Status of Women at ESO: a Pilot Study on ESO Staff Gender Distribution

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Equal career opportunities require working conditions that make it possible to reconcile family needs and career development. This article describes the goals and main findings of a pilot investigation that has recently been carried out at ESO focusing on gender balance issues.

Over the past decades, several studies in Europe (e.g. within the FP5-FP6 programmes) and the United States have considered gender distribution, and in particular the status of women, in different sciences. Gender equality and dual careers are just two of the many aspects that have been closely scrutinised. In astronomy, the Baltimore Charter and the Pasadena Recommendations are among the main outcomes of these investigations and provide guidelines on how the situation of women in astronomy could be improved. Further, several working groups have been established by international scientific bodies. With ESO as a multi-cultural research organisation, it became clear that a similar, systematic study of its current gender distribution was an important goal to achieve. This article presents the first results of such a study.

The project and its goals

The "Status of Women at ESO" is a project that, as a start, aimed at evaluating the current gender distribution at ESO, thus providing a snapshot of the status of women at ESO. This task necessitated a systematic and impartial breakdown of the ESO organisational structure in terms of female *versus* male personnel members by division and rank over a given time period. The team was chaired by Francesca Primas and included Roland Block, Mark Casali, Nathalie Kastelyn, Rubina Kotak and Bruno Leibundgut. We focused on the period 1999–2006, which has witnessed a significant expansion in the number of staff members owing to the start of VLT operations, and on the following groups:

a) ESO International Staff Members and Paid Associates by division and by rank;
b) ESO Faculty members, Fellows and Students;
c) ESO Governing Bodies and Committees: Council, Observing Programmes Committee, Scientific and Technical Committee, Users Committee, Finance Committee;
d) ESO Visitors;
e) invited speakers at ESO Lunch Talks and the Munich Joint Astronomy Colloquia.

The project and its outcomes

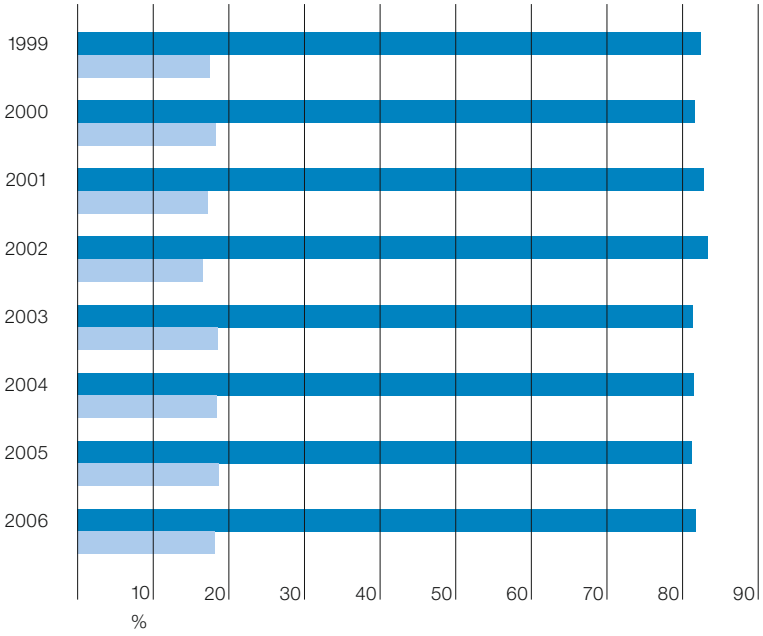
Once all the data were gathered, we compiled and analysed statistics on the distribution of female and male employees by various categories. The numbers reported here cover all international staff of ESO, i.e. at both the ESO Headquarters in Garching and ESO Chile, with the latter including the Vitacura offices and the La Silla Paranal observatory. Where appropriate, we have split the analysis for the two main ESO regions. In the following sections, we will briefly comment on the results obtained for the different categories (a–e) that were scrutinised.

a) ESO staff members

Established members of ESO personnel are identified as International Staff Members (ISM), whereas Paid Associates (PA) belong to the so-called non-established personnel. Typically about 7 to 10 PA are employed at ESO per year and these are included in the overall statistics of ESO staff.

Figure 1 displays the fraction of female ESO staff over the past eight years. During the same time the ESO staff increased from 239 ISM in 1999 to 329 ISM in 2006. This is also reflected in the recruitment statistics: ESO recruited 33 women (17.7 %) compared to 153 men (82.3 %) between 2000 and 2005. Although the number of women employed as ISM has increased from 44 to 59 over this period, it has clearly lagged behind the pace of male hiring. Among the women hired, nearly half (16 or 48.5 %) were scientists, 12 (36.4 %) were administrative staff and only 5 women (15.2 %) were engineers. When the breakdown is done by ESO division, one finds that while the Office of the Director General and Administration have a nearly even gender balance, the technical divisions have, in general, a very low frac-

Figure 1: Yearly gender distribution of all ESO International Staff Members and Paid Associates (dark blue: male, light blue: female).



tion of women on their staff. The fraction of female Paid Associates is slightly higher than that of ISM; this also holds in the more technically-oriented divisions.

When the grade is taken into account, the difference becomes even more striking: during the past three years, the percentage of female staff (ISM + PA) has remained rather stable, around 50–60 % for salary grades 5–7, but only around 10 % for grades 8–11. This continues further into the management level (grades 12 and above) where at the moment there are only two women. Women are clearly under-represented at the higher echelons, presumably corresponding to positions with a higher scientific and technical profile. It should be noted that the current Director General and one division head are women. By total numbers, ESO has more than doubled the number of women in grades 8 to 11 (from 16 to 34), but the relative increase remains rather small (only 4 %).

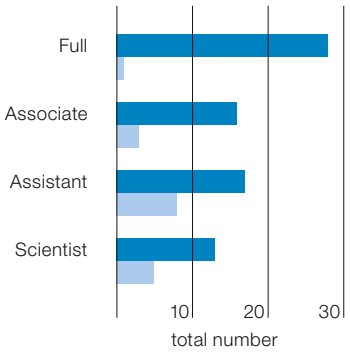


Figure 2: Gender distribution (by total number) of the three categories of ESO Faculty members, and Scientist, in the year 2006 (dark blue: male, light blue: female).

	Female | Male Fellows	Students
Garching	10 | 34	22 | 29
Chile	15 | 36	11 | 17
All	25 | 70	33 | 46
Garching (%)	22.7 | 77.3	43.1 | 56.9
Chile (%)	29.4 | 70.6	39.3 | 60.7
All (%)	26.3 | 73.7	41.8 | 58.2

Table 1: Total number and percentages of ESO fellows and students (2000–2006).

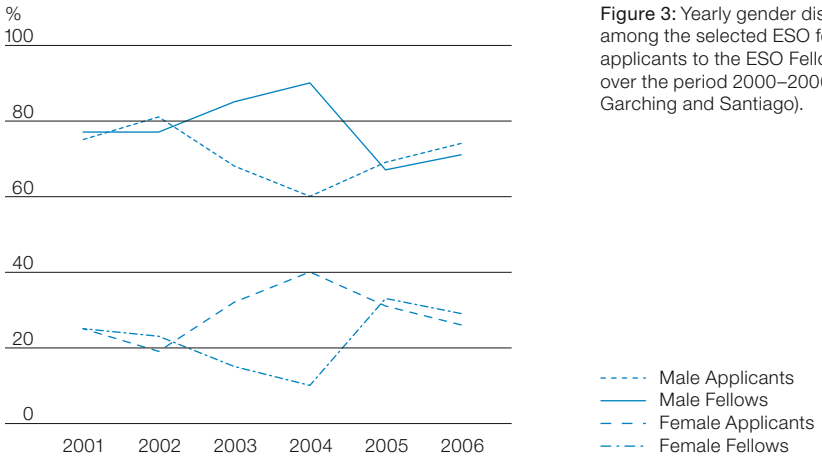


Figure 3: Yearly gender distribution among the selected ESO fellows and applicants to the ESO Fellowship, over the period 2000–2006 (for both Garching and Santiago).

b) The ESO Faculty, Fellows and Students

The ESO Astronomer Charter defines the roles of astronomers and their membership in the ESO Faculty. As of 2006, there are 17 women in the Faculty (to be compared to 74 men), and their fraction has increased fairly steadily over the past decade.

However, we note that the highest fraction of female Faculty members is currently at the Assistant Astronomer level, the entry level for junior staff. The Scientist level (astronomers with reduced research time), also have a higher fraction of women, as can be seen from Figure 2. The global average, including all levels (Full, Associate, Assistant and Scientist) is 18.7 % of women.

Complete statistics for ESO fellows and students are available from the year 2000 onwards for both ESO sites, including the gender distribution among the applicants and the gender distribution in the Fellowship and Studentship Selection Committees (FSSC). Table 1 shows the total number and percentages of all ESO Fellows and Students during the last seven years.

The percentage of females among the selected fellows has been between 10 and 40 % over the past few years. The comparison with the distribution among the applicants (Figure 3) shows that the gender balance is reasonably maintained, i.e. there is no obvious discrimination against female candidates.

However, the years 2003 and 2004 show that this is not universally true. In 2004, for instance, only one female fellow was selected out of 34 female applicants! Also, it should be noted that the fraction of female fellows is significantly higher than for female members in the Faculty. Compared to the Assistant Astronomer level in the Faculty, the gender distribution is nearly the same. However, despite the increased number of Fellowships offered in Chile for Paranal, we have observed a steady decrease in the number of female applicants over the last few years, which has stopped only in the past year. The comparison of the gender distribution between Garching and Chile is shown in Figure 4. The fraction of female fellows has decreased dramatically in Chile – by almost a factor of two since 1999, while the distribution in Garching has been between 25 and 40 % over the recorded period. Admittedly, very few applications for ESO Fellowships in Chile were received from female candidates in 2003 and 2004, nevertheless the trends show that constant vigilance is required.

The situation with the students is more positive. While there still appears to be a majority of male applicants, the selection has consistently created a more balanced distribution so that ESO has a fairly high fraction of female students (see Figure 5), which is consistently above 30 % and often above 40 %. The fluctuations are due to the short-term nature of student

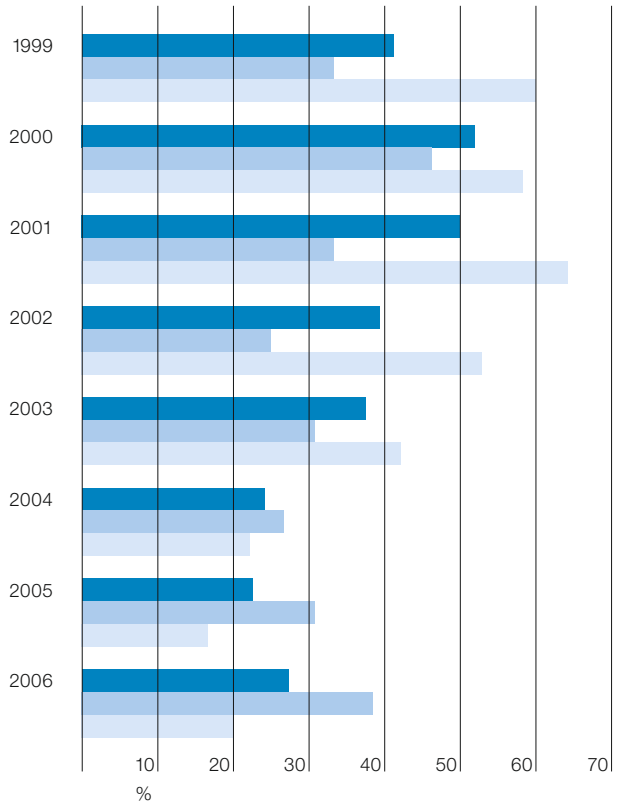


Figure 4: Percentage of female fellows in Garching, in Chile, and as a whole.

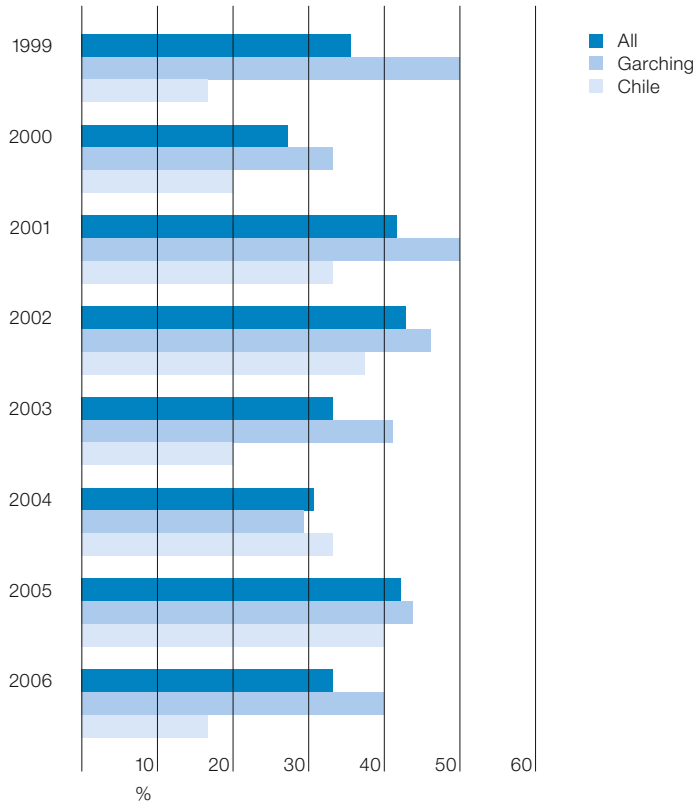


Figure 5: Percentage of female students in Garching, in Chile, and as a whole.

contracts (two years in almost all cases, with the International Max-Planck Research School (IMPRS) contracts running for three years – currently there are six such positions at ESO Garching). The distribution between Garching and Chile is fairly balanced, with the large fluctuations for Chile due to the small number of students (ten positions).

Overall, the situation with young researchers at ESO has improved over the past few years. With the exception of 2003, the ratio of female students has been consistently above 30 %. The number of applications from female students is also steadily increasing.

We further investigated the composition of the selection committees for the fellows and the students. In Chile, during the past few years not a single woman has been nominated to this committee, whereas in Garching, a realistic balance of women on the committee has been achieved. The fraction of women on this committee is higher than the average of the Faculty astronomers.

c) ESO Governing Bodies and External Committees

ESO has one main governing body (Council) and several specialised committees that have the task of making decisions and/or recommendations on specific matters. Since membership to these committees is selected in different ways (not only among different committees, but even among different countries for the same committee), the numbers we have gathered on this category are more complex to interpret.

We noted that the more technically-oriented committees show a very low percentage of female representatives, whereas other committees (e.g. Finance Committee and the Users Committee) have reached a very balanced gender distribution. However, every committee shows a positive trend, and the female representation is increasing, though at a slow pace.

d) ESO Visitors

The ESO Scientific Visitor Programme aims to promote the scientific interaction between ESO and its community and to enhance ESO's role as an astronomical centre of excellence. The programme is under the responsibility of the Head of the Office for Science, who appoints the members of the two Visitor Selection Committees (VSC, one in Garching and

one in Vitacura) and their respective chairs. Applications to the ESO Scientific Visitor Programme can be submitted by any scientist with an interest in ESO activities and/or collaboration with ESO staff members. ESO can also make formal invitations to scientists with a high scientific profile. On average, ESO Garching is able to support between four and five visitors per month.

From the data we have been able to collect, i.e. the gender distribution of the applicants, as well as of the approved and invited visitors over the past eight years (1999–2006) at ESO Garching, there is clearly no discrimination in the approval of the applications – ESO Garching is usually able to approve almost all applications. Nevertheless, we note that despite the fact that the ESO visitor programme is open to everybody, the number of female applicants represents a very small percentage; the reason for which is not easy to uncover. One possibility is that for female astronomers with family commitments, it is notoriously difficult to take leave of absence from their home institute. However, there is clearly room for improvement, especially for the targeted high-profile astronomers: here, the numbers are extremely small (only three women in the last few years), and ESO should make a special effort to attract senior women for extended visits.

We note that the composition of the VSC-Santiago at the beginning of this year included one female and seven male astronomers, which is identical to the 2006 situation of the VSC-Garching.

e) Invited speakers to Joint Astronomy Colloquia and ESO seminars

ESO is a very lively scientific environment, where many scientific talks are organised on a weekly basis, both in Garching and in Santiago. ESO-Garching has its own Lunch Talk (LT) series, organised by an appointed team of ESO-Garching staff (usually two to three members, who change every two to three years). This committee has the task of running a full schedule of weekly talks, by inviting speakers who cover a broad range of scientific activities and interests. Invitations are also made based on suggestions provided by other ESO staff members.

Together with MPA, MPE and the LMU-Sternwarte, ESO-Garching also co-organises the Joint Astronomy Colloquia (JAC) series, also held on a weekly basis. The JAC committee includes representatives from all involved institutes. This is recognised as the main scientific colloquium of the week.

Table 2 shows that gender distribution in the Lunch Talk (LT) series is clearly more balanced than the one among JAC speakers, but there is clearly room for improvement here as well. The numbers in the table are yet another reflection of the fact that there are more junior than senior female astronomers. Considering the higher relevance of the JAC series, the very low number of female speakers is discouraging. The JAC committee is currently chaired by a woman and it will be worthwhile to monitor the selection of speakers in the coming years.

	Female | Male	
	LT	JAC
1999	3 | 49	1 | 32
2000	4 | 37	5 | 28
2001	10 | 29	2 | 29
2002	5 | 29	4 | 26
2003	11 | 28	1 | 27
2004	6 | 19	5 | 30
2005	5 | 23	4 | 33

Table 2: Gender distribution among the invited speakers to Lunch Talks (LT) and the Joint Astronomy Colloquium (JAC).

Present and future

All the numbers collected so far and discussed in this report have been taken at face value, i.e. they represent snapshot views of the gender distribution among ESO staff and various ESO governing bodies and committees, during the last few years. No attempt has yet been made to compare these numbers to, for instance, the number of applicants and eventually short-listed candidates for any given staff position. This type of comparison was readily available for the Fellows and Students only, as discussed above. Due to this incompleteness, it is difficult to properly interpret these numbers and draw firm conclusions. In what follows, we attempt to flag the most important outcomes of this pilot project and possible future actions that ESO is considering.

1. Concerning ESO Staff, we have established that the gender distribution is not very balanced (18 % female *versus* 82 % male). The balance is far from being satisfactory, especially in the more technically-oriented divisions, where very few women are employed. It is disappointing that this distribution has remained constant for the past eight years. The women employed at ESO are preferentially in lower grades with very few women in senior positions. In other words, the significant increase in the number of newly-hired staff members required by the start of VLT operations has not resulted in a corresponding increased fraction of female staff (at any level).

2. The conspicuous lack of senior female astronomers is striking. The fraction of women in the Assistant and Associate levels is encouraging, although not yet satisfactory, and it reflects the recent employment history. The Assistant Astronomer level is the entry level for Faculty astronomers at ESO and these are the junior members. It seems important to assess what support is required to have these women succeed both in their research and at ESO, as well as to increase their number further and ensure that the fraction does not decline with increasing seniority. In a few years these numbers should be critically assessed and the reasons for possible changes examined.

3. The gender distribution among the ESO Fellows and Students is in general higher than for the staff and the Faculty. The selection of the Fellows and Students does not show clear discrimination, but constant awareness in the selection process is still required. The low female selection rates in 2003 and 2004 are a warning not to neglect this issue.

4. For the Scientific Visitor Programme, it would probably be helpful to assemble a list of high-profile female scientists to become the target of official invitations to visit ESO. If no improvement is seen over a given amount of time, then one should try to understand the main reasons that

make women decline the invitations (family organisational issues, busy professional schedules, etc.).

5. For the Lunch Talks, but especially for the JAC series, a similar list of high-profile female scientists could be useful in order to significantly increase the number of female speakers. It is well known that the percentage of female invited speakers at any scientific conference remains low. The International Astronomical Union, for instance, is now checking, for each symposium they sponsor, the gender and national distribution of the scientific organising committee and of the invited speakers, requiring the organisers to propose alternative names if the gender balance is not satisfactory. ESO might want to follow a similar philosophy for its own series of symposia and workshops.

The importance of this study is that it provides a baseline for future comparison and should be used as a reference for future studies regarding the status of women at ESO. Once ALMA will have started early operations and ESO may be involved in the development of its next large facility, it may make sense to repeat this study.

Equal career opportunities require working conditions that make it possible to reconcile family needs and career development. Being an international organisation adds extra responsibility to the employer: it is usually more difficult for expatriates to fall back on childcare facilities or rely on family help in the country of employment other than the home country. ESO has adopted, and will continue to adopt a series of measures that aim to contribute towards an effective personnel policy. Some changes to the regulations to further help women and family members working at ESO have recently been implemented (e.g. on-site daycare, more flexibility on maternity leave, as well as part-time solutions) and discussions of several more are under way with the appropriate committees.

Independently of these important improvements, and despite the fact that the current situation at ESO closely follows the numbers of the other EIROforum[1] institutes (CERN, ESA, ILL, EMBL, ESFR, EFDA), ESO needs to better understand why the number of female staff has not increased over the past few years. Is ESO not attractive enough for female astronomers and engineers? Are the ESO working conditions not suitable for female staff to simultaneously cope with professional career and family commitments? Constant monitoring and increasing awareness will hopefully lead to improvements.

Acknowledgements

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[1] EIROforum is a partnership of Europe's seven largest intergovernmental research organisations, which includes: the European Organization for Nuclear Research (CERN); the European Fusion Development Agreement (EFDA); the European Molecular Biology Laboratory (EMBL); the European Space Agency (ESA); the European Synchrotron Radiation Facility (ESFR); the Institute Laue Langevin (ILL); and ESO.

References

The following list of publications includes recent results from studies similar to ours (some of which were mentioned in the text) as well as some suggestions for further reading. These references can be found in the form of articles or web sites. The list does not intend to be exhaustive, rather a starting point for the interested reader.

The Baltimore Charter for Women in Astronomy (*http://www.stsci.edu/stsci/meetings/WiA/BaltoCharter.html*)

The Pasadena Recommendations (*http://www.aas.org/~cswa/Equity_Now_Pasadena.pdf*)

The European Commission reviews on Gender Equality (*http://ec.europa.eu/employment_social/gender_equality/index_en.html*) and their publications, including the most recent (2007) report (*http://ec.europa.eu/employment_social/emplweb/gender_equality/publications_en.cfm*)

A Study on the Status of Women Faculty in Science at MIT (1999 and its 2002 update) (*http://web.mit.edu/faculty/reports/pdf/sos.pdf*)

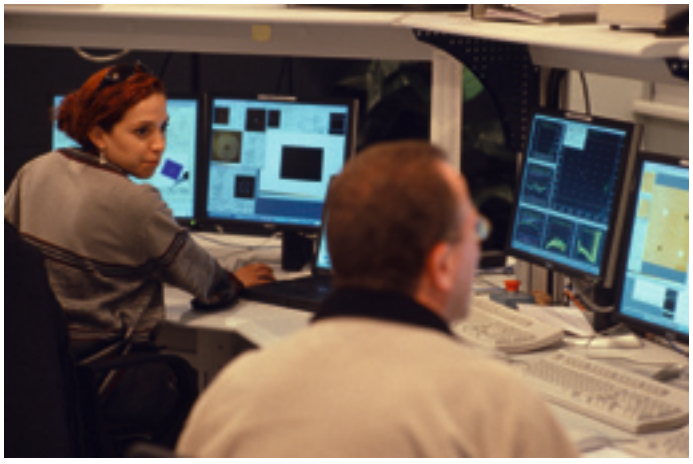
Review of the Status of Women at STScI (2002) (*http://www.aura-astronomy.org/nv/womensReport.pdf*) and the AURA (Association of Universities for Research in Astronomy) response to the report (*http://www.aura-astronomy.org/nv/response.pdf*)

The AIP (American Institute of Physics) Report on "Women in Physics and Astronomy, 2005" (*http://www.aip.org/statistics/trends/reports/women05.pdf*)

The IAU (International Astronomical Union) Working Group of Women in Astronomy (*http://astronomy.swin.edu.au/IAU-WIAWG/*)

The AAS (American Astronomical Society) Committee on the Status of Women in Astronomy (*http://www.aas.org/~cswa/*)

The IUPAP (International Union of Pure and Applied Physics) Working Group on Women in Physics (*http://www.iupap.org/wg/wip/index.html*)



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