

## 2018 Minerva Informatics Equality Award

### Nominated Department - contact details

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### Brief Summary

**The Computer Science Department from Babeş-Bolyai University dedicates significant effort to both enroll and retain female members. In order to enroll female students various strategies are used, their impact being that the ratio female/male (F/M) increased from approximately 0.5 for Bachelor students to 0.77 for Master's students. For retaining female students in the department, their transition to academic positions is supported through maternal leave, team building events with family members, promotions to senior positions and existing female role models. The impact of these strategies is that in the last ten years the department "flourish" female professors and female leaders.**

## 1. Description of the initiative

### 1.1. Enroll female students (admission level, Master's level, PhD level)

Within the Faculty of Mathematics and Computer Science, the current F:M ratio of the enrolled students through the admission system is around 1:2, which is a good ratio for an informatics-oriented faculty. Our goal to encourage women to pursue a career in Computer Science is twofold: firstly, we aim to increase the number of female students in our faculty and to retain as many students as possible for the Master's and PhD programmes, and secondly to encourage them to become employees of our department, being involved in research and teaching activities. In order to attain these goals, it is important to establish a recruitment strategy starting early in the educational trajectory (even from high school).

In this respect, our faculty organizes four important events: the Mate-Info UBB Contest as a pre-admission system [1], the UBB Caravan [2], counseling teaching classes [3] organized during the entire academic year at the end of the week, and "Saptamana Scoala Altfel" [4]. These are addressed to the 12th grade students who aim to enroll to our faculty.

**The Mate-Info UBB Contest** has been organized since 2013. It is preceded by a **package of lectures** organized by our teaching staff. Having these teaching classes, students from the 12th grade have the opportunity to interact with the teaching personnel of our faculty and to understand what is being expected from them. It is worth mentioning that within the last years more female teachers are preparing these special lectures (i.e. from 9 males-5 females in 2015 to 6 males - 10 females in 2017) [3]. One of the impact that we observed since these classes are organized is that students are more comfortable within the first year of the Bachelor's degree. The number of female students taking part in these classes is higher than the number of the male students. Although this activity is not entirely dedicated to female students, it has been noticed that the number of female students enrolled at our faculty in the first year has considerably increased even since these events are being organized, from 312 - the average number of female students five years before this event, to 458 - the average number of female students five years later. This may be linked to the fact that females need to be more informed than males in order to make a decision and it is in their nature to be more hesitant with the unknown.

**The UBB Caravan** is a project implemented by representative students of our University (HERMES [5]), whose purpose is to inform high school students from all over the country about the educational programme offered by the Babes-Bolyai University. This event also influences the number of female students enrolled in our educational programs. The goal of this activity is not entirely that of promoting our faculty, but it is also meant to raise the quality of the candidates. We always cared that the group of representative students includes girls, because it is important to share the experience of female students in our faculty to prospective candidates.

Another important event organized by our faculty is "**Săptămâna Școala Altfel**" [4] (Non-formal Education Week). During this event the high school students have the opportunity to visit our faculty, to participate in classes and even to have organized discussions with the faculty members. In the last 5 years, these presentations were made by our female colleagues, who seem to be more considerative with visitors' questions, and encourage both boys and girls to pursue a career in IT.

The companies understand the importance of investing in research and also that students are educated for doing research. Moreover, the companies are aware of the fact that students that undertake Master's and PhD programmes are better prepared, demonstrating an increased level of knowledge that responds to their real needs. In this context, the faculty, with the support of the local IT industry, offers various awards and fellowships to motivate students to continue their studies with Master's and PhD programmes.

Awards are materialized by the organization of the "**Graduation Day**" event where the best theses for Bachelor's and Master's Degree are publicly presented to local IT industry representatives. In this context, the participating students have the opportunity to be awarded by the software companies.

Industrial Fellowships are given in two contexts: the Master's Programme and the PhD Programme. Regarding the Master's Programme, there are two types of fellowships: research oriented and thesis oriented. For the PhD Programme, the fellowships come mainly to support the research around the PhD thesis.

Computer Science Department also brings its own contribution to support the students in doing research. In this respect, the Master's curricula has been modified to offer the context for doing research by allocating the necessary time, thus the last semester is dedicated entirely to the research project and thesis. Therefore, both the university and the IT companies provide support for the students in preparing their graduation theses.

All the above-mentioned events organized throughout the three levels of study (Bachelor's degree, Master's degree, and PhD) encourage female students to start an academic career in our department. The impact of all these events is described in Section 2.1 by analyzing the data expressed in terms of numbers of female students before and after these events were organized. The following section presents the strategies implemented to retain females to pursue an academic career.

## 1.2. Retain female students

Various strategies are used in order to retain female students for undergraduate to Master's and from Master's to PhD [10]. These strategies are stated in the previous section. The strategies implemented in order to get female PhD students pursue an academic career in computer science are described next:

- **Maternal leave and return to work.** Following an informal discussion with female members of the department regarding the maternal leave, they felt that the faculty, in full respect of the national regulation, offered support according to their personal needs. Thus, when they decided to return to work, they have been offered the opportunity to progressively return to their academic activities. This ensured a work-life balance for these women. Also, the University agreed with a flexible teaching timetable that was in harmony with the needs of the mother and the baby. Moreover, the female members felt solidarity from their female colleagues regarding support with child care related issues, sharing their own maternal experience.
- **Team building.** Several events and activities are being annually organized with the aim of improving the communication and building trust relations among the faculty members. Among these events, one of the most important is the team building event organized at the end of every academic year. At this event the members of the faculty bring their families, thus making it easier for mothers with young children to reintegrate in the work community.
- **Role models.** Having female role models clearly visible in our department with an important career record track and also family life, constitute a premise for young women to pursue a successful trajectory in their academic career.
- **Achieving a male/female balance at work.** One of the Computer Science Department concerns is to maintain a male/female balance. In this context, women are encouraged to enroll in academic positions, especially taking into consideration their specific skills. Women's native analytical competencies, together with their goal-driven attitude and soft skills, contribute to the balance within our professional community. The goal is to achieve collaboration and teamwork as fundamental principles in our department. All these arguments motivate the necessity for diversity in any professional environment.
- **Support females to leadership positions.** We have several females in leadership positions that we are proud of: the Head of the Computer Science Department from our faculty is a female (the two candidates for the last departmental elections were women), two vice deans of our faculty are females, the Head of the Mathematics and Computer Science Doctoral School at the UBB is a female from our department, females representatives in the Department Council, Faculty Council, Senate representatives.
- **Support females to gain managerial skills:** always involve female members of the department in organizing events: Graduation Day [7], Internship Workshop, Computer Science Students Conference [8]. Several females in our department are participating in interviews and local community events, conferences, local TV to convey the message that computer science domain is appropriate for male students as much as for female students.

As a result of these retain strategies implemented by our department, it is worth mentioning that some of the women students that were enrolled at our faculty and later pursued a PhD in collaboration with foreign universities, decided to return and be employed [11] in our department: professors (Laura Diosan and Anca Andreica), associate professors (Sanda Avram and Camelia Chira), and lecturers (Sabina Surdu, Ioana Ciuciu and Diana Troanca).

## 2. Evidence of impact of the initiative

The results of our actions to enroll and retain female students and employees are next presented in separate sections, to better emphasize the transformations in our department.

### 2.1. Enroll female students

The strategies implemented for enrolling as many female students as possible at our faculty were presented in Section 1.1. To attain this goal, three levels of study were targeted: Bachelor, Master's and PhD. Figures 2.1.1, 2.1.2, 2.1.3, 2.1.4 contain the results obtained by analyzing the data from admission regarding these three levels of study.

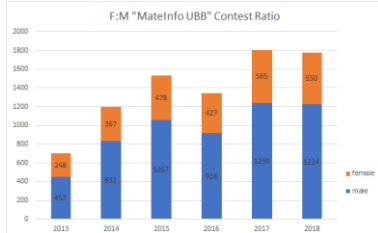


Fig. 2.1.1 Mate-Info UBB Contest 2013-2018

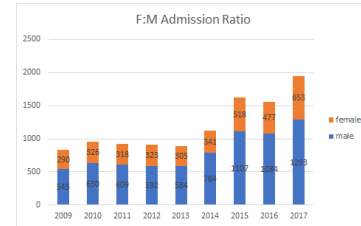


Fig 2.1.2. Students enrolled in the first year 2009-2017

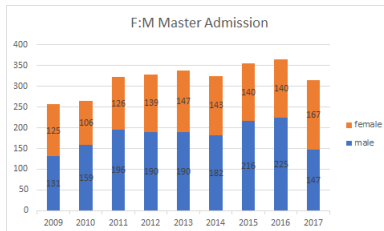


Fig. 2.1.3 Master's students enrolled 2009-2017

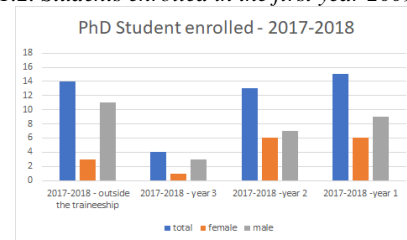


Fig. 2.1.4. PhD students enrolled 2017-2018

Analyzing the data from Figure 2.1.2, it has been noticed that *the number of female students enrolled at our faculty* has considerably increased since the “Mate-Info UBB” contest is being organized, from 305 to 653. Regarding the F:M ratio, there were minor up and down fluctuations in the  $[0, 0.1]$  range, but the average of this ratio is 0.5 which is similar with that F:M ratio before the contest was organized. A better situation is encountered at the Master's admission, where the number of female students has increased from 125 (in 2009) to 167 (in 2017) and the ratio F:M has an average of 0.77 (Figure 2.1.3). However, in the last two years, the ratio F:M increased to 0.87 (since the “Mate-Info UBB” contest was organized). For the PhD level there is an increased number of female students in the last five years (Figure 2.1.4), but more relevant is the fact that the vast majority of the female students who finished their PhD studies became employees of our department.

Having all the above mentioned into account, we can draw the following two conclusions:

1. The number of female students in the studied period of time has constantly increased;
2. The ratio F:M from Bachelor's Degree to Master's Degree has been increased from 0.5 to 0.7.

Some other important aspects need to be mentioned here:

- Female students from our faculty have an important role in start-up companies or important multinational technical companies [6], [13];
- There are students from our faculty that had continued their studies abroad at the Master's and PhD level, but after finishing their studies they came back as employees of our department (Avram Sanda, Ioana Ciuciu, Camelia Chira);
- Several female colleagues from our department have PhD studies in joint coordination (Ioana Ciuciu, Laura Diosan, Sabina Surdu, Avram Sanda, Troanca Diana, Adela Rus).

### 2.2. Retain female employees

In this section we present the results of the used strategies aiming to retain female students from PhD students to academic positions. We will present various analyses, emphasizing the biggest changes and improvements in our department.

#### • Analysis of new academic positions

The number of academic positions held by females and males has undergone some changes:

- From 2007 to 2017 the number of positions held by females has increased, as stated in Figure 2.2.1;
- Between 2015 and 2018, an increase of the number of new female academic staff can be noticed (Figure 2.2.2);

- The difference between male and female numbers has diminished, the department being now more balanced.

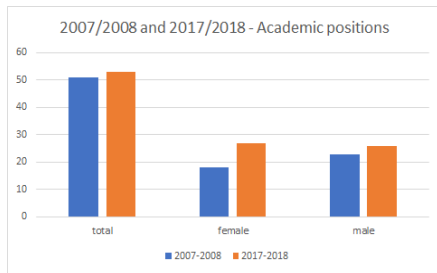


Fig. 2.2.1. Academic positions in 2007/2008 and 2017/2018

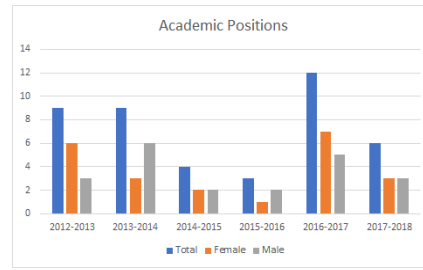


Fig. 2.2.2 New academic positions (obtained by females/males) between 2012-2018

- **Evolution of various types of academic positions in 2007/2008 and 2017/2018**

The number and type of academic positions held by females and males has undergone some changes:

- From the analysis presented in Figure 2.2.3 the following conclusions could be drawn:
  - The number of “professor” academic positions for females increased from 2007 to 2017 from 0 to 3, and it decreased for males (due to multiple retirees);
  - The number of “associate professor” academic positions increased more for females than males;
  - The number of “lecturer” academic positions increased around the same value;
  - The number of “assistant professor” academic positions decreased for both female and male side.
- From the analysis presented in Figure 2.2.4. we can conclude that:
  - Within the last years, more professor academic positions were obtained by females;
  - For the “associate professor” position there was an apogee for males in 2015-2016, but the number of females grew constantly over the years
  - The lecturer positions were obtained continuously and uniformly by both males and females.

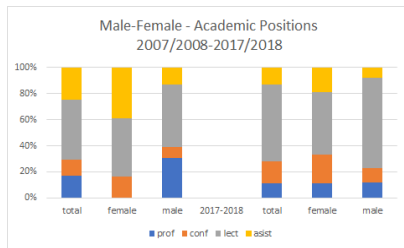


Fig. 2.2.3. Male/Female New Academic positions in 2007/2008 and 2017/2018

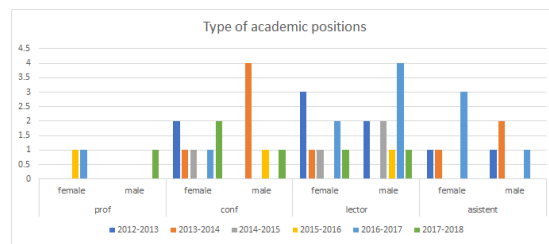


Fig. 2.2.4 New Academic positions types (promotion) 2012-2018

The impact of the increased number of female members was felt both by students and on the activities of the Computer Science Department: good female coordinators, multi-thread behavior of the female members, hardworking and carefully finishing all the assigned tasks in time and with a high-quality delivery.

- **PhD enrollment admissions, PhD defenses and future positions in the Department**

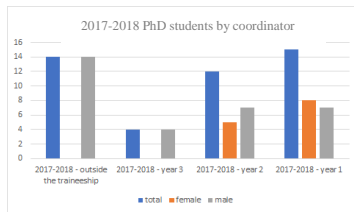


Fig. 2.2.5. Number of PhD students in different stages of their PhD studies, coordinated by females/males

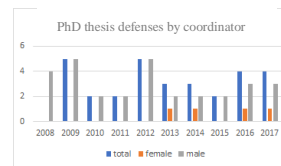


Fig. 2.2.6. Number of PhD thesis defenses coordinated by females/males

As a result of supporting females to leadership positions, our department currently has three female PhD coordinators with a significant number of PhD students (see Figure 2.2.5). Also, the number of defended PhD thesis has increased for female coordinators (see Figure 2.2.6). As a conclusion, Computer Science Department [12] from Babeş-Bolyai University is devoting significant effort to enroll and retain female members.

## References:

- [1] Mate-Info Contest, <http://www.cs.ubbcluj.ro/concursul-mate-info-ubb/>
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- [6] <http://www.cs.ubbcluj.ro/anamaria-cotirlea-de-pe-bancile-facultatii-in-echipa-google-play-londra-uk/>
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- [8] <http://www.cs.ubbcluj.ro/scss/>
- [9] University Admission, <http://www.cs.ubbcluj.ro/admitere/nivel-licenta/admiterea-la-facultatea-de-matematica-si-informatica-nivel-licenta/>
- [10] Phd Admission, <http://doctorat.ubbcluj.ro/ro/>
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- [13] <https://www.startupcafe.ro/idei-si-antreprenori/mira-rehab-fondatoarea-startup-top-femei-antreprenor.htm>