

### 3 The Netherlands

*By Channah Herschberg and Laura Berger*

#### 1. INTRODUCTION

The participating STEM institute at the Radboud University in the Netherlands is the Institute for Mathematics, Astrophysics and Particle Physics (IMAPP). The IMAPP is one of the six research institutes at the Science faculty, and is divided into four departments: Mathematics, Astrophysics, Theoretical High Energy Physics, and Experimental High Energy Physics. The Mathematics department is divided into three sub-departments: Algebra & Topology, Applied Stochastics and Mathematical Physics. The Science faculty is one of the seven faculties of Radboud University.

The participating SSH institute is the Institute for Management Research (IMR). The IMR is the multidisciplinary research institute of the Nijmegen School of Management (NSM). The NSM is one of the seven faculties of Radboud University. The IMR conducts top-level research on the governance of complex societal systems. The IMR is divided into five sections: Business Administration, Economics and Business Economics, Political Science, Public Administration, and Geography, Planning and Environment. Each section is divided into different departments.

The various academic positions in the Netherlands are full professor, associate professor, assistant professor, other academic staff (teachers and researchers, among which postdoctoral researchers), and PhD candidates (De Goede, Belder, De Jonge, 2013). A PhD position in The Netherlands is a job that comes with a salary. There is no fee for tuition. The normal duration of a PhD contract is four years.<sup>21</sup> The assistant professor position is the stage in which an academic functions as an independent researcher (De Goede, Belder, De Jonge, 2013).

#### 2. MAPPING THE INDICATORS AT THE NATIONAL LEVEL

For mapping the national indicators concerning academic personnel, we made use of the Academic Personnel Information System (WOPI) which is derived from the personnel information of all Dutch Universities by the Association of Collaborating Universities (VSNU). These data are publically available on the website ([www.vsnu.nl](http://www.vsnu.nl)). For mapping the national indicators concerning Bachelor and Master students, we made use of the information of the Central Bureau for Statistics (CBS) of the Netherlands, in particular their online program Statline ([statline.cbs.nl](http://statline.cbs.nl)).

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<sup>21</sup> <https://www.lorentz.leidenuniv.nl/freqques.html>

## 2.1 National level indicators – gender

From Table 1 we learn that although women form a majority at the levels of bachelors and masters, from the level of PhD candidates onwards they gradually become a bigger minority, with the lowest number of women at the rank of full professor (grade A). The percentages of women and men bachelor and master students, PhD candidates, and postdocs and other non-permanent researchers remain stable over time, whereas we see an increase in the percentages of women and decrease of percentages of men in all levels from assistant professors onwards: women assistant professors from 33% (2010) to 38% (2014); women associate professors from 20% (2010) to 26% (2014); women full professors from 13% (2010) to 17% (2014).

**Table 1: General table with % of women and men in different ranks in the Netherlands**

Position	2010		2011		2012		2013		2014	
	M	F	M	F	M	F	M	F	M	F
Bachelor students**			45%	55%	45%	55%	44%	56%		
Master students**			46%	54%	46%	54%	46%	54%		
PhD candidates	54%	46%	54%	46%	55%	45%	55%	45%	55%	45%
Postdocs and non-permanent researchers*	61%	39%	61%	39%	59%	41%	61%	39%	61%	39%
Assistant professors	67%	33%	65%	35%	64%	36%	63%	37%	62%	38%
Permanent research staff - associate	80%	20%	78%	22%	78%	22%	75%	25%	74%	26%
Permanent research staff - full	87%	13%	85%	15%	84%	16%	84%	16%	83%	17%

\* For postdocs and non-permanent researchers we have taken the "Other Academic Personnel Research" as a category in the WOPI (Academic Personnel Information System – national level).

\*\* No information was available in Statline on the years 2010 and 2014.

From Table 1 we learn that although women form a majority at the levels of bachelors and masters, from the level of PhD candidates onwards they gradually become a bigger minority, with the lowest number of women at the rank of full professor (grade A). The percentages of women and men bachelor and master students, PhD candidates, and postdocs and other non-permanent researchers remain stable over time, whereas we see an increase in the percentages of women and decrease of percentages of men in all levels from assistant professors onwards: women assistant professors from 33% (2010) to 38% (2014); women associate professors from 20% (2010) to 26% (2014); women full professors from 13% (2010) to 17% (2014).

## 2.2 Tables for the number of women and men in FTE and % in the Dutch SSH and STEM fields

Comparing master students to PhD candidates, we see that disproportionally more women are hired as PhD candidates than men: in 2011, for instance, the percentage of women master students was 29%, whereas the percentage of women PhD candidates was 39% (see Table 2). Despite this fact, women on all levels are the minority, with the lowest point at the level of full professor (grade A).

The total number of PhD candidates increases from 1733 in 2010 to 2086 in 2014. The percentage of women PhD candidates decreases over time, from 40% in 2010 to 35% in

2014. The increase of PhD candidates thus seems to be caused by a disproportionate amount of new men PhD candidates. The total number of postdocs and other non-permanent researchers increases from 1085 in 2010 to 1142 in 2014. The number of women in this group remains stable around 32%. The total number of assistant professors slightly increases from 581 in 2010 to 597 in 2014. The number of women assistant professors increases from 21% in 2010 to 27% in 2014. The total number of associate professors decreases slightly from 352 in 2010 to 340 in 2014. The number of women associate professor increases from 2010 (13%) to 2011 (15%) and then remains stable at that percentage. The total number of full professors increases slightly from 458 in 2010 to 471 in 2014. The number of women full professors increases from 9% in 2010 to 11% in 2014. Interestingly, we see that there are more full professors than associate professors.

Comparing master students to PhD candidates, we see that disproportionately more men are hired as PhD candidates than women: in 2011, for instance, the percentage of men master students was 44%, whereas the percentage of men PhD candidates was 63%. In contrast with the STEM field, the leaky pipeline thus already starts at that transfer.

**Table 2: STEM number of women and men in FTE and %\***

Position	2010		2011		2012		2013		2014	
	M	F	M	F	M	F	M	F	M	F
Bachelor students			1341 64%	740 36%	1514 64%	836 36%	1328 61%	861 39%		
Master students			1699 71%	700 29%	1961 71%	789 29%	1764 69%	801 31%		
PhD candidates	1048 60%	685 40%	1142 61%	715 39%	1189 64%	682 36%	1272 65%	687 35%	1357 65%	729 35%
Postdocs and non-permanent researchers**	730 67%	355 33%	739 68%	342 32%	742 67%	370 33%	748 68%	358 32%	775 68%	367 32%
Assistant professors	459 79%	122 21%	456 77%	133 23%	417 76%	130 24%	423 74%	148 26%	434 73%	163 27%
Permanent research staff - associate	305 87%	47 13%	293 85%	48 15%	290 86%	48 14%	286 85%	51 15%	289 85%	51 15%
Permanent research staff - full	417 91%	41 9%	412 90%	44 10%	407 90%	44 10%	424 90%	45 10%	420 89%	51 11%

\* The WOPI divides the disciplines in several categories. For IMAPP, our STEM department, we have taken the category of Science & Physics (Natuurkunde). For the information on BA and MA students, we chose the discipline 'Science&Physics/ Informatics' in Statline. No information was available on the years 2010 and 2014.

\*\* For postdocs and non-permanent researchers we have taken the "Other Academic Personnel Research" as a category in the WOPI (Academic Personnel Information System).

The total number of PhD candidates decreases from 593 in 2010 to 576 in 2014. The number of women PhD candidates increases over time, from 37% in 2010 to 43% in 2014. The total number of postdocs and other non-permanent researchers decreases from 164 in 2010 to 142 in 2014. The number of women in this group fluctuates but there is, in the end, a decrease from 40% in 2010 to 38% in 2014. The total number of assistant professors increases very slightly from 453 in 2010 to 458 in 2014. The number of women assistant professors increases gradually from 26% in 2010 to 31% in 2014. The total number of associate professors increases from 243 in 2010 to 259 in 2014. The number of women associate professor increases from 13% in 2010 to 18% in 2011. The total number of full professors decreases slightly from 303 in 2010 to 292 in 2014. The percentage of women full

professors increases from 8% in 2010 to 9% in 2014. Again it is interesting to see that there are more full professors than associate professors.

**Table 3: SSH number of women and men in FTE and %\***

Position	2010		2011		2012		2013		2014	
	M	F	M	F	M	F	M	F	M	F
Bachelor students			7004 44%	8928 56%	7883 44%	10069 56%	7408 44%	9445 56%		
Masters students			8225 44%	10484 56%	9551 44%	12086 56%	8295 44%	10406 56%		
PhD candidates	374 63%	219 37%	366 63%	217 37%	370 60%	249 40%	347 57%	263 43%	331 57%	245 43%
Postdocs and non-permanent researchers**	98 60%	66 40%	118 65%	63 35%	126 64%	72 36%	101 61%	65 39%	88 62%	54 38%
Assistant professors	334 74%	119 26%	312 73%	117 27%	303 71%	123 29%	330 71%	136 29%	315 69%	143 31%
Permanent research staff - associate	211 87%	32 13%	206 85%	35 15%	210 84%	40 16%	214 85%	39 15%	212 82%	47 18%
Permanent research staff - full	280 92%	23 8%	276 91%	26 9%	273 92%	25 8%	268 91%	27 9%	265 91%	27 9%

\* The WOPI divides the disciplines in several categories. For IMR, our SSH department, we have taken the category of Economics (Economie) as that was closest to the fields in which the IMR resides. This includes business administration (largest department within the IMR) and economy, but excludes, for instance, public administration, spatial planning and political science. The table thus gives a partial picture of the context of the IMR as different departments are located in different disciplinary fields. For the information on BA and MA students, we chose the discipline 'Social Sciences/Business' in Statline. No information was available on the years 2010 and 2014.

\*\* For postdocs and non-permanent researchers we have taken the "Other Academic Personnel Research" as a category in the WOPI (Academic Personnel Information System – national level)

### 2.3 Other data on PhD holders & academic careers in the Netherlands

#### Rathenau Institute Facts and Figures 2012

- The proportion of total female academic staff has risen from 19.5% in 1990 (total: 21,314) to 36.7% in 2010 (total: 24,321).

#### Rathenau Institute Talent Centraal 2013

- The number of temporary positions has increased over the years, mostly in the form of postdoc positions (Postdocs 2005: 2,559; 2010: 3,548). Average number of years in postdocs: 7.5. The report states that especially 'postdoc-stacking' (i.e. doing multiple subsequent postdoc projects) within the same department and the same institute has a negative effect on the career perspective of researchers. After a few postdoc projects, these people are not only 'too old' but also too specialized to transfer to another organization, whether inside or outside of academia. The exit flow is higher than upward flow, which means they have little chance of climbing up the current institute.
- Important role for national stimulation grant "Vernieuwingsimpuls" ("Innovational Research Incentives Scheme")<sup>22</sup>, including 'Veni', 'Vidi' and 'Vici' grants: 75% of Veni laureates was a postdoc and 45% of them went on to a higher position after the project (mostly Assistant

<sup>22</sup> <http://www.nwo.nl/en/funding/our-funding-instruments/nwo/innovational-research-incentives-scheme/index.html>

Professor). 36% of Vidi laureates was postdoc and 80% of them went on to a higher position after the project. The biggest part of Vidi laureates was Assistant Professor and moved on to associate or full professorship.

#### Rathenau Institute Facts and Figures 2013

- PhD candidates, researchers, lecturers and assistants professors are more likely to leave academia than associate and full professors.
- 2005: postdocs 35% of 'other academic personnel', in 2011: 43%. The number of postdocs is increasing.
- 13% of 'other academic personnel' flows through to a higher position in own institute, 7% to other university, 67% outside of academia.

#### She figures 2012. Gender in Research and Innovation

- According to the She Figures 2012 the number of women researchers in the Netherlands in the A level is among the lowest in Europe: 13%. Grade B: 21%, Grade C: 34%, Grade D: 45%.
- Proportion of female heads of universities or assimilated institutions based on capacity to deliver PhDs, 2010: 7% against 93% of men.

#### OECD 2014 Education at a Glance

- The average age for first-time graduation in the Netherlands is below 25.
- 90% of high-skilled people are employed in the Netherlands. Tertiary educated women: Type B 76% and Type A or advanced research programmes; men 84% and 90% respectively. Unemployment rates women: 5.2% and 2.7%; men: 4.7% and 3.0%.
- There is a minimal difference between younger and older tertiary-educated women who work fulltime. The difference between women and men is considerably larger. Percentage of fulltime full-year earners: 22-25% women and 65-70% men. The number of women working fulltime is the lowest compared to all other countries in this report (see page 108 of the OECD report).
- Average annual earnings of tertiary educated women as a percentage of men's earnings: 60% (2010). This difference has to do with the large amount of part-time working women.
- Average annual full-time, full-year earnings of tertiary-educated women as a percentage of men's earnings (2010): age 25-64: 74%; age 35-44: 83%; age 55-64: 74%.

### **3. MAPPING ORGANIZATIONAL INDICATORS**

In the next paragraph, we will describe the available organizational indicators from the IMAPP and the IMR. We used the personnel data we received from the personnel departments in January and February 2015, when we requested the data for WP4 and WP6. All indicators required for writing this report were available, except the data on numbers of promotions of the scientific staff in the IMR and the IMAPP department. This information is not documented and therefore not available.

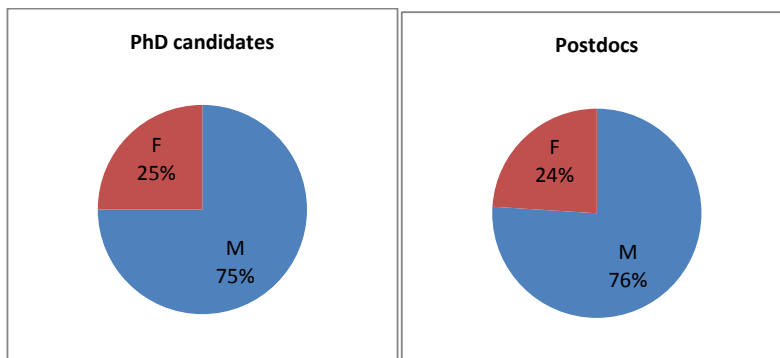
### 3.1 The IMAPP (STEM)

Looking at the tenured (permanent) staff within the IMAPP (see Table 4), over the time period 2010 – 2014, only two women professors and one woman assistant professor have been newly employed. Among the non-tenured staff, more women can be found. The highest numbers of women postdocs and PhD candidates work in the Astrophysics department. Within the Astrophysics department, the number and percentage of women PhD candidates and postdocs increased over time. In the other departments with women postdocs and PhDs, the number remained constant. Overall, the percentage of women staff has been constant over the years (16% women on average). With an increased proportion of women non-tenured staff, this means a decreased proportion of women tenured staff.

The proportion of women PhD candidates and postdocs was the same in 2014 (see Figure 1). The percentage of women assistant, associate, and full professors in that same year was respectively 8% (N=1), 0%, and 7% (N=1) (see Table 4). This shows a (very) leaky pipeline, starting between the postdoc and assistant professor level. Over the time period 2010 -2013 all assistant professor hires have been men, except for one. The one woman assistant professor hired was hired in 2011 on a gender tenure-track. At the moment she has a permanent contract.

In 2014, only the Astrophysics department contained women PhD candidates (N=10), so the percentage in Figure 1 is based on one department only. Women postdocs were working in three departments, of which the highest number in the department of Astrophysics (N=4). Since the number of women assistant professors, associate professors, and full professors is so low, we did not include them in a graph.

**Figure 1 – Percentage of non-tenured women and men IMAPP staff in 2014**



Over the years 2010 – 2013, one woman professor and five women postdocs have left the IMAPP, compared to three men professors, two men associate professors, one man assistant professor, and 15 men postdocs (see Table 6). Of the total number of 'exits', 22% was women. This is a higher percentage than the average percentage of women staff over the same time period.

**Table 4 - Number of women and men IMAPP staff 2010-2014**

	2010			2011			2012			2013			2014				
	M	F	%F	M	F	%F	M	F	%F	M	F	%F	M	F	%F		
Tenured staff	Position			Total			Total			Total			Total			Total	
	Full prof	10	1	9	11	9	1	10	10	12	2	14	14	13	2	13	15
	Associate prof	7	0	0	7	0	0	7	0	0	0	0	0	7	0	0	7
Non-tenured staff	Assistant prof**	8	0	0	8	10	1	9	11	13	1	7	14	13	1	7	14
	Postdoc	9	3	25	12	10	2	17	12	13	3	19	16	22	4	15	26
	PHD candidate	17	4	19	21	24	7	23	31	26	8	24	34	34	9	21	43
<b>Total</b>	<b>51</b>	<b>8</b>	<b>14</b>	<b>59</b>	<b>60</b>	<b>11</b>	<b>15</b>	<b>71</b>	<b>70</b>	<b>14</b>	<b>17</b>	<b>84</b>	<b>89</b>	<b>16</b>	<b>15</b>	<b>105</b>	

Note: Data on the 31<sup>st</sup> of December of each year

\* In the IMAPP assistant professors on a temporary contract also belong to the category 'Tenured staff' because they are all intended to get a permanent contract after a fixed number of years (tenure-track system).

**Table 5 - Number of women and men IMR staff 2010-2014**

	2010			2011			2012			2013			2014			
	M	F	%F	M	F	%F	M	F	%F	M	F	%F	M	F	%F	
Tenured staff	Position			Total			Total			Total			Total			Total
	Full prof	8	22	27	30	7	23	23	30	8	27	23	35	9	24	27
	Assistant prof	19	34	36	53	20	32	38	52	17	29	37	46	16	24	40
Non tenured staff	Associate prof	5	20	20	25	4	20	17	24	6	20	23	26	6	22	21
	Full prof	1	9	10	10	1	8	11	9	1	8	11	9	1	8	11
	Researcher 3*	5	2	71	7	4	1	80	5	3	3	50	6	4	6	40
	Researcher 4**	3	2	60	5	5	4	56	9	4	6	40	10	6	4	60
	Assistant prof	1	1	50	2	6	5	55	11	7	14	33	21	7	14	33
PHD candidate	18	23	44	41	24	22	52	46	27	23	54	50	31	22	58	
<b>Total</b>	<b>60</b>	<b>113</b>	<b>35</b>	<b>173</b>	<b>71</b>	<b>115</b>	<b>38</b>	<b>186</b>	<b>73</b>	<b>131</b>	<b>36</b>	<b>204</b>	<b>80</b>	<b>126</b>	<b>39</b>	

Note: Data on the 31<sup>st</sup> of December of each year

\* Postdoctoral researchers are indicated by the function Researcher 3 or 4

Table 6 shows that the number of newly entering women PhDs increased over the years and so did the number of PhDs obtained by women.

**Table 6: Number of exits among the IMAPP staff 2010-2013**

	2010		2011		2012		2013	
	M	F	M	F	M	F	M	F
N of exits of Full professors	1	0	2	0	0	0	0	1
N of exits of Associate professors	0	0	1	0	1	0	0	0
N of exits of Assistant professors	0	0	0	0	1	0	0	0
N of exits of Postdocs	3	1	2	1	5	2	5	1

**Table 7: Information on IMAPP PhD candidates 2010-2013**

	2010		2011		2012		2013	
	M	F	M	F	M	F	M	F
N of PhD candidates	17	4	24	7	26	8	34	9
N of newly entering PhD candidates	6	1	7	3	10	3	11	4
N of PhDs obtained	2	0	5	1	10	3	9	3

### 3.2 The IMR (SSH)

Overall, the percentage of women staff has been fluctuating between 34 and 45% over the time period 2010 – 2014 (see Table 5). The highest percentages of women staff can be found among the non-tenured Researcher 3 and Researcher 4 positions (postdoctoral positions), however the overall numbers of positions in Researcher 3 and 4 positions are low.

Of the tenured (permanent) staff, the percentage of women assistant professors is higher than the percentage of women associate and full professors. However, the percentage of women associate professors is lower than the percentage of women full professors. The percentages of women tenured staff have remained quite constant over the years. Of the non-tenured staff, the percentages of women have also remained constant, except for the temporary assistant professor position. Here the percentage of women has decreased in the recent years compared to 2010 and 2011.

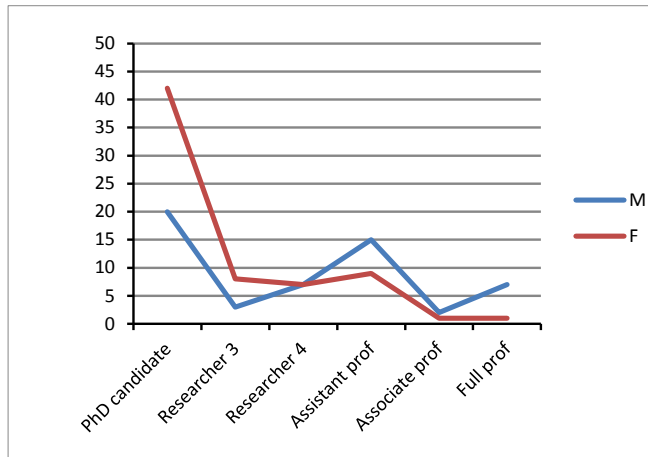
Looking at the numbers of men and women staff, the number of tenured assistant professors has decreased over the years, whereas the number of non-tenured assistant professors has increased. The numbers of tenured associate professors and full professors has remained quite constant.

The percentage of women PhD candidates has been fluctuating between 44 and 68% over the years, with the highest percentage in 2014. In 2014, the number of women PhD candidates was more than double the number of men PhD candidates. In five years' time, the number of women PhD candidates more than doubled whereas the number of men PhD candidates remained stable.

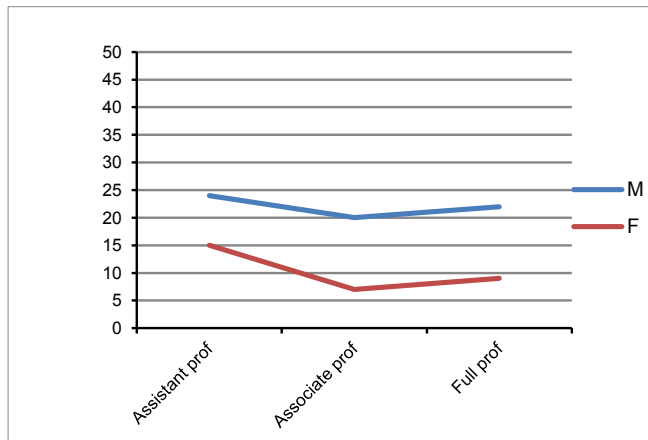
Figures 2, 3 and 4 show the pipeline of the academic staff in the IMR. These graphs show a leaky pipeline in 2014, as the number of women is higher than the number of men at the PhD and Researcher level (non-tenured positions), but from the assistant professor level onwards, the number of men exceeds the number of women.

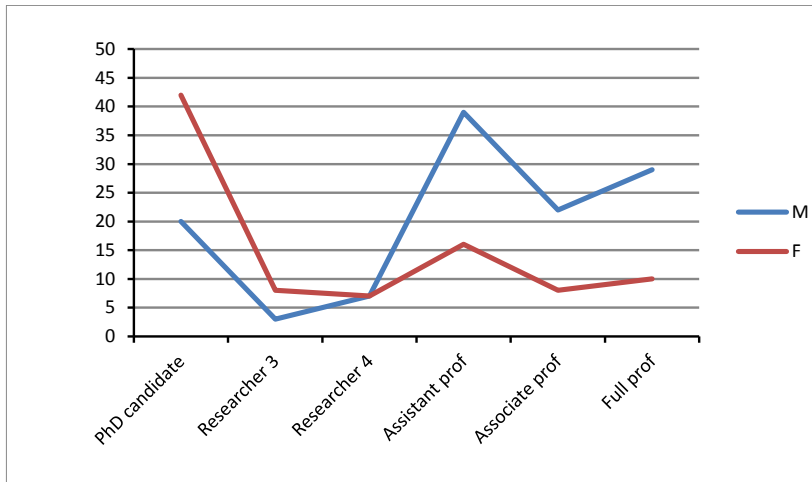


**Figure 2 – Number of non-tenured women and men IMR staff 2014**



**Figure 3 – Number of tenured women and men IMR staff in 2014**



**Figure 4 – Number of total women and men IMR staff in 2014**

Over the years 2010 – 2013, three women assistant professors and two women researchers have left the IMR (see Table 8), compared to four men assistant professors and three men researchers. Of the total number of ‘exits’, 42% was women. This is in accordance with the percentage of women assistant professors and researchers in this time period.

**Table 8: Number of exits among the IMR staff 2010-2013**

	2010		2011		2012		2013	
	M	F	M	F	M	F	M	F
N of exits of Assistant professors	0	1	0	0	2	2	2	0
N of exits of Researcher 3 and Researcher 4*	2	0	0	0	1	1	0	1

Note: Information on associate and full professors was not available

\* Postdoctoral researchers are indicated by the function Researcher 3 or 4

Over the years 2010 – 2013, more women than men entered a PhD position in the IMR (see Table 9). In 2011, 2013, and 2014 the number of newly entering women PhD candidates is more than double the number of men.

**Table 9: Information on IMR PhD candidates 2010-2013**

	2010		2011		2012		2013		2014	
	M	F	M	F	M	F	M	F	M	F
N of PhD candidates	23	18	22	24	23	27	22	31	20	42
N of newly entering PhD candidates	5	6	4	10	7	6	4	9	3	9
N of PhDs obtained	2	4	7	7	4	1	6	3	8	2

## 4. INTERPRETATIVE ANALYSIS

In this section we provide a short interpretative analysis of the different data on the leaky pipeline mapped in the previous sections.

### 4.1 National and organizational indicators on the Leaky Pipeline

Looking at the national figures, we can say that a leaky pipeline exists in Dutch academia: we learn that although women form a majority at the levels of bachelors and masters, from the level of PhD candidates onwards they gradually become a bigger minority, with the lowest point at the rank of full professor (grade A): the number of women PhD candidates in 2014 is 45% whereas the number of women full professors is 17%. However, we did see an increase over the years of women at the levels from assistant professors onwards, due to policies and practices to increase the numbers of female staff.

From the tables on the STEM and SSH fields we can conclude that in both fields the leaky pipeline exists. For the STEM field this starts from the transfer from PhD candidate to higher positions - a disproportionate number of women master students flow through to a PhD position, but then the number of women gradually decreases at each step. For the SSH field the leaky pipeline already starts at the transfer from master student to PhD candidate: a disproportionate number of men master students flow through to PhD positions, and this trend continues from there.

From the other studies on PhD holders in the Netherlands we learn that the number of women professors is among the lowest in Europe. We learn that the number of temporary contracts, among which postdocs are an important group, is increasing in the Netherlands. Gaining a Veni or Vidi grant is seen to be an important stimulant for researchers to gain higher positions. The yearly awarded amount of these prestigious personal grants are, however, very low, so obtaining such a grant is difficult and rare. If the obtainment of a Veni or Vidi is the norm for a career in academia, the pool of successful academics and potential candidates for tenured positions will be very small. The budget is a total of 150 million euros per year for the Veni, Vidi and Vici grants combined over all disciplines. In 2012, 38 of the 150 Veni grants were awarded in the social sciences field (25%). The emphasis on acquiring external funding is higher in the IMAPP than the IMR. Within the IMAPP there are more academics who received a Veni grant than in the IMR. Mobility is also an important factor for advancing as a researcher: remaining in one place, especially as postdoc, is disadvantageous for one's career as a researcher. This too, is more important in the IMAPP than the IMR.

The leaky pipeline is also present in the IMAPP and the IMR. Within the IMAPP, the percentage of women MSc students in Physics and Astronomy is similar to the percentage women PhD candidates. Within Mathematics, there is a big difference between the percentage of women students (27% in academic year 2014/2015, see Table 10 in the Appendix) and the percentage of women PhD candidates (8% in 2013 and 0% in 2014). Overall, in the year 2014 the percentage women at the PhD and postdoc level was the same in the IMAPP. The 'leak' seems to start between the postdoc and the assistant professor level, however it should be noted that when the data is divided by department, the leak starts at different moments in the different departments (e.g., already after the MSc programme). The number of academics on a temporary contract has increased over time. The total number of PhD candidates increased since 2011 and the number of postdocs sharply increased since 2012. The increase in the number of PhD candidates and postdocs is due to financial stimuli, as

the number of completed PhDs is part of the performance related financing of the Dutch government. The governmental budget for higher education in the Netherlands has been under pressure for years. PhD candidates, and postdocs to a lesser extent, are relatively cheap human resources, for the most part paid out of external funding.

The number of IMAPP staff on a permanent contract remained relatively stable. In 2011, the only woman assistant professor in the institute was hired, which increased the percentage of women assistant professors. Since then, only men assistant professors have been hired, so the percentage women assistant professors has decreased again over time. No women associate professors have been employed in the period 2010 – 2014. In 2012 and 2013 there were two women full professors in IMAPP, but since one of them left in 2013, the percentage of women full professors in 2014 (7%) was the lowest in the years 2010-2014, and lower than the national average of 11% in 2014. Similar to the national data in STEM and SSH, there are more full professors than associate professors in the IMAPP and the IMR.

Within the IMR, the percentage of women MSc students (see Table 11 in the Appendix) is lower than the percentage women PhD candidates, particularly in recent years. No information is available per department. The number of PhD candidates is much larger than the number of postdoctoral researchers. The number of assistant professors is also higher than the number of postdoctoral researchers, particularly for men. The higher number of assistant professors can be explained by the focus on teaching within the IMR (on average 60% teaching duties per individual). Within the IMAPP, the focus is more on research than teaching. The number of academics on a temporary contract in the IMR has increased over time. The total number of PhD candidates sharply increased since 2010 (particularly women PhD candidates) and the number of postdocs slightly increased since 2010. This is in contrast with the national numbers, but similar to the IMAPP. The increase in the number of PhD candidates can be partly explained by policy choices and financial stimuli. After a reorganization of the Business Administration department in 2009-2010 in which the tenured staff was reduced from 58 FTE in 2008 to 40 FTE in 2010<sup>23</sup>, more money became available for attracting PhD candidates. The faculty policy for internal PhD rounds is to finance the first three years of the PhD appointment. The fourth year has to be paid by the promoter him/herself.

Similar to the IMAPP, in the IMR we also see that the percentage of women assistant professors has decreased over time, but only the non-tenured assistant professors. The percentage of tenured women assistant professors remained constant, as did the number of associate and full professors on a permanent contract. Also similar to IMAPP and the national context, the percentage of women associate professors is lower than the percentage of women full professors. The percentage of women tenured staff in the IMR is higher than the national average in SSH (Economy and Business Administration only, see p. 5), particularly at the professor level if we look at the field of Economics and Business Administration (29% in IMR in 2014 versus 9% national in 2014).

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<sup>23</sup> [http://www.ru.nl/bedrijfskunde/actueel/laatste\\_nieuws/redactionele/reorganisatie/](http://www.ru.nl/bedrijfskunde/actueel/laatste_nieuws/redactionele/reorganisatie/)

## 4.2 Gender and welfare regimes

The conclusions from the D3.2 report on gender and welfare regimes summarizes the Dutch academic context very well:

Women's level of education has improved significantly over the years. In general, women nowadays are highly educated. More women than men have tertiary qualifications. At the highest level of education, only one third of all doctorate holders are women. However, when we consider the young generation, the number of women with a PhD is much higher. When we zoom in on the different fields of studies at the tertiary level, we find a persisting sex segregation. Particularly, the underrepresentation of women in Science – both in historical and cross-national perspective - is extreme. In the domain of employment, this same pattern of both horizontal and vertical segregation is reproduced. Women tend to work in particular sectors, and are underrepresented in top positions.

Currently, a high percentage of women in the Netherlands are participating on the labour market, yet most of them in part-time jobs. The Netherlands can be best characterized as a one-and-a-half-earner model: the most dominant working arrangement of (heterosexual) couples in the Netherlands is a situation in which the man has a full-time job, and the woman a part-time job. This situation is more often true when couples have children.

While part-time work is a key characteristic for the Dutch labour market, women with a university degree tend to work much more often in full-time jobs. The same goes for women working in the academic sector. Yet, female assistant and associate professors much less often than their male colleagues work in full-time positions. At the same time, the gender difference for full-time jobs is small at the level of full professorship.

Furthermore, the recent and sharp increase in temporary contracts in the academic sector in general particularly affects the job security of women as they more often than men work in temporary contracts. Academic staff who hold a PhD cannot get more than three consecutive temporary contracts. The total period of temporary employment cannot exceed six years (Collective labour agreement for Dutch Universities). As of 1 July 2015, a new law will be limiting this to four years. This has serious consequences for academics. The intention of the policy change was to reduce precarity, however within the current financial structure of universities, the measure will most likely increase precarity. One result of the change is that academics, also academics who attract external funding, might not be able to renew their contract in their current university when they reach the four years of employment.

The policies and practices around care and work-life issues remain rather traditional in the Dutch context. Child-birth affects women more than men. In 2013, 31% of women reduced their working hours after child-birth, a 4% decrease compared to 2011. Close to 60% of women kept working the same amount of hours after the birth of their first child (Merens, Van den Brakel, 2014). Compared to men, women are still primarily responsible for and spend more time on childcare and domestic work. Despite a culture of taking care of children in the family (by the mother), the use of formal childcare has increased rapidly.

Besides equal treatment laws, gender equality policy measures in the Netherlands are primarily soft policies. Emancipation policy continues to focus on women's labour market participation and women's economic independence. Measures taken often

intend to improve the representation of women. Politically, there is resistance to the more radical measure to improve the underrepresentation of women by compulsory quota and target figures are preferred. To conclude, measures mainly focus on increasing numbers, and less on more cultural and structural changes.

With regard to the academic sector, both the government and universities themselves have been actively introducing individual and structural measures to improve the situation of women. Unfortunately, there is a general lack of monitoring and evaluation of these policies and their effectiveness (van den Brink 2010). Research on the Dutch academic sector does show that measures are not fully applied everywhere, and success depends on committed initiators (van den Brink 2010).

### 4.3 Gender budgeting

A few findings from WP5 are relevant to the Leaky Pipeline report.

First, the strategic plan of the Radboud University speaks broadly of diversity and the intention to increase the (gender-based) diversity of full professors at the university. The diversity policy is mostly placed under the umbrella of HR, as the HR agenda is more elaborate on the diversity/gender policies of the universities. Both plans speak more of diversity in a broad sense – including also international diversity - than of gender equality. Target figures are set for the coming years regarding women and men full professors, as well as several measures to be taken (e.g., a tenure track system).

Second, a very small part of the budget of the university as a whole goes into the general diversity policy. The same goes for the institutes' budgeting processes: both institutes allocate a small part of the budget to gender-sensitive items such as a gender research group in IMR and measures to attract more women students in IMAPP.

Finally, regarding the conditions for an academic career we can conclude that the IMR is focused on the internal organisation of PhD candidates in a doctoral school. The IMAPP is more outward looking, as it has no central doctoral school but allocates PhD candidates to national discipline-related doctoral schools. The student-staff ratios show the different orientations of the two institutes, with the IMR being education-focused and the IMAPP being research-focused. This is also reflected in the number of fixed-term contracts, which is one-third in the IMR and about half in the IMAPP (going for a large part to postdocs).

### 4.4 Academic career paths and selection criteria

Within the IMR, it is not (yet) common to do a postdoc between the PhD and an assistant professorship. This is due to the high teaching load of staff within the department and to the lower amount of external funding that is available for and acquired by the IMR. Within the IMAPP it is a formal requirement for assistant professors to have some years of postdoc experience, also abroad. Committee members whom we interviewed, thought this to be important in order to acquire an international network and gain experience in a research environment outside one's home country. We expect that this criterion can have gendered consequences because it is argued that it can be harder for women to spend time abroad.

Interviews with committee members revealed that within the IMR international experience is preferred, but not required.

When comparing the selection criteria required as formulated by selection committee members in both institutes, we found that for both the IMAPP and the IMR the dominant criteria for assistant professors largely involve features as quality of research, publications, and teaching, and experience with applying for or obtaining research funding. Yet, in the IMR it is possible to be hired on an assistant professor position when candidates have recently or not yet defended their PhD. On the contrary, the IMAPP requires a finished PhD and a number of years of postdoc experience (also abroad). Thus, candidates for assistant professor positions at the IMAPP have to be more academically 'mature' compared to the IMR, in terms of research experience and academic age (number of years after PhD). Within the IMR, it is more so that the potential to become a successful assistant professor is assessed, whereas in the IMAPP the proven qualities of the candidates are important.

Also, selection committee members in the IMAPP stated that it is not common to climb the academic career ladder within the same institution. PhDs in the IMAPP have to leave the institute after their defense and the selection procedures between 2010 and 2013 showed that no internal candidates are hired on assistant professor positions. This is in contrast with IMR, where it is more common to hire internal candidates for postdoc and assistant professor positions. However, the limited number of postdocs that were interviewed in the IMR stated that they do not have the prospect of continued employment within the IMR. Postdoctoral researchers, in both institutes, are hired on temporary contracts or on personal grants, and work on research projects that are not necessarily at the core of the department. Most of the postdocs are hired from outside, and often they do not get the possibility to get teaching experience; a criterion that becomes important as an assistant professor. They are not embedded in the department. Therefore, postdoctoral positions are focused on a research project and not on a career path.

Within the IMAPP, most, if not all, of the women PhD candidates and postdoctoral researchers are foreigners. A research project in the Technical University Delft showed the same results and stated: "International women arrive from other universities abroad and disappear after a temporary stay in Delft" (Van Engen, Bleijenbergh, Vinkenburg, 2010). This is most likely the same in Nijmegen, causing early academic women to leave and never return to the Radboud University. When it is obliged to leave the organization after a period of time, this can have more negative implications for women than for men, as previous research showed that it is easier for women to get promoted within their own organization than outside (Baron, Davis-Blake, Bielby, 1986). If they have to apply outside their organization, informal contacts tend to play an important role, which has also gendered implications.

## 5. CONCLUSION

We see that in internationally comparison (OECD, EU), the Netherlands has one of the lowest numbers of women full professors. In both the STEM and the SSH field, on both the national and the organizational level, the leaky pipeline is present. The numbers and percentages of women on academic positions differ between the STEM and the SSH domain, on both the national and the organizational level, but the trend of decreasing numbers at every step in the pipeline is present everywhere. Yet, in both participating GARCIA departments in the Netherlands, the IMAPP and the IMR,

we see higher percentages of women full professors than women associate professors. The number of women full professors is higher than the national average in the IMR, but lower in the IMAPP.

In both the IMAPP and the IMR we found an increasing number of women non-tenured staff over the years 2010-2014, however no increase in the number of women tenured staff. This indicates an increasing leak in the pipeline at the assistant professor level in the IMAPP and IMR. In the IMAPP, the number of women staff leaving seems to be disproportionate, when compared to the number of women employed. This is not the case within the IMR.

Despite the similarity of the career ladder in the IMAPP and the IMR (PhD – postdoc – assistant prof – associate prof – full prof), the criteria for the positions differ, particularly at the early stages of the academic career. Earning a Veni or Vidi grant is a great stimulant for the career prospects of early career researchers within the Netherlands, however only attainable for very few academics. Within the IMAPP, getting a Veni or Vidi is almost a requirement to get hired or to get tenure, whereas in the IMR it is more of a bonus and more exceptional when a staff member receives such a grant.

In general, the Netherlands has the highest number of women working part-time, and a one-and-a-half earners model is prevalent. Care divisions between men and women are still conservative. However, the prevalence of part-time work does not apply to women in academia. Previous research in the University of Tilburg has shown that fathers and mothers in academia hardly differ in their contract hours (Van Engen et al., 2008), which was confirmed by a research project in Delft (Van Engen, Bleijenbergh, Vinkenburgh, 2010). In Delft, only at the assistant professor level women worked slightly fewer hours than men. The research project in Tilburg also showed that women academics have more often no children or fewer children than women outside academia. A pay gap exists between men and women with tertiary education.

#### RECOMMENDATIONS:

- Educate women and men PhD candidates about the gendered context of academia.
- Focus on hiring women PhD candidates, particularly in the IMAPP departments except Astrophysics.
- Loosen the criterion of international experience for IMAPP postdocs, and take into consideration that it can have gendered consequences, and that international networks and collaborations can be obtained in many different ways.
- Create postdoc positions that contain the possibility to do teaching. For example, a postdoc position that has funding for three years fulltime research can be extended to a four-year contract when the postdoctoral researcher has 25% teaching duties. The teaching time is paid for by the department (if the budget allows). This way the postdoc gets valuable experience in teaching and also has a longer secured position.



- Develop a talent follow up system to trail talented women PhD candidates and postdocs after they leave, and offer them a position after a number of years (also recommended in the Delft project).

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## 7. APPENDIX

**Table 10: Number of IMAPP MSc students 2009-2015**

Year	MSc programme	N of students	%Female
2009/2010	Mathematics	16	38%
	Physics and Astronomy	49	10%
2010/2011	Mathematics	25	20%
	Physics and Astronomy	41	15%
2011/2012	Mathematics	26	8%
	Physics and Astronomy	32	28%
2012/2013	Mathematics	37	30%
	Physics and Astronomy	59	24%
2013/2014	Mathematics	54	33%
	Physics and Astronomy	62	19%
2014/2015	Mathematics	62	27%
	Physics and Astronomy	79	25%

**Table 11: Number of IMR BSc and MSc students 2010-2014**

	2010/2011			2011/2012			2012/2013			2013/2014		
	M	F	%F	M	F	%F	M	F	%F	M	F	%F
N of students BSc	1227	605	33	1323	682	34	1192	671	36	1331	717	35
N of students MSc	476	439	48	501	410	45	561	441	44	604	402	40