

Application for Minerva Award by Radboud Women of Computing Science *

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1 Introduction

The Institute of Computing Science (iCIS) at the Radboud University grew consistently in numbers of students as well as employees over the last years. Together with that growth, it managed to increase the percentage of female students and employees. The percentage of women who enrolled in the bachelor studies of Computer Science (CS) increased from 2% in the academic year 2013-2014 to 16% in 2017-2018 (see Fig. 1). Due to the small percentage of women studying or pursuing a career in CS,

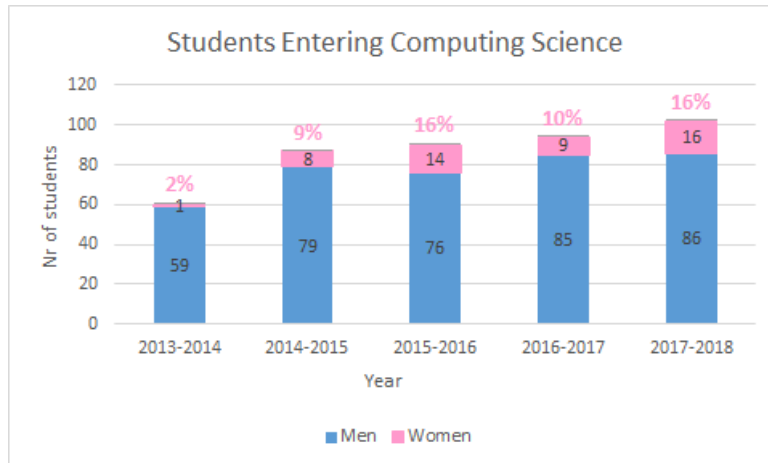


Figure 1: Numbers of students entering the Computing Science Bachelor program at Radboud University over the last five years, separated by female (pink) and male (blue) students.

Radboud Women of Computing Science (RWoCS) was founded in 2014. The group started out with the aim to create a network for female students and employees to encourage and motivate them to remain in CS and play an active role therein. Monthly events are organized that facilitate students and employees to socialize with their female peers and to openly discuss issues arising from working and studying in a male dominated field. Dependent on the focus of the event, it is either open uniquely to women, or to all.

One year after being founded, RWoCS also got actively involved in recruiting female students to study CS. RWoCS actively engages in campus-wide outreach activities to promote CS. The last year, RWoCS developed an outreach program to introduce CS at high schools by providing tools, teaching material and staff support.

*can be considered as a runner up (if it does not win the award) and be included as an exemplar of best practice in future Informatics Europe publications.

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This application elaborates on the above mentioned activities, while providing proof of their relevance and impact by showing results of surveys and quotes from participants of our activities. Section 2 explains the RWoCS outreach activities in detail. Following, Section 3 elaborates on RWoCS events for networking and building awareness. Finally, Section 4 concludes with future plans. Additionally attached are three letters of support.

2 Recruiting - Outreach activities on and off campus

We first explain the RWoCS outreach program, which we developed to motivate young girls to study CS. Additionally, we lay out our activities in the campus-wide initiatives to promote CS to (female) high school pupils.

2.1 Outreach Program

In the Netherlands, CS is only offered at some high schools, due to the lack of CS teachers. And even when it is offered, it is an elective, only offered to pupils aged 16-18.

Therefore, RWoCS offers an outreach program that aims at motivating more high school girls to study in the field of CS. To achieve this, the program offers introductory classes to pupils aged 12-18 to different fields of CS. The program demonstrates to both male and female pupils that the CS degree is accessible to people of any gender, as the classes are given by female student assistants.

To implement the RWoCS outreach program, we first developed ready-to-use teaching packages. These packages contain all the required material for giving a class on CS, e.g. a set of slides, a number of assignments, and background information. The packages are made in such a way that student assistants with a background in CS, can be sent to high schools, without much preparation needed. We arrange those classes by actively promoting our program to high school teachers.

This program has been running for a year now, including the development of the teaching packages. We developed four packages, on two subjects, namely ‘Programming’ and ‘Security’, and for two age levels, namely 12-15 years, and 16-18 years. All packages can easily be adapted to available time and whether computers are at hand. The packages were developed from online sources, as well as from a teaching program developed by one of our RWoCS members [9].

To promote our outreach program, we have a separate section on our website [2]. Furthermore, we published an article in the news letter from the Pre-University College of Radboud University, which is sent out to a large number of Dutch high school teachers.

So far, we have given five classes on three schools, and we are scheduling another one before the summer break. We will actively promote our classes again before the start of next academic year.

The classes we have taught were successful. We had the chance to teach to groups of pupils that were equally mixed in gender. Both the teachers from high school and the student assistants were very positive about the whole experience. Additionally, the pupils participated enthusiastically. This is further confirmed by the positive evaluation forms that were filled in after class, see Figure 2.

“ For me, the RWoCS outreach program is an outlet where I am able to act on my intentions of making computer science programs more appealing for young girls and overcoming the prejudices that exist because it currently is a field predominated by males. ”

B.Sc. Tanja Crijns, student assistant for the RWoCS outreach program

2.2 Girls Day

RWoCS annually organizes and teaches the Computer Science program during the country-wide Girls Day [3] which is hosted by the Faculty of Science at the Radboud University [4]. For those interactive classes, we first used the software GameMaker, that allows to quickly build 2D games. The last two years, we used our own developed class, based on two small exercises from the program developed by one of our RWoCS members [9].

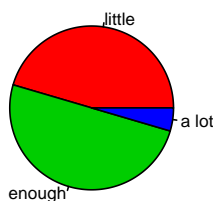
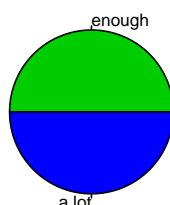
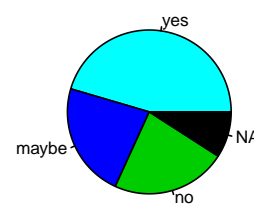
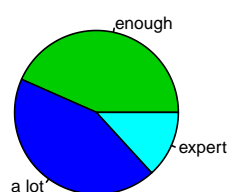
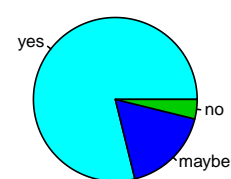
Knowledge about CS before class**Knowledge about CS after class****Would you study CS****Knowledge about CS before class****Knowledge about CS after class****Would you study CS**

Figure 2: Evaluation of outreach program of two classes - classes depicted per row. Pupils were asked about their knowledge about CS before (left) and after (center) the class. They were further asked, whether, after having taken the class, they would consider studying CS (right).

2.3 NLT - Dutch initiative to attract more pupils study in sciences

Further, we are actively involved in the Dutch high school course NLT (=Natuur, Leven en Technologie) [5], which can be translated literally to Nature, Life and Technology. It is intended for high school pupils at the age of 16-17 years. The course was introduced in 2007 country-wide to motivate pupils to choose for higher education in science. This course consists of different modules about biology, chemistry, math, physics and software science. At Radboud University, the robotics module Lego MindStorms is taught. Whilst no experience with programming was required, the explicit goal of this course was to teach students basic programming skills, and also to motivate them to be creative.

“ At the start of the course, many of the female students assumed that programming would be hard, but in the end, most enjoyed it and produced very good results. This module was successful in introducing programming in a non-intimidating way. ”

B.Sc. Emma Gerritse, Student Assistant at NLT program, 2016-2018

3 Supporting - Building a Network and Raise Awareness

To support our female students and staff, we organize regular events with different focus and target audience. Additionally, we hand out stipends to attend this year’s Ada Lovelace festival, a conference intended for connecting women in computing and technology.

3.1 Events - Women only, Mixed, Faculty- or Campus-Wide

RWoCS invites female staff and students on a regular basis to meet and discuss. Informal meetings to socialize are organized as well as more formal meetings with the aim to discuss a given topic, such as the imposter syndrome or time management. While the more informal meetings are exclusively for female staff and students, with the aim to discuss and exchange on daily issues, the more formal

events are usually opened to all staff and students. At the most recent event all staff and students were invited to watch the documentary 'CODE - debugging the gender gap', followed by a discussion afterwards on the reasons and possible counter-activities for the lack of women in CS.

Furthermore, we regularly co-organize lunch lectures with the student association from iCIS, Thalia. The most recent lecture was given by dr. Inge Bleijenbergh about the gender gap. We asked her as she does research on Gender and Diversity Management.

Additionally, RWoCS organizes several lunch-lectures and workshops together with the Halkes network, the campus-wide network for female staff. Some examples are the lunch-lecture on the Women's Day, as well as the recent #metoo workshop. Those events lead to summaries that are, as in case of the #metoo event, presented to the executive board of the university, together with suggestions on how to further improve the work environment on campus.

“ On April 24 2018 I attended the event ‘#MeToo in Academia: How does it feel and how to fight it?’ which was brought to my attention via an invitation sent by Radboud Women of Computing Sciences. (Fortunately) the invitation explicitly welcomed men (which did not prevent me from being the only male in the meeting). There were two major reasons why I signed up. First, I think that academia must be a safe environment for everybody to exchange ideas and knowledge, regardless of gender, religion, or cultural background. Second, as coordinator of the bachelor program of computing science at the Radboud university, I think all of our students must feel welcome and appreciated, so it is important to be able to recognize signals that point in the opposite direction and know how to fight it. The keynote speech by em. prof. Toine Lagro-Janssen was very interesting and made it very clear that sexual harassment exists and should not be neglected. In the workshop we exchanged ideas in a small group of five persons, which helped to get a clearer picture how people experience these kind of situations and how you can act on it and also how hard that is. Unfortunately, I could not attend the closing discussion. Nevertheless, it was a valuable experience.”

Dr. Peter Achten, iCIS, participant at campus-wide #metoo event, 2018

3.2 Travel Fellowship for Ada Lovelace Festival

As an addition to the regular events, we also had the opportunity to hand out four stipends to female students or staff for this year's Ada Lovelace Festival [6]. This event provides brand new tech insights, inspiring talks, valuable hands-on workshops and a unique networking base for the community of women in tech. Female students and staff applied for the stipend by handing in a motivation letter. We expect the attendees to share their experiences with the RWoCS network.

4 Future plans

We work hard on increasing the percentage of female students in CS to 30% in the next three years. Therefore we will actively pursue and extend the activities explained in this application. The RWoCS outreach program will play a crucial role in recruiting new female students to study CS. To pro-actively shape the admission from the university's side, we continue to actively contribute to the university's initiatives to attract more girls into sciences, such as the Girls day and the NLT course. But we also participate further in adapting the admission processes.

To extend our networking activities and inspire students as well as employees, we plan on inviting female professionals from outside the university to shed light on their individual careers in academia or industry.

Additionally, we will actively support the course 'Open Math', which is set up by dr. Greg Alpar, who is awarded with the Comenius Teacher Fellowship [7] to introduce that course to the Radboud University. The course intends to mitigate some of the issues as discussed in [8]. The main pillars of 'Open Math' are (1) demonstrating positive messages about mathematics and individual potential;

(2) developing mathematical sense making by low-entry, high-ceiling problems and by great online resources; (3) establishing an encouraging atmosphere for effective teamwork.

References

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