Executive Summary

Thanks to a persistent political commitment and considerable government investments into the public and private R&D sector, Luxembourg has the opportunity to welcome a growing number of talented researchers with rich and varied profiles. Yet, Luxembourg currently suffers from a stark lack of female scientists and engineers, particularly in senior positions. The present document provides a snapshot of key issues that might limit their number and a set of recommended actions that, if taken, could improve the gender balance not just in this sector – now and in the future. These are the result from discussions held during the WISE colloquium in February 2017, which brought together 100 scientists, engineers, influencers and decision makers from the Luxembourg public and private research sector and beyond for 3 thematic panels. The WISE Colloquium was the concluding event of the WISE Women exhibition (Women in Science and Engineering in Luxembourg), which featured a selection of portraits of female researchers and engineers active in the science and technology sector in Luxembourg. Both events were an initiative of the “Commission consultative de l’égalité entre femmes et hommes” of the Ville de Luxembourg (VDL) and organised in collaboration with the Fonds National de la Recherche (FNR) and the Fondation Jeunes Scientifiques Luxembourg (FJSL).

The main conclusions of the colloquium were:

1) Scientists with children need extra flexibility and support to combine their professional duties with those of a young parent, and maternity with mobility

2) Science and society are still too far apart and need to be brought together to inspire everyone. Young girls need more than just male role models. Both science communicators and researchers need to play an active role in inspiring future generations of scientists that are more gender balanced

3) We need a cultural change in the Luxembourg society. Parents, teachers, employers, we all need to change our attitude towards the roles of both genders in general to provide an inclusive and fair work environment for all. We need to work towards a knowledge society that makes women and girls feel more at home in science.
Background: Statistics and Challenges

The stats: Only 24% of all researchers employed in Luxembourg are women, which is significantly below the EU average (33%). The situation is worse for Grade A positions (Full Professors) and the business enterprise sector, where only 16% and 11% are women respectively, putting Luxembourg at the bottom of the class in Europe.

In high school, the situation appears more balanced at least in the Lycées Classiques: the distribution of girls and boys who choose to specialize in science and technology subjects in 2015/16 was almost at a par. At closer inspection however, girls have a strong preference for biology and natural sciences (Section C) over mathematics (Section B). In the Lycées Techniques, the situation is different: in 2015/16, only 13% and 28% of girls were registered in science and technology specialisations in the "régime technique" and "technicien" respectively.

The Challenge: How can one explain these figures? And how to improve the situation for female researchers and engineers in Luxembourg?

To address these issues, the VDL together with the FJSL and the FNR organized a colloquium on 13 February 2017 where researchers and engineers discussed their experiences and identified major issues and solutions along with specialists and the audience in the following three separate panels. The list of panel participants can be found in Annex 1.

WiSE Women Exhibition - 20 Jan to 11 Feb 2017

WiSE Colloquium - 13 Feb 2017

More info:
http://www.science.lu/de/content/exhibition-colloquium-wise-women-women-science-and-engineering-luxembourg
Any woman wanting to combine career with family faces challenges. However, for female researchers - particularly in academia - the time to have children often coincides with the most productive and decisive time in her career. Researchers are continuously judged on their performance, be it for promotions, to receive competitive third-party funding, or a permanent position. In addition, the researcher’s career usually requires a high degree of mobility. Whether it is working in a different country for at least a year or frequent travel to international conferences and meetings, this is often difficult to organise with young children in tow, and a partner who also works full-time.

1) How to combine maternity and mobility?

"Science is very competitive, it does not forgive absence." (Elisabeth Schaffner-Reckinger, Research Associate at University of Luxembourg, mother of three children)

"The five-year-rule for limited contracts is a real problem for scientists, especially with third-party funding. Maternal and parental leave should really not count towards these five years." (Joëlle Fritz, Post-doc at University of Luxembourg, mother of a 1.5-year-old child)

"We would like to have a second child, but are scared of the logistics involved." (Carolina, Post-doc at University of Luxembourg, mother of a 3-year-old child)

"There is still a ‘just-look-after-your-kids’ attitude in Luxembourg." (Member of the audience, Professor at the University of Luxembourg and mother of two)

"Men play a big role. Their support is very important and counts a lot. The more men take time off, the more it becomes something normal.” (Member of the audience, industry employee and mother of two)
In general, girls have more successful school careers than boys. However, in a large majority of OECD countries, among high-performing students, girls do worse than boys in mathematics and science. Girls also generally have less self-confidence than boys in their ability to solve mathematics or science problems. In the PISA report 2012, Luxembourg was among the countries that displayed the highest gender disparities in mathematics and natural sciences. In some of the top-performing countries and economies in PISA, girls perform on a par with their male counterparts in these subjects as well as in reading ability. These results strongly suggest that gender gaps in school performance are not determined by innate differences in ability. What can Luxembourg do to engage more girls in STEM (science, technology, engineering and mathematics)?

2) How to inspire young girls for scientific careers?

In general, girls have more successful school careers than boys. However, in a large majority of OECD countries, among high-performing students, girls do worse than boys in mathematics and science. Girls also generally have less self-confidence than boys in their ability to solve mathematics or science problems. In the PISA report 2012, Luxembourg was among the countries that displayed the highest gender disparities in mathematics and natural sciences. In some of the top-performing countries and economies in PISA, girls perform on a par with their male counterparts in these subjects as well as in reading ability. These results strongly suggest that gender gaps in school performance are not determined by innate differences in ability. What can Luxembourg do to engage more girls in STEM (science, technology, engineering and mathematics)?

What people said:

“Bring science and research closer to society by making it part of the culture.” (Joseph Rodesch alias "Mr Science", Science Communicator at FNR)

“What is the use of maths? Showing how what we learn applies to the real world creates more passion.” (High school student on the panel)

“Informal science education in museums etc. plays a big role. Create an inclusive learning environment.” (Susana Filipecki, ECSITE)

“Not frame it as if it is girls aspiring to a higher level of a male domain. It is about making it normal. Also inspire boys for careers that still today do not seem ‘worthy’ for boys.” (Member of the audience)

“Role models are very important, especially teachers. And we need a Mrs Science.” (Member of the audience)
3) Creating an inclusive work environment for all

Change is happening: today, more and more women enter the workplace, whether it is out of necessity to live a decent life or out of interest for a particular job. Yet, stereotypes still persist and women often have to fight for positions, recognition and salaries in comparison to their male colleagues. Academia in particular is still a rather conservative place. But there is hope, because we have seen change in other domains, e.g. medical doctors and judges. On the other hand, some companies have come up with social innovations that are focused on individual talent and diversity. How can we create an inclusive work environment in the science and technology sector? What does “inclusive” mean?

What people said:

“To change the work environment, change society.” (Anik Raskin, CNFL)

“Start from the top, have leaders who understand gender diversity.” (Clara Moraru, entrepreneur and politician)

“Industry should promote team work, which women are good at. If you promote teams, you almost automatically value everyone.” (Annette Lechtenboehmer, Goodyear)

“It is important to think about education, research-based education. To get children involved in learning, we have to start this even at pre-school level.” (Tonie van Dam, University of Luxembourg)

“We should also think about how we assess people, reflect on how we can organise science differently, making it less focussed on the leader and more on teamwork.” (Marc Schiltz, FNR)
Women in Science and Engineering in Luxembourg - How can we do better?

**Key Recommendations**

What follows are key recommendations for actions to be designed by all concerned decision-makers (research administrators, politicians, administrative heads and gender delegates at Research Performing Organisations).

1. **Offer more flexibility to researchers with children**
   
   This could be achieved e.g. by institutionalising home office, providing flexible day-care facilities that are integrated in the workplace (with extended opening hours and the option to drop off children for a couple of hours only), and adapting teaching/meeting schedules around those of parents who need to drop off/pick up children at/from school at specific times (e.g. no teaching at 8 AM, meetings/events at lunch time rather than at 4 PM/evenings). Researchers on maternity/paternity leave could be offered assistance to perform experiments or other research-related tasks. Organisers and funders of international scientific conferences should also think about offering childcare and covering costs related to travelling to conferences with children.

2. **Promote gender balance in parental leave throughout society**
   
   The current mainstream in Luxembourg is still that women take time off work to look after small children. Men should be given a framework where it is acceptable to take equal time off, allowing more women to continue their career as much as possible. Could the government introduce mandatory paternity leave?

3. **Develop and promote role models**
   
   Girls and women need strong role models and especially strong female role models. To stimulate interest and confidence in science and research, we first of all need to bring science and research closer to society by making it part of our culture and talk a lot about it. We need to show the diversity in science (i.e. different thematic domains, careers paths, men and women) and make it clearer what a job in science entails. We need to talk about science in a non-rational way, e.g. show its practical implications and the emotions it can trigger. Education is another important tool and teachers play a big role here: they need to encourage and foster self-confidence. And even at a later stage, in their early career, numerous women have reported the necessity and benefits of coaching or mentoring schemes – which again should involve role models.

4. **Start early (in pre-school)**
   
   Opportunities that nurture curiosity and inquiry are really essential to form a scientific mind, and this needs to start at the level of pre-school. We need to raise awareness about this among teachers, educators and parents. A lot of parents do not realise that an inquisitive mind starts to be formed in the first three to four first years. Out-of-school activities also play a really important role and should be further implemented and promoted. The same applies to gender stereotypes: children copy the way the parents behave at home and how things are shared in society. We need a more diverse and scientific environment from very early on. This starts with toys — if girls are interested in traditional “boys” toys, parents should encourage it and vice-versa. Girls in science, or even better: girls and boys in science need to become a normal thing.

5. **Create a gender-sensitive work environment**
   
   Creating a gender-sensitive work environment requires a cultural change that needs to start at the top. Decision makers, the government and employers need to mediate that change by including more women in boards, politics and at all levels of decision-making. They should publish their gender statistics and implement measures such as mentoring or award schemes that support and highlight positive role models. In addition, they should think about innovating their career progression structures; very often, these are based on the male life cycle, which may however be very different to that of women.

6. **Promote and valorise team work**
   
   Experimental evidence points to an important role for gender diversity in science teams. Mixed teams have been shown to be more effective in problem-solving; women tend to recognise the expertise of fellow team members better than men; and gender-balanced teams address research questions from different perspectives, thus broadening the viewpoint. Additional research has shown that women are also more likely to enter competition when able to participate as a team. Hence, we should promote and valorise teamwork, not individuals. Care must be taken to create an inclusive environment that promotes team work involving both genders.
**Conclusion: A Great Opportunity for Luxembourg**

Over the past 15 years, public investments into Luxembourg’s public and private Research and Development sector have increased ten-fold. In addition, the country has a generous parental leave scheme. Hence, Luxembourg is in a privileged position to become a leader in the promotion of gender balance in the research and engineering sector. To achieve this, it is necessary to implement innovative and forward-thinking solutions, starting at a young age and with a strong focus on role models and inclusive education models. Luxembourg should not miss this opportunity to grow a gender balanced knowledge society that includes ALL the available talent.

**References**

1. She Figures 2015- Gender in Research and Innovation. European Commission
2. The ABC of Gender Quality in Education - Aptitude, Behaviour, Confidence. OECD

Author and editor: Michele Weber (FNR)
Photos and Image Credit: Emily Iversen (FNR) and Ville de Luxembourg
Annex 1 - WiSE Colloquium: How can Luxembourg do better?

Closing event of an exhibition featuring portraits of a selection of 12 women currently employed in science and engineering in Luxembourg. The portraits were adapted from articles and videos previously published on science.lu, Luxembourg’s website for science and research.

The colloquium took place at the Tramschapp in Luxembourg-City with around 100 participants, including panellists. The audience consisted of a mix of scientists from academia and industry, science communicators and influencers and decision makers from politics and research administration.

Programme

19h00 Introductory speech by Cathy Fayot, présidente de la commission consultative de l’égalité entre femmes et hommes de la Ville de Luxembourg.

19h05 Overview of statistics and the research landscape in Luxembourg by Ulrike Kohl, Head of Unit Talent Attraction and Capacity Building at Fonds National de la Recherche

19h15 Panel 1: Maternity and mobility

Panelists:
- Carolina Nikaedo, Research associate at ECCS Research Unit (University of Luxembourg)
- Elisabeth Schaffner-Reckinger, Research scientist at Life Sciences Research Unit (University of Luxembourg)
- Joëlle Fritz, Research Associate at Luxembourg Centre for Systems Biomedicine (University of Luxembourg)

Moderator: Michele Weber, Science Communicator at FNR

19h45 Panel 2: how to inspire young girls to embrace scientific careers?

Panelists:
- Suzana Filipecki, Hypathia Project
- Cristina Florean, Researcher at Laboratoire de Biologie Moléculaire et Cellulaire du Cancer in Luxembourg
- Madalena Oliveira, Ana Pereira, Mariana Rodrigues, Young Scientists
- Joseph Rodesch alias “Mr Science”, Science Communicator at FNR

Moderator: Marie Deneux, Director of Fondation Jeunes Scientifiques Luxembourg

20h15 Panel 3: how to create a more female-friendly work environment?

Panelists:
- Anik Raskin, Director Conseil National des Femmes Luxembourg
- Tonie van Dam, Vice-President and Gender Delegate of the University of Luxembourg
- Clara Moraru, Entrepreneur, Languages.lu, Inspiring Wo-Men, Leadership Academy
- Marc Schiltz, Secretary General Fonds National de la Recherche
- Annette Lechtenboehmer, Research Engineer, Goodyear

Moderator: Michele Weber, Science Communicator FNR

20h45 Summary of the evening by Marie Deneux, Director of FJSL

20h50 Networking cocktail
For each panel, a board was put in place where colloquium participants (panellists and members of the audience) could leave comments in the form of post-it notes. Below are all the notes:

**Notes from participants: How to combine maternity & mobility?**

"Help women to create scientific network by financing conferences & events with other colleagues that they choose. Bring the network to them!"

"If you want to promote mobility, parental leave should be a possibility even if you just started your position."

"Introduce reintegration grants at the FNR (e.g. Postdoc)"

"Women are pushed to adapt more to the family/work reality. Make men adapt as well! Compulsory paternal leave."

"You could ask students to conduct your experiments while you breastfeed etc.?"

"Men & women at work should help each other with it via gender equality."

"Flexible daycare during stays abroad."

"'Corporate' or 'work' culture needs to shift."

"Introduce re-integration grants"

"Inspiring young researchers with more peer-to-peer training and fun learning"

"With support from 'work place' will make it possible"

"Daycare on campus"

"Maternity leave should not be considered as a hole in the CV. It needs to be valorised."

"Possibility of doing home office"

"I want my son to see women in positions of power and leadership. FNR, uni.lu need to promote this."

"Why does the school day finish half way through the working day?"

"Promote partnerships"

**Notes from participants: How to inspire young girls?**

"If you want to inspire girls/boys to pursue a scientific career, you also have to inform their first role models - their parents - about career choices"

"Only 2% of our streets are named after famous women, and among this percentage only half are scientific. We should push the government to change that, show the public - our subconscious - that women have always been present in the scientific fields."

"Mrs. Science?"

"We need a female science leader to engage the young. No stereotypes."

"Information! Information about school-level events, competitions, etc. as well as Uni-level, such as science communication contests, and so on. Don't speak just to the few initiated, put it in front of the general public."

"School evolution. Teach science since kindergarten. We are surrounded by science, so it can be taught every year of schoolhood. Teach the way of asking question. Teach any job (scientific, nurse, cleaning, economics, philosophy etc.) Any job is unisex. We are all people/persons with capabilities and qualities to learn and work in any field we like. There is no gender job or gender roles. Society is responsible for a development without gender concerns. Birth and raising future generations of persons is everybody's responsibility."

"Start at primary school! Make compulsory training for professors at school on unconscious bias and 'microdiscrimination', girls/boys."

"Start with the school but even earlier at home. Share role models. Seminars. Job fairs with science talks."

"Kindergarten should be gender neutral, teaching science"

**Notes from participants: How to create an inclusive work environment?**

"Educate leaders and those aspiring what gender discrimination is and how to discourage it"

"Paternity leave obligatory? In Oslo, this is done and it works fine"

"Having a company policy & culture of equality for men and women"

"Anonymous' applications, no gender, no name, the competences are the most important"

"Create posts for women. Only with concrete targets and quotas will it happen"

"Having policies in place protecting women's job position upon returning to work from maternity"

"Good research does not equal 100% working time"

"Impact factor is about influence, not about trustworthiness. Change the values, measurement of science that has 'added value', impact"

"Question the paradigm of 'most productive career steps' between 25-35 yrs (for men & women)"

"Love the 50%/50% position idea. Does not mean 50% of working time/contract but 2x 100%. More flexibility? Two heads always function better than one"
Women in Science and Engineering in Luxembourg - How can we do better?

Annex 3 - WiSE Women Exhibition (Women in Science and Engineering in Luxembourg)

Portraits of scientists and engineers from the WiSE exhibition:

Prof. Conchita d’Ambrosio, Professor of Economics and FNR PEARL Chair at the University of Luxembourg
Prof. Mahulena Hofmann, SES Chair in Satellite Communications and Media Law at the University of Luxembourg
Dr. Patrice Caire, Research Associate in Artificial Intelligence at the University of Luxembourg
Dr. Anna Heintz-Buschart, Research Associate in Microbiology at the University of Luxembourg
Dr. Conny Mathay, Research Scientist in Biology at IBBL (Integrated BioBank of Luxembourg)
Dr. Simone Niclou, Head of oncology research unit at Luxembourg Institute of Health (LIH)
Prof. Ines Thiele, Associate Professor in Systems Biomedicine at University of Luxembourg
Julie Distel, Mechanics Engineer at IEE
Sandra Domagala, Product Specialist at DuPont
Dr. Nathalie Valle, Material Scientists at Luxembourg Institute of Science and Technology (LIST)
Prof. Pascale Engel de Abreu, Associate Professor in multilingual cognitive development at the University of Luxembourg
Prof. Claudine Kirsch, Associate Professor in Linguistics and Educational Sciences at University of Luxembourg

Download the brochure summarising the exhibition and the WiSE Women’s portraits by clicking here.

More info and links to portraits:
http://www.science.lu/de/content/exhibition-colloquium-wise-women-women-science-and-engineering-luxembourg