

Ann KIEFER

Curriculum Vitae

CONTACT INFORMATION

INSTITUTION: University of Luxembourg
FACULTY: Faculty of Humanities, Education and Social Sciences
DEPARTMENT: Luxembourg Centre for Educational Testing
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ACADEMIC POSITIONS

JAN. 2021 - AUG. 2025	Postdoctoral Researcher , University of Luxembourg LUCET (Luxembourg Centre for Educational Testing) Position: STEM Expert
SEP. 2020 - JAN. 2021	Maternity Leave
OCT. 2019 - AUG. 2020	Postdoctoral Researcher , Vrije Universiteit Brussel Algebra Research Group (Prof. Eric Jespers) Position: Wetenschappelijk medewerker VUB
FEB. 2018 - SEP. 2019	Postdoctoral Research Fellow , Vrije Universiteit Brussel Algebra Research Group (Prof. Eric Jespers) Fellowship: Fonds voor Wetenschappelijk Onderzoek (FWO)
NOV. 2017 - JAN. 2018	Maternity Leave
OCT. 2017	Postdoctoral Research Fellow, Vrije Universiteit Brussel Algebra Research Group (Prof. Eric Jespers) Fellowship: Fonds voor Wetenschappelijk Onderzoek (FWO)
APR. 2016 - SEP. 2017	Postdoctoral Researcher , Universität Bielefeld Research Group of Prof. Christopher Voll Position: Wissenschaftliche Mitarbeiterin (FWO on pause)
JAN. 2015 - MAR. 2016	Postdoctoral Researcher , Universität Bielefeld Research Group of Prof. Christopher Voll Fellowship: Fonds voor Wetenschappelijk Onderzoek (FWO)
OCT. 2014 - DEC. 2014	Postdoctoral Researcher , Université Fribourg Research Group of Prof. Ruth Kellerhals Fellowship: Fonds voor Wetenschappelijk Onderzoek (FWO)
2010-2014	Ph.D. student in Mathematics, Vrije Universiteit Brussel Title: <i>Units in integral group rings via fundamental domains and hyperbolic geometry</i> Advisor: Prof. Eric Jespers Co-advisor: Prof. Ángel del Río Grant: Fonds voor Wetenschappelijk Onderzoek (FWO)

EDUCATION

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| 2010-2014 | Doctor in Sciences - Mathematics
Vrije Universiteit Brussel, Brussels |
| 2008-2010 | Master in Mathematical Sciences,
Université Libre de Bruxelles, Brussels
Grade: summa cum laude
Thesis: <i>Polyhedra Associated to Symmetric and Alternating Groups</i>
Advisor: Prof. Dimitri Leemans |
| 2005-2008 | Bachelor in Mathematical Sciences,
Université Libre de Bruxelles, Brussels
Grade: summa cum laude |
| 1998-2005 | High school diploma,
Lycée Classique Diekirch, Diekirch, Luxembourg
Grade: Très Bien |

TEACHER CERTIFICATION

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| 2018-2019 | Master in Secondary Education - Mathematics
Université Libre de Bruxelles, Brussels
Grade: magna cum laude |
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GRANTS AND EXTERNAL RESEARCH FUNDINGS

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| 2015 | GRANT FOR A LONG STAY ABROAD (FWO)
Allowance of some supplementary 6600 euros for a stay abroad |
| 2014 | FONDS VOOR WETENSCHAPPELIJK ONDERZOEK (FWO)
3 year Postdoctoral Research Fellowship, 2014-2017 |
| 2010 | FONDS VOOR WETENSCHAPPELIJK ONDERZOEK (FWO)
4 year Doctoral Research Fellowship, 2010-2014 |
| 2010 | FONDS NATIONAL DE LA RECHERCHE SCIENTIFIQUE (FNRS)
Doctoral Research Fellowship (declined in favor of FWO-grant) |

HONOURS AND AWARDS

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| 2022 | WINNER OF THE SCIENCE SLAM GÖTTINGEN |
| 2021 | WINNER OF THE LUXEMBOURG SCIENCE SLAM |
| 2020 | WINNER OF THE TRIER SCIENCE SLAM |
| 2008 | RUTH AND JOE GANI PRIZE IN PROBABILITY
Award for the best student in the Probability and Statistic Classes
of the Bachelor degree at the Université Libre de Bruxelles |
| 2006 | PRIX FLEURICE MERCIER
Award for best overall student of the Faculty of Science of the
Université Libre de Bruxelles |

RESEARCH INTERESTS AND CURRENT PROJECTS

My research has focussed on pure mathematics for 10 years. As I have always been interested in mathematics education, two years ago I switched to STEM education. I am interested in methods that improve teaching and learning in STEM domains. In particular, I am interested in how to awaken curiosity for STEM domains in children and young adults and get them passionate about it. Sciences and mathematics are often, from a very young age on, taught as dogmatic and right-or-wrong subjects, whereas they are exactly the contrary. In my projects I aim at changing this and give impetus for different teaching methods.

PITT - Programme for Innovative Teaching and Training

With an interdisciplinary team of teachers and researchers from the fields of didactics, educational science, psychology, sociology, mathematics and German studies, we provide practical examples that give innovative impulses for contemporary teaching in Luxembourg's secondary schools. The PITT teaching modules are intended as incentives to try out new things and to think differently and digitally about teaching.

It is not about presenting something ready-made and self-contained. Rather, the teaching modules are suggestions and proposals for discussion. We are pursuing a cooperative approach where the teachers' feedback is particularly important.

Each year, PITT focuses on a different school subject. During the last two years, we have developed modules for the Digital Sciences course. Now we are working on modules for the mathematics course in the second year of Luxembourgish high school. This is a joint project with Dr. I. Baumann, S. Baumann, Dr. D. Harion and Dr. T. Lenz, www.pitt.lu.

Statistical Literacy

In this project, we are interested in how to familiarize high school pupils with basic statistics at a very young age. The goal is not to develop a statistics class, but rather to link basic statistical concepts to real life examples that are interesting to young people. By basic statistical concepts, we mean reading and interpreting diagrams and graphs, understanding correlation, causality and bias. We are interested in seeing in how far pupils can get a feeling and understanding for these notions when discovering them not in a typical math course, but encountering them while trying to understand some real life example. This is a joint project with Prof. C. Ley and Dr. K. Mai Huy.

Mathematical Story Telling

This project is an interdisciplinary project between the French class and the math class. Together with Dr. M. Lhuissier, we have written two beginnings of a story, in French language. Pupils can choose one story and have to complete it, by inventing and writing down an ending to the story. Every story contains a plot-twist involving a mathematical reasoning. To continue the story, pupils are forced to do some minimal calculations and come to terms with the mathematical theory. We are interested in seeing how the mathematical reasoning can be stimulated when linked to story telling. Moreover it is interesting to see if some pupil's interest for mathematics will be reflected in the way he or she completes the story.

PUBLICATIONS

Published or Accepted

- [1] A. Bächle, A. Kiefer, S. Maheshwary, and Á. del Río. Gruenberg-Kegel graphs: cut groups, rational groups and the Prime Graph Question. *Accepted in Forum Mathematicum*, 2022. [arXiv:2112.08188\[math.GR\]](#).
- [2] A. Bächle, G. Janssens, E. Jespers, A. Kiefer, and D. Temmerman. A dichotomy for integral group rings via higher modular groups as amalgamated products. *Journal of Algebra*, 604:185–223, 2022. [arXiv:1811.12226\[math.GR\]](#).
- [3] A. Bächle, G. Janssens, E. Jespers, A. Kiefer, and D. Temmerman. Abelianization and fixed point properties of units in integral group rings. *Mathematische Nachrichten*, 2022. [arXiv:1811.12184\[math.GR\]](#).
- [4] A. Kiefer. On units in orders in 2-by-2 matrices over quaternion algebras with rational center. *Groups Geom. Dyn.*, 14(1):213–242, 2020.
- [5] E. Jespers, S. O. Juriaans, A. Kiefer, A. de A. e Silva, and A. C. Souza Filho. Dirichlet-Ford domains and double Dirichlet domains. *Bull. Belg. Math. Soc. Simon Stevin*, 23(3):465–479, 2016.
- [6] E. Jespers, A. Kiefer, and Á. del Río. Presentations of groups acting discontinuously on direct products of hyperbolic spaces. *Math. Comp.*, 85(301):2515–2552, 2016.
- [7] E. Jespers, A. Kiefer, and Á. del Río. Revisiting Poincaré’s Theorem on presentations of discontinuous groups via fundamental polyhedra. *Expo. Math.*, 33(4):401–430, 2015.
- [8] F. Eisele, A. Kiefer, and I. Van Gelder. Describing units of integral group rings up to commensurability. *J. Pure Appl. Algebra*, 219(7):2901–2916, 2015.
- [9] E. Jespers, S. O. Juriaans, A. Kiefer, A. de A. e Silva, and A. C. Souza Filho. From the Poincaré theorem to generators of the unit group of integral group rings of finite groups. *Math. Comp.*, 84(293):1489–1520, 2015.
- [10] A. Kiefer and D. Leemans. On pairs of commuting involutions in $\text{Sym}(n)$ and $\text{Alt}(n)$. *Comm. Algebra*, 41(12):4408–4418, 2013.
- [11] A. Kiefer and D. Leemans. On the number of abstract regular polytopes whose automorphism group is a Suzuki simple group $\text{Sz}(q)$. *J. Combin. Theory Ser. A*, 117(8):1248–1257, 2010.

E-prints

- [12] D. Harion and A. Kiefer. Involution - Didaktischer Kommentar. <https://pitt.lu/module/involution/1-1-die-algorithmen-bfs-und-dijkstra/>, 2022.
- [13] D. Harion and A. Kiefer. Data Viz Superpowers - Didaktischer Kommentar. <https://pitt.lu/module/data-viz-superpowers/3-1-didaktischer-kommentar/>, 2022.
- [14] S. Baumann, D. Harion, and A. Kiefer. Discover Life on Mars with a Rover - Didaktischer Kommentar. <https://pitt.lu/module/discover-life-on-mars-with-a-rover/4-1-didaktischer-kommentar/>, 2022.
- [15] I. Baumann, D. Harion, and A. Kiefer. Pupils vs Machine - Indication didactique. <https://pitt.lu/fr/module/pupils-vs-machine/5-1-indication-didactique/>, 2022.

Outreach articles

- * P. Igodt and A. Kiefer. Sophie Germain een onvoldoende bekende pionier. *Vector 6 - Tijdschrift voor wiskundeonderwijs*, September 2019.
- * A. Kiefer. Le théorème de Fermat vu par M. Le Blanc (Fermat's Theorem seen by M. Le Blanc). *Brussels Summer School of Mathematics, Notes de la cinquième BSSM*, pages 51–65, 2012.

GIVEN TALKS AND POSTER PRESENTATIONS

Selected Talks given at international conferences

- **Invited Speaker**, Groups and Rings Talking: Conference in Honor of Ángel del Río's 60th Birthday, Murcia, Spain; June 2020
- *Generators for discrete subgroups of 2-by-2 matrices over rational quaternion algebras*, Conference Groups St Andrews, Birmingham, United Kingdom; August 2017
- *Generators for discrete subgroups of 2-by-2 matrices over rational quaternion algebras*, **Invited speaker**, Journées de Géométrie Hyperbolique, Fribourg, Suisse; Mars 2017
- *Units in Integral Group Rings via Fundamental Domains and Hyperbolic Geometry*, **Invited speaker**, Second joint Conference of the Belgian, Royal Spanish and Luxembourg Mathematical Societies, Logroño, Spain, June 2016
- *Generators for discrete subgroups of 2-by-2 matrices over rational quaternion algebras*, Conference Groups and their Actions, Bedlewo, Poland; June 2015
- *A Presentation for a Group Acting Discontinuously on a Direct Product of Copies of Hyperbolic Spaces*, Conference Brock International Conference on Groups, Rings and Group Rings, St. Catharines, Canada; July 2014
- *Generators and Relations for a discrete subgroup of $SL_2(\mathbb{C}) \times SL_2(\mathbb{C})$* , Conference Groups St Andrews, St Andrews, United Kingdom; August 2013
- *Units in integral group rings and hyperbolic geometry*, Forum des jeunes mathématiciennes, Institut Henri Poincaré, Paris, France; Novembre 2012
- *Generators and Relations for a discrete subgroup of $SL_2(\mathbb{C}) \times SL_2(\mathbb{C})$* , Conference Groups, Rings and Group Rings 2012, Universidade de São Paulo, Ubatuba, Brazil; July 2012
- *Poincaré Bisectors and Application to Units*, Conference Groups, Rings, and Group-Rings, University of Alberta, Edmonton, Canada; July 2011

Colloquium Talks

- *Fermat's Last Theorem viewed by Monsieur Le Blanc*, SFB Kolloquium Regensburg, Germany; Decembre 2015

Poster Presentations

- *Discontinuous actions of unit groups of orders in rational group rings $\mathbb{Q}G$* , Conference Locally Compact Groups Beyond Lie Theory, Université Catholique de Louvain-La-Neuve, Spa, Belgium; April 2013

STUDENT SUPERVISION

2023	Co-Supervision (with Antonella Perucca) of a Master Thesis University of Luxembourg
2023	Co-Supervision (with Hugo Parlier) of a Master Thesis University of Luxembourg
2022	Co-Supervision (with Hugo Parlier) of a Master Thesis University of Luxembourg
2021	Co-Supervision (with Antonella Perucca) of a Master Thesis University of Luxembourg
2015	Supervision of a Bachelor Thesis Universität Bielefeld
2019	Supervision of a Bachelor Thesis Vrije Universiteit Brussel

TEACHING EXPERIENCE

Lecturer for the following Courses

L'IMPORTANCE DES DIFFÉRENTS LANGAGES EN MATHÉMATIQUES	Master in Secondary Education - Mathematics Université du Luxembourg 2022, 2023
INLEIDING GROEPENTHEORIE	Introduction to Group Theory, 1st year Bachelor in Mathematics Vrije Universiteit Brussel 2019
ELEMENTARE ZAHLENTHEORIE	Elementary Number Theory, Bachelor in Mathematics Universität Bielefeld 2017

Organizer of the following Student Seminars

SEMINARIE ACTUELE WETENSCHAPPEN EN ZAMENLEVING	Seminar where Mathematicians speak about their Job 1st year Bachelor in Mathematics, VUB 2019-2020
PROSEMINAR COXETER GRUPPEN	Introduction to Coxeter Groups 2nd year Bachelor in Mathematics, Bielefeld 2015

Teaching Assistant at Université du Luxembourg for the following Courses

COMMUTATIVE ALGEBRA	Didactical Exercise Sessions for future Teachers Master in Secondary Education - Mathematics 2021, 2022
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Teaching Assistant at Universität Bielefeld for the following Courses

ANWENDUNGEN DER MATHEMATIK	Applications of Mathematics, Master Primary School Teachers 2016
ALGEBRAISCHE ZAHLENTHEORIE	Algebraic Number Theory, Master in Mathematics 2016
ANALYSIS 2	Analysis 1st year Bachelor in Mathematics 2016
ALGEBRA 1	Introduction to Group Theory 2nd year Bachelor in Mathematics 2015
GRAPH THEORY II	Follow up on basic Graph Theory Master in Mathematics 2015

Teaching Assistant at Vrije Universiteit Brussel for the following Courses

DIFFERENTIAALMEETKUNDE	Differential Geometry 2nd year Bachelor in Mathematics/Physics 2018, 2019
DIGITALE WISKUNDE	Digital Mathematics 2nd/3rd year Bachelor in Mathematics/Informatics 2018
INLEIDING GROEPENTHEORIE	Introduction to Group Theory 1st year Bachelor in Mathematics 2018, 2014, 2013, 2012, 2011
KANSTHEORIE	Probability Theory 2nd year Bachelor in Mathematics 2013
LINEAIRE ALGEBRA	Linear Algebra 1st year Bachelor in Biology and Geography 2013
RING- EN MODUULTHEORIE	Ring and Module Theory 2nd year Bachelor in Mathematics 2012, 2011, 2010

Assistant of Teaching Assistant at Université Libre de Bruxelles for the following Course

ALGÈBRE LINÉAIRE		Linear Algebra, 1st year Bachelor in Physics 2009
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Student Support Sessions in Mathematics at Université Libre de Bruxelles

GUIDANCES EN MATHÉMATIQUES		Support in Mathematics, 1st Bachelor all students of the Faculty of Science 2008, 2009
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Tutoring Courses in Mathematics for High School Students

COURS DE RATTRAPAGE		Tutoring courses in mathematics for high school students organized by Lycée Classique Diekirch classes of 5 to 10 students 2 weeks in Septembre from 2004 to 2009
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STEM OUTREACH ACTIVITIES

Festivals and Expositions

RESEARCHER'S DAY 2022	<i>ReCreate</i> ((with H. Parlier and B. Teheux) FNR Luxembourg Novembre 2022
YEP SCHOULFOIRE 2022	<i>Math: joue, pense, découvre!</i> (with B. Teheux) SCRIPT & WorldSkills Luxembourg May 2022
2020 DUBAI EXPO	<i>ReCreate, ReShape, ReTrace</i> Mathematics Exposition (with H. Parlier and B. Teheux) February 2022
SCIENCE FESTIVAL 2021	<i>The Simplicity of Complexity</i> (with Hugo Parlier and Bruno Teheux) FNR Luxembourg Novembre 2021
CRÉATIVITÉ ET SCIENCES	Participant at a round table about the making of a creative workshop in math or science class <i>I Love Science</i> Festival Brussels Octobre 2021
MATHS JAM SESSION	Co-organization of the evening program of the large audience conference <i>The Beautiful Impact of Mathematics in Society</i> Vrije Universiteit Brussel Septembre 2016

Performances

SCIENCE SLAM GÖTTINGEN	First Price Universität Göttingen Octobre 2022
LUXEMBOURG'S SCIENCE SLAM	First Price LuxDoc and DESCOM https://www.youtube.com/watch?time_continue=279&v=00cszH7ozYQ&feature=emb_title Octobre 2021
TRIER SCIENCE SLAM	First Price Kultur Raum Trier e.V. January 2020
BRIGHT CLUB	During Bright Club, scientists are transformed into stand-up performers and deliver a comedy set around their life and work as a researcher Wtnschap.be and Vrije Universiteit Brussel https://www.youtube.com/watch?time_continue=2&v=HpcEsVI8ccc March 2019

Miscellaneous

MANNEKEN PISTHAGORAS/ PEETHAGORAS/PISTHAGORE	Together with a team of researchers and a cloth designer we created a mathematical suit for Brussels' famous Manneken Pis Vrije Universiteit Brussel article in French March 2019
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STEM Projects with High Schools

RACONTE-MOI LES MATHS	Pupils between the ages of 15 and 17 work on a chosen mathematical theory related to their school program. The goal is to produce a short movie about their topic. In cooperation with Nighthawks Production ASBL financed by Innoviris, Région de Bruxelles-Capitale and Fédération Wallonie-Bruxelles. https://nighthawksproductions.be/2020/08/19/raconte-moi-les-maths/ 2019-2022
MATH.EN.JEANS	Organizer of the MeJ Congress 2024 at the University of Luxembourg Plenary Speaker at the MeJ Congress 2022 Supervision of the MeJ-group of the Lycée Classique Diekirch 2021-22 Speaker at the Journée MeJ at the University of Luxembourg 2021 In charge of the first Flemish pupils participating, 2019
ANN KIEFER - MATHÉMATICIENNE PORTRAITS FILMÉS DE FEMMES SCIENTIFIQUES	Short movies about female scientists Produced by high school pupils https://vimeo.com/channels/1450903 February 2019
WISKUNNEND WISKE	Math Contest for high schools https://www.vub.be/nl/studeren-aan-de-vub/iedereen-welkom-aan-de-vub/wiskunnend-wiske Vrije Universiteit Brussel 2011, 2012, 2013, 2014, 2018, 2019

Workshops and Activities for High Schools

PI-DAY FOOT, CHIPS ET MATH	Fun Math Talks soft introduction to hyperbolic geometry Université de Liège March 2023
COLLOQUIUM DE NOËL LGE FOOT, CHIPS ET MATH	Fun Math Talk for high school pupils soft introduction to hyperbolic geometry Lycée des Garçons Esch Decembre 2022
GEM (GIRLS EXPLORING MATH)	Exchanges with girls about being a mathematician https://math.uni.lu/outreach/gem/ May 2022
DE GEHEIME GESCHIEDENIS: WISKUNDE EN CODETHEORIE	Workshop on the mathematics behind Coding Theory given to Dutch-speaking pupils of Belgian high schools 2012, 2013
DE DONKERE MATERIE VAN DE GETALLENAS	Workshop on number sets and constructible numbers given to Dutch-speaking pupils of Belgian high schools 2011, 2012, 2013
PRINTEMPS DES SCIENCES	Scientific Exposition organized by ULB Student Support for one group of participating students 2012
MATHS LUDIQUES: LES ORIGAMIS	Workshop on the link between origamis and mathematics given to French-speaking pupils of Belgian high schools 2008, 2009, 2010

STEAM Activities for Primary school children

REGARDS DE GÉOMÈTRE - PUZZLE	Activity around Mathematics and Art for children aged 6 to 8 (French Cycle 2) École primaire de Guentrange March 2022
KINDERUNIVERSITEIT	Activity around mathematics and football for children aged 10 to 12 Vrije Universiteit Brussel May 2019

Outreach Talks given to students

- *Einheiten in ganzzahligen Gruppenringen mithilfe von hyperbolischer Geometrie* (Units in Integral Group Rings with the Help of Hyperbolic Geometry), Upstream Perspective, Universität Heidelberg, Decembre 2016

- *Die Jagd nach Primzahlzwillingen und warum 2 und 70.000.000 ganz nah beieinander sind* (Chasing Twin Primes and why 2 and 70.000.000 are very close to each other), Weil Frauen Naturwissen schaffen, Zentrum für interdisziplinäre Forschung in Bielefeld, March 2016
- *Fermats letzter Satz aus der Sicht von Monsieur Le Blanc* (Fermat's Theorem and Monsieur Le Blanc), Netzwerktreffen Young Women in the CRC 701, Universität Bielefeld, June 2015
- *Les Maths et le Foot* (Mathematics and Football), Mathematikon, Université de Fribourg, Novembre 2014
- *De stelling van Fermat en Monsieur Le Blanc* (Fermat's Theorem and Monsieur Le Blanc), Seminarie Actuele Wetenschappen en Samenleving, Vrije Universiteit Brussel, Decembre 2012
- *Le Théorème de Fermat vu par M. Le Blanc* (Fermat's Theorem and Monsieur Le Blanc), Brussels Summer School of Mathematics, Université Libre de Bruxelles, August 2012

ORGANISATIONAL TASKS

MEMBER OF THE DIGRA CONFERENCE COMMITTEE	Conference Education@Play Digital Games Research Association & University of Luxembourg July 2026
ORGANIZER OF THE FLORENCE NIGHTINGALE CONFERENCE	Conference organized in collaboration with ANIL (Association nationale des infirmières et infirmiers du Luxembourg) University of Luxembourg June 2023
MEMBER OF THE COUNCIL OF THE MATH DEPARTMENT	Representing the postdoctoral researchers Vrije Universiteit Brussel 2019-2020
LOCAL ORGANIZER OF THE CONFERENCE "GROUPS, RINGS AND ASSOCIATED STRUCTURES"	International Algebra Conference Spa, Belgium June 2019
ORGANIZER OF THE ARXIV-SEMINAR	Vrije Universiteit Brussel 2018 - 2020
LOCAL ORGANIZER OF THE CONFERENCE "GROUPS, RINGS AND THE YANG-BAXTER EQUATION"	International Algebra Conference Spa, Belgium June 2017
LOCAL ORGANIZER OF THE CONFERENCE 'HE BEAUTIFUL IMPACT OF MATHEMATICS IN SOCIETY"	National Conference aimed at teachers and general public Vrije Universiteit Brussel 2016-2019
YOUNG WOMEN IN THE CRC 701	Initiative organizing meetings aimed at female students to come in contact with female researchers and exchange experiences 2015-2017

RESEARCH STAYS

UNIVERSITÉ DE FRIBOURG		Fribourg, Switzerland Research Group of Prof. Ruth Kellerhals October 2014 - December 2014
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UNIVERSIDAD DE MURCIA		Murcia, Spain Several research stays of 3 weeks Research Group of Prof. Ángel del Río 2012 - 2014, 2021
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LANGUAGES

MOTHER TONGUE:	Luxembourgish
FLUENT:	French, German, English, Dutch
GOOD:	Spanish