driven as anyone to boost the quality of our programmes through collaboration. As a testament to the work they put in and the ambitions the UvA and VU science faculties are able to realise together, we encourage you to read the interviews in this booklet.

At the time of writing, we are once more at a critical point in our collaboration. The UvA and VU executive boards are on the verge of making several crucial decisions on the relocation and housing of staff at both campuses. We hope they, but also staff and students at both sides of the Amstel river, are inspired by what we have achieved so far, and that we may look forward to a prosperous future for Science in Amsterdam.

Nico M. van Straalen, professor of Animal Ecology at the Faculty of Earth and Life Sciences (VU) and Director of Education at the Faculty of Earth and Life Sciences and the Faculty of Sciences (VU)
Jan de Boer, professor of Theoretical Physics and acting Director of Education at the Faculty of Science (UvA)
field of science of key relevance to major societal issues in areas such as food, medicine, energy and sustainability,' that is how Sape Kinderman, programme director of the Bachelor's in Chemistry, describes his subject area. ‘At information days especially, I notice that many prospective students have an impression of chemistry that does not match with reality.’

**A**

Up and running

In Amsterdam, around 180 Bachelor's students are learning to understand, create, analyse, do calculations on and make applications with molecular bonds. Since 2009, students from UvA and VU have been doing so jointly, when the Bachelor’s programmes in Chemistry of both universities were merged. By now, everything is running smoothly, says Kinderman. For example: for every course a single responsible lecturer is appointed in consultation with all staff, whereas before a UvA lecturer and a VU lecturer would share responsibility. The Board of Studies, Examinations Board, eight curricula each with their own coordinator: everything is up and running.

Many prospective students have questions beforehand about the joint nature of the programme, Kinderman has noticed. ‘They ask about cycling back and forth, and about what kind of qualification they will receive.’ But once begun, they see the programme as a single entity: ‘Nobody is concerned anymore with who enrolled at which university.’ Since September 2016, new students are officially enrolled at both universities anyway, as the Bachelor’s in Chemistry has become a joint degree.

Large staff

Kinderman believes that overall, the joint programme benefits students. ‘With a staff as large as we have in Chemistry, every course can be taught by a handful of lecturers.’ Staff members consult with each other on who teaches what course, he adds, dividing up responsibilities based on expertise, teaching strengths and workload.

**More minors and internships**

Another benefit: ‘Students have more minors to choose from, as well as more research groups when selecting a research internship, for example.’ The Amsterdam-based programme stands out because it embodies the research priority areas of both the UvA and the VU, Kinderman says. Both are strong in analytical and theoretical chemistry, for example. Additionally, the UvA also places a lot of focus on ‘green chemistry’: sustainable chemistry, homogeneous and heterogeneous catalysis, and photonics. The VU places extra focus on ‘red chemistry’, or molecular pharmaceutical research. The research groups in this area will remain at VU Campus, Kinderman says, but the theoretical chemists from VU might move to Science Park.

VU Campus and Science Park

Science Park is where virtually all compulsory courses are taught. This is intentional, Kinderman explains, ‘In order to give students a home base: Science Park is also home to the joint ACD study association, for example, as well as to the annual Chemistry Tour, where last year Amsterdam chemistry students met the winner of the Nobel Prize.

The location where electives from later in the Bachelor’s programme are taught depends on the available expertise: third-year students take Biomarkers and Proteomics at VU Campus, for example, whereas Catalysis is taught at Science Park.

For those working at VU, however, a greater part of the programme now takes place outside their direct environment, Kinderman observes. ‘But I have no reason to believe that they feel inferior, given the large degree of effort and enthusiasm evident in their teaching.’

**HIGHLIGHTS**

**CHEMISTRY (BACHELOR)**

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<th>Number of Students</th>
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<td>First Year Enrolment 2015-2016</td>
<td>56 UvA &amp; VU</td>
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<tr>
<td>Language of Teaching</td>
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<tr>
<td>Location</td>
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19 January 2016
Perfect timing
Since September 2016, the programme is offered as an actual joint degree; newly incoming students will receive a single degree from UvA and VU. ‘The merging of the programmes in 2014 was perfectly timed,’ says Vreeswijk. ‘From 2010, the number of students grew so rapidly that we almost couldn’t cope anymore at the UvA. By working together with our colleagues from VU, we’ve been able to organise a solid Bachelor’s programme with small sized working groups and many projects.’

Easy merger
Vreeswijk and his colleagues began working on the merger in 2012. ‘It wasn’t very easy at first, because everyone wanted to hang on to their own courses. But together we were able to develop a better joint curriculum than each of us previously had.’ The long period of preparation ensured an easy merger, according to Vreeswijk. ‘From the very start, the objective was to have one degree programme located in one place. ‘We wanted students to be able to settle into a single place.’ That place became Science Park, where more than 95 percent of courses are taught. ‘Of course, this implies that many lecturers need to travel between their research and teaching location.’

Teaching as a uniting factor
Most lecturers already knew each other through their research, Vreeswijk adds. ‘But teaching turned out to be a uniting factor. Research is more individualistic, something you do with your own group. The group of lecturers are getting on well. ‘We regularly have meetings and discuss our teaching without our UvA or VU hats on.”

Small scale teaching
There are three factors that make the joint programme unique, says Vreeswijk. Scale is one of them. ‘We’re large scale, but we aim for small-scale teaching with groups of 20 to 25 students.’ There is also a student mentoring group. ‘We actively keep an eye on students in the first year in particular, when it’s most needed.’ And finally: the joint programme is explicitly research based. ‘Our lecturers can talk about their research with great passion and in great depth. They work as researchers at leading scientific institutes, such as LaserLab, Nikhef, Institute of Physics and Anton Pannekoek Institute of Astronomy. We also have good connections at the Academic Medical Center (AMC-UvA) and the VU University Medical Center (VUmc).’

Students can graduate in any area of physics, Vreeswijk adds. The UvA’s research focuses slightly more on fundamental physics, with subjects such as quantum universe and gravitation. VU is also well known for its research into the physics of life, the bio- and medical physics.

Joint degree
From September 2016, new students are enrolled in the joint degree programme, which is still optional for students in higher years. There will be changes behind the scenes, but students will barely notice the difference, according to Vreeswijk. ‘The real difference will be on the degree certificate, which will have both the UvA and VU logo on it.’
Science. ‘We hope this will bring everyone up to the basic level that we want to see.’ The differences in knowledge before people start the course are significant, he adds, but they can be made up. ‘For example, we had an architect who turned out to be one of our best students.’

Different locations

Students attend lectures in different locations depending on where the lecturers are based. For example, for a typical UvA course like Alfons Hoekstra’s Stochastic Simulation they have to go to the Science Park, says Lees, whereas for Henri Bal’s Parallel Programming course they have to be at VU’s De Boelelaan site. ‘But we do try to plan full days at UvA and full days at VU.’

Open curriculum

But students do not have to restrict themselves to Amsterdam, continues Lees. ‘We offer specialist programmes like Computational Biology and Computational Finance. These are what we recommend to students. But we have an open curriculum and students are free to choose their own modules. And that could also be a course in Leiden, for example.’

Joint degree

Lees barely noticed the fact that, until recently, students had to formally enrol with one of the two universities: ‘It is a unified programme.’ Since this year, all new students enrol in the new joint degree. The majority of existing students who were in the second year of their Master’s also transferred to the joint degree, says Lees. ‘They had already been regarding the programme as a joint degree,’ explains Lees, ‘and now that’s what will be on their degree certificates.’
The joint UvA-VU Master’s in Chemistry is the most complete Master’s in Chemistry in the Netherlands, according to programme director and VU chemist Henk Lingeman.

The UvA and the VU have been offering the Master’s jointly since 2002. ‘We were both small,’ explains Lingeman. ‘We were in frequent contact with our UvA colleagues in professional context, of course, and it occurred to us that we complemented each other well. While we work with natural polymers, for example, our colleagues from the UvA work with synthetic polymers. We figured that by combining our programmes we could make a really strong programme in the Netherlands.’

Gradual change
The joint programme was quickly established. In addition to Lingeman, UvA chemist Wim Kok was also involved. ‘In the beginning, the division of tasks was pretty rigid, with half the lecturers from the UvA and half from the VU. That was necessary at the time,’ says Lingeman. ‘There was a considerable cultural difference and the best way to bridge the gap was to make sure the change was gradual. Nowadays, we select the lecturer who is most suitable for the course.’

Broadest Master’s programme
Students are now reaping the benefits of the joint programme, says Lingeman. ‘In each course, they are lectured by a true specialist. Also, there are a lot more options than there were in the past. Back then, neither we or the UvA offered courses on certain topics, and students would often shop around at other universities. They do not have to do so anymore. I think that we now offer the broadest Master’s programme in Chemistry in the Netherlands.’

The Amsterdam degree programme is also characterised by its focus on valorisation. ‘I really try to impress upon my students what they can do with the practical applications of chemistry. My own specialisation, for example, is in clinical chemistry. A problem in this field is that medical doctors sometimes know very little about chemistry and find it difficult to figure out which chemical readings are required. As a result, the physician and the patient don’t always have the right information, which might lead to a wrong diagnosis. This is why these days, we also place a lot of emphasis on clear and understandable communication of results in our teaching.’

Advantage of different approaches
As a lecturer, Lingeman is still very satisfied with the partnership. ‘A larger staff is better able to deal with issues when they arise, not to mention the fact that you learn from each other. We were used to doing things the VU way, but now we also see the possibilities that come with different approaches.’ Most often, this works out at an advantage, according to Lingeman. As an example, he mentions the lectures he has taught together with UvA colleague Wim Kok for the past 25 years. ‘He explains things based on theory and then conducts a few targeted experiments. I am very practically orientated and base my teaching on the experiments. During lectures, I do not discuss formulas because I know that Wim will cover those. Likewise, Wim does not need to get into the difference between water and methanol as solvents.’

Joint degree
In September the joint Master’s programme officially became a joint degree. Graduates receive a degree certificate from both universities. The UvA is the coordinating partner and Lingeman is the programme director. When he retires in about three years he hopes to be succeeded by the most suitable candidate, regardless of university affiliation.
We have also been working to make research at the UvA and VU increasingly complementary since 2000,’ says Van Linden van den Heuvell. Whereas research at VU centres largely on the physics of life and energy, the UvA is more focused on string theory, theoretical physics and astronomy.

Astronomers and physicists

Within astronomy, the UvA specialises in compact objects such as black holes and neutron stars, planet formation, exoplanets and massive stars, says Carsten Dominik, director of the UvA Master’s programme in Astronomy & Astrophysics until the merger. UvA astronomers also work alongside physicists within GRAPPA, and there are myriad interconnections in the degree programme as well, Dominik explains. ‘We are collaborating with physicists at VU to investigate if physical constants really do have the same values throughout the universe and at all times. And we are working with the department of Earth Science at VU and with SRON to offer courses on the composition of planets and exoplanets, and on planetary atmospheres.’

Showcasing tracks

Clearly then, the merger has not come out the blue. Nonetheless, there were concerns initially, Dominik admits. For instance, will astronomy continue to be visible after it goes from a full-fledged degree programme to a track? ‘Our programme is well-known at the moment. To retain that visibility, we will be doing more to showcase the different tracks we offer in our recruitment activities for the joint programme. That is something my physics colleagues have also wanted to do for a long time.’

Synergy

The three think the merger mainly yields synergy fits, for example in terms of administration. ‘The difference hinges on the small qualities, I hope,’ says Van Linden van den Heuvell. ‘Good support helps everyone involved to feel more driven.’ Dominik adds: ‘Some students have trouble deciding between physics and astronomy, because they are fascinated by both. It is now easier for them to decide on a focus within the degree programme. Physics and astronomy each have their own distinct methods, but share common goals. More interaction with physics, letting students attend lectures across the whole spectrum of the field, will have a positive effect.’
Brothers
Up until 2014, VU offered an MSc degree in Computer Science, while across town the UvA offered an MSc in Computational Science. ‘Like brothers,’ Kielmann says. ‘However, unlike with other joint programmes, we decided not to merge them. Instead, VU’s Computer Science programme was complemented with UvA lecturers, and vice versa for Computational Science.’

Education mirrors research
Students enrolled in the Computer Science programme can choose from six different specialised Master’s tracks. That makes it unique in the Netherlands, and among the best in the world, according to Kielmann. Past year, based on the knowledge and experience the lecture team built up since 2014, the programme’s curriculum has been extensively modernised. Kielmann explains: ‘These tracks are a direct translation of the main focus areas of Computer Science research in Amsterdam.’ Take for example Big Data Engineering, a new track shaped around research being done within Amsterdam Data Science, the large network organisation of which both VU and the UvA are members.

Unique track
The track addresses the central role played by data in the current internet era. People are constantly communicating via social networks and expect information to be accessible at all times. Data processing leads to valuable insights. These developments are made possible by a worldwide data processing infrastructure, in which computer clusters of small businesses connect with data centres of large IT-giants. ‘The Big Data Engineering track in our Master’s programme concentrates on the technology behind these infrastructures. Our students design and build solutions for processing, analyzing and managing large quantities of data.’

Additional fields of research
However, as Kielmann points out, there is almost no overlap between the two universities’ respective lines of research. ‘That is the result of an intentional policy of which we are now reaping the rewards: Whereas UvA researchers are working on parallel programming, cloud-based systems and performance engineering, for instance, efforts at VU are focused on topics such as computer system security, green IT and internet technology. This wide spectrum of research is not the only benefit, Kielmann notes. ‘Research collaboration creates added value; it is a one-plus-one-equals-three equation.’

Benefits of a joint degree
Students are also enthusiastic about the broad scope of the Master’s curriculum. Practical details like two student information systems do not temper this, according to Kielmann. Since September 2016, Computer Science is offered as a joint degree. ‘Basically, you have got the combined force of two universities behind one degree certificate,’ says Kielmann, ‘and that is something students certainly appreciate.’

Kielmann is excited about the collaboration in the Master’s programme with his counterparts at the UvA. ‘Computer Science has always pioneered collaboration, and there has always been good chemistry with each other, so we are already accustomed to working together. Now we also have courses that are taught jointly by VU and UvA lecturers, with partnerships forged purely on the basis of content.’

* in 2016 Thilo Kielmann was appointed as educational director of the VU Faculty of Sciences. The new programme director of the MSc Computer Science is Wan Fokkink.
is one of the biggest advantages of the collaboration between UvA and VU: ‘Together we can offer students a broad range of courses locally, more comprehensive than anywhere else in the country,’ says Rink.

However, the broad range of available courses also has a downside. Students can now choose from so many subjects that they hardly need to meet each other. ‘But we do feel it is important that a sense of community exists among our students,’ says Taelman with regard to this issue. This is one reason why the programmes began the year with a communal barbecue. Probably more important: a compulsory joint seminar has been set up for each specialisation, and the students themselves have to work together to organise the seminar and keep it going.

No sense of ‘home’ or ‘away’
The students generally do not have a sense of playing a ‘home’ or ‘away’ game. ‘Maybe the historical difference between UvA and VU plays a role for some Dutch students, or if they have specifically selected one or the other university because of their specialisation, but for international students the distinction between UvA and VU is fairly meaningless,’ Rink observes.

Lecturers, too, barely notice the difference. ‘If I ask colleagues about the difference between students from UvA and from VU, they always say that they do not really know which students are enrolled at which university,’ continues Rink. They are also happy to help each other out for thesis supervision. As Taelman explains: ‘To give one example, I recently received a request from a student, but I was fully booked. Luckily, a VU colleague was more than willing to supervise the student in question.’

Difficult to pinpoint
Lenny Taelman and Bob Rink find it difficult to pinpoint exactly for how long the programmes have been offered jointly. ‘Certainly much longer than the two years that I have been programme director,’ says Taelman. ‘Yes, I think it must be around 15 years,’ adds Rink. The Stochastics and Financial Mathematics Master’s programme was set up jointly, while the Mathematics Master’s programmes gradually grew towards each other. For the latter, the universities offer three specialisations together. The department at the UvA is stronger in Algebra & Geometry, while VU is stronger in Analysis & Dynamic Systems; for Stochastics it’s about an even 50/50. ‘And indeed, those students travel between locations the most,’ says Rink.

Joining forces
The collaboration was a logical development when, around the year 2000, the number of mathematics students in the Netherlands was at a historical low. The UvA and VU were not the only ones to join forces at that time: all mathematics Master’s programmes in the Netherlands started to offer courses together, accessible to each other’s students, in the national MasterMath programme.

Broadest range of courses
‘I myself was one of these very few students at that time, and I get really envious when I see all the courses that students can take nowadays,’ says Taelman. Since then, the MasterMath scheme has grown to include over 40 courses, many of which are taught in Amsterdam. That
percent of the Master's students continue with a PhD programme after graduation. The other fifty percent work in consultancy, policy or education in the field of biology.'

The charm of a small programme

This year, 25 students are enrolled in the programme, half of whom are from abroad. ‘The number of students may be small, but a small programme does have its advantages,’ says Driessen. ‘The communication lines are short and the lecturers know all the students, who in turn feel free to just drop by to see us. The atmosphere is really good and that's what the students appreciate.’

This is also corroborated by the results of the National Students' Survey, which revealed that students rate the quality of the degree programme and the atmosphere as very good. Driessen: ‘I’m delighted with these results. We’ve worked really hard together to achieve this.’

The collaboration between the universities is excellent, according to Driessen, and there are plans to make the programme into a joint degree programme in the future. ‘This will enable us to promote the unity of the programme and universities more strongly.’

Outdoors beckons

Driessen retired at the end of 2016. Asked what he would miss the most, he said: ‘Being in contact with students and supervising them, and giving lectures, which is something I always enjoyed. The people I worked with are a wonderful bunch and totally committed to teaching and research.’ Years ago, Driessen chose to become a biologist because he loves the outdoors. ‘Yet at the end of my career I’m surrounded by concrete. The outdoors beckons and that’s where you’ll find me after retirement.’

We had already been conducting research together with colleagues from the UvA for some time. It wasn’t such a big step to combine the curricula, as there were many similarities between the two programmes. Moreover, considering dwindling student numbers, it was a good move,’ Driessen and his UvA colleague Patrick Meirman soon developed a curriculum for the new Master’s programme. ‘The range of courses offered was rather homogeneous. In many cases we could maintain one of the two overlapping courses,’ Driessen explains. ‘Lecturers from both the UvA and VU are involved in all courses.’

Focus on research

The Master’s programme in Ecology and Evolution is a two-year research-oriented programme. Research projects form a substantial part of the programme, with students doing a research work placement in both the first and second year. Why does research have such a major focus in the Master’s programme? ‘It was a conscious choice, we are really good at research,’ says Driessen. ‘Learning to conduct research provides a solid academic basis even if students are not planning to further their career as researchers. About fifty

The Master’s programme in Ecology and Evolution offered by VU and the track in Ecology and Evolution, part of the UvA Master’s programme in Biological Sciences, had so many similarities that both programmes were combined into a single Master’s programme in September 2012. A logical step, according to Gerard Driessen, coordinator of the VU Master’s programme in Ecology and Evolution.
The first six months of the two-year Artificial Intelligence Master’s programme consists of five compulsory core courses. Next, students may take electives. ‘This way they can immerse themselves in exactly the topics that they find interesting,’ says Van Someren. The second year also includes required courses, supplemented by writing a thesis.

Differences in teaching

By now, feedback has been collected from the first class of students in the programme. The most prominent revelation pertained to the differences in teaching, say the programme directors. ‘According to the students, UvA lecturers are conventional, with lectures and assignments, whilst VU lecturers teach more interactively and stimulate discussion,’ says Van Someren. The evaluation shows that students do not find this the least bit problematic. ‘They indicate that they like being taught in different ways,’ says Haasdijk. ‘It is perceived as enriching.’

Interest from employers

With respect to the students’ future prospects, the programme directors have no worries whatsoever. ‘Based on what I see now, the biggest risk is students starting a job before they obtain their degree. Companies such as Google, Microsoft and Ernst & Young, as well as banks, are eager to collaborate with Master’s students on projects involving data analysis,’ says Haasdijk. Van Someren concurs. ‘There is a lot of work in this field and great interest from society. Artificial Intelligence graduates can easily find a job.’
The Master’s programme is a combination of molecular and cellular biology, computing science and mathematics. In other words, it is a multidisciplinary programme, and that multidisciplinarity is reflected in the students. ‘We enrol students from a variety of disciplines. A couple of years ago, we had a situation where 37 of our 40 students came from different areas of study,’ explains Heringa. ‘That diversity works incredibly well,’ adds Hoefsloot. ‘Knowledge is pooled and students learn a great deal from each other.’

Crash course
When starting the two-year programme, students take a test to establish their knowledge level in each of the three disciplines. ‘During the first two months, students attend crash courses in which we brush up their knowledge in areas where they need it,’ says Heringa. Composing working groups is always a bit of a puzzle: ‘We take care to ensure that groups include students from different backgrounds so they’ll complement each other,’ says Hoefsloot.

Areas of expertise
UvA and VU contribute equal shares of expertise. ‘Our specialist areas have already blended in with each other to a large extent, and our expert knowledge is an integral part of teaching and research,’ says Hoefsloot, who has a background in mathematics. According to him, biology has become increasingly focused on quantification in recent years. ‘In the past, the emphasis was on phenomenological analysis, where you describe what is happening. Now, people want to explain how something works quantitatively,’ Heringa, the first person to obtain a PhD in Bioinformatics in the Netherlands, agrees. ‘Capacity for knowledge and the quantity of data has increased. Technology is playing an important role in that.’

Compliments
Students do two internships during the programme, one of which many do abroad. ‘We often receive compliments about our students by people who work with them abroad,’ says Hoefsloot. ‘Just yesterday, I received an email from a lecturer at Harvard Medical School. “He’s better than some of my PhD students,” she wrote.’ The assessment panel that accredited the programme at the beginning of this year was also full of praise. The panel was very positive about the way in which students from different programmes had been brought together, and described the collaboration between VU and UvA as very special.

Out-of-the-box thinking
Sixty per cent of the programme’s graduates go on to pursue a PhD. The programme directors do not have an immediate explanation for this high rate. ‘Selection certainly seems to be one factor. In general, it’s the better students who opt for this Master’s programme. They have the confidence to do it, and the ability to think outside the box,’ says Heringa. A broad skills set helps, because what it ultimately boils down to, according to the directors, is how you tackle problems and questions.

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<th>HIGHLIGHTS</th>
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<td>Number of Students</td>
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Science Education at UvA-VU

Bètapartners

24 January 2017

Bètapartners is a network of VU, UvA, the Amsterdam University of Applied Sciences (AUAS), Inholland University of Applied Sciences, over 44 secondary schools in the greater Amsterdam region and businesses, all working together to increase knowledge and innovation in science education. Agnes Kemperman, Bètapartners programme manager, explains the strength of the network.

‘Improving the quality of science education, maintaining enrolment rates and increasing study success: these are, in brief, the main focus areas of Bètapartners,’ says Kemperman: ‘It is a platform for all of us, where we operate based on content.’

Forging connection
Bètapartners was launched in 2004. ‘The enrolment of secondary school students in science programmes in higher education was decreasing rapidly. According to VU and UvA student counsellors at the time, the issue was not primarily recruitment. They came to the conclusion that too few secondary school students were choosing science subject cluster (education programmes with a focus on Science and Technology or Science and Health). And it is there, at secondary schools, where the connection to higher science education needs to be forged.’

Professionalisation of teachers
By now, 44 secondary schools are part of the network. One of the important focus points of the network is the professionalisation of teachers. ‘Every year, we organise four refresher courses for teachers on subject content,’ Kemperman explains. ‘Sometimes changes are made to the curriculum, and then suddenly teachers have to explain topics they know little about, such as biophysics or nanotechnology. And where better to learn about these topics than at university, where the science research is actually conducted?’ The courses are taught by UvA and UvA professors, and sometimes by external partners.

We take a bottom-up approach in this regard. The first question we ask teachers is: What do you need to be able to teach well?’ Kemperman gives examples such as e-learning and flipping the classroom, where high school students watch short video lectures prior to the actual classes. The advantage of flipped classrooms is that the classes can focus considerably more attention on the students’ questions.

Intensive collaboration
According to Kemperman, there is intensive collaboration between the VU, UvA, AUAS (HvA) and Inholland. One thing they do together is create ready-to-go lesson boxes filled with materials for experiments. “These boxes often contain expensive materials that schools will only be using once a year, but they are an important supplement to the regular course material. We also consult with each other on how we design activities and what we charge schools for participation.”

“Yes,’ Kemperman answers in response to the question whether these activities come at a price. ‘It costs money to offer these programmes, which is sometimes a cause for objection from within our organisations. But I believe that part of the money we currently allocate to make up for mismatched students and repairing deficiencies is better spent on preventing wrong choices and deficiencies in the first place.’

Crossing borders
As former professional educationalist, Kemperman feels at home in her job. ‘To me, the pioneering, connecting with parties, and working on teaching concepts and quality improvements for science education, all of it remains unique. Our network has grown from 24 to 44 schools since I’ve been here, I consider that quite an accomplishment.’ In this regard, she praises the collaboration. ‘Collaboration benefits us all, competition doesn’t. We share knowledge and dare to cross borders. I want to strengthen Amsterdam, serve it well and retain a certain grip on the chain and the process.’

In the coming period, Kemperman will also be focusing her attention on the humanities and social sciences education, which is following the example set by the Bètapartners network. ‘It is important to be able to provide a larger structure.’