

Studies related to gender and geographic diversity in the ATLAS Collaboration

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On behalf of the ATLAS Collaboration

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Composition of the ATLAS Collaboration



The ATLAS Collaboration was founded in 1992

- **Diverse membership:**
 - Currently ~5300 members of 94 nationalities
 - 2800 scientific authors (mainly PhD physicists and PhD students) from 182 institutions in 38 countries
 - engineers, technicians and administrative support
- **Study Group on Diversity established in 2015**
 - assess the diversity within the collaboration
 - current study focuses on gender and geography
 - make recommendations on how best to support it
 - collected information on
 - the demographics of the collaboration
 - how people participate
 - leadership and management roles
 - recognition for contributions

Professions within ATLAS



Demographic information available:

- Institution of affiliation
- gender
 - available choices: male, female
 - 19% are female
- age
- profession
- nationality

data from
CERN
registration
(self-
declared)

Binomial
“uncertainties”
on fractions to
facilitate
comparisons



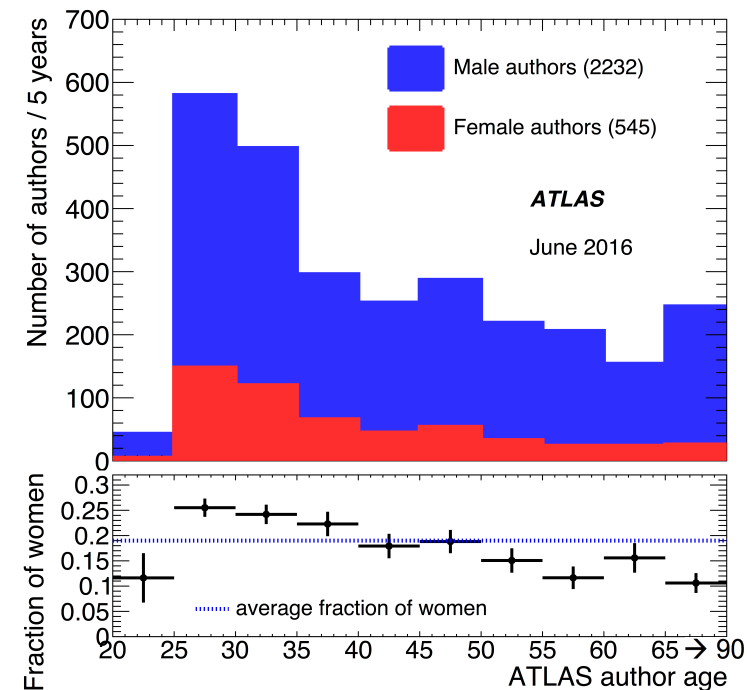
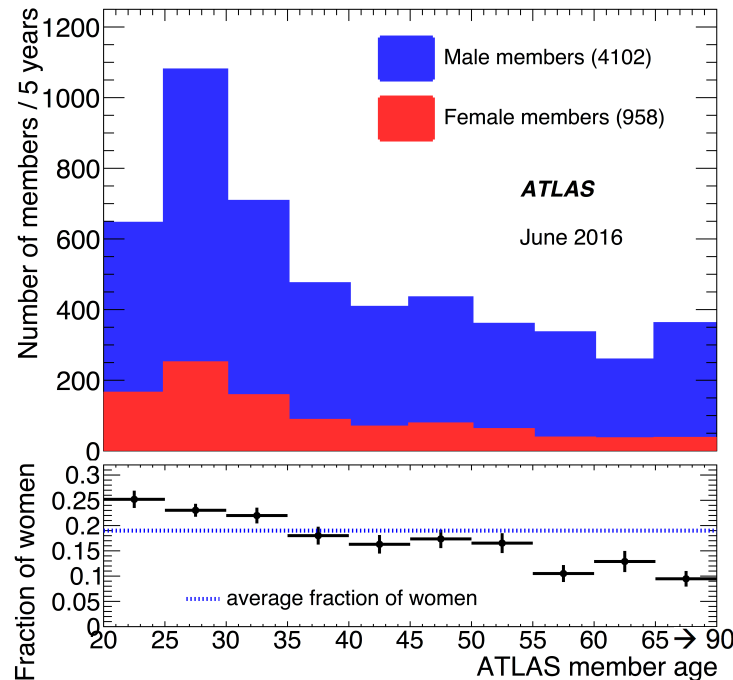
Profession	Number of people (fraction)	Fraction of women (%)
Physicist	2,237 (44%)	17±1
Physics PhD student	1,080 (21%)	24±1
Physics master/diploma student	443 (9%)	22±2
Summer/undergraduate student	234 (5%)	27±3
Engineering student	67 (1.3%)	12±4
Engineer	711 (14%)	10±1
Technician	210 (4%)	7±2
Administrative support	78 (1.5%)	62±5

Age Distribution, Correlation with Gender



Collaboration members' ages span seven decades

- nearly half are younger than 35
 - mostly students and people in term-limited contracts
 - those 35 or older are mostly in continuing / long-term posts
- striking correlation (decrease) in fraction of women with age

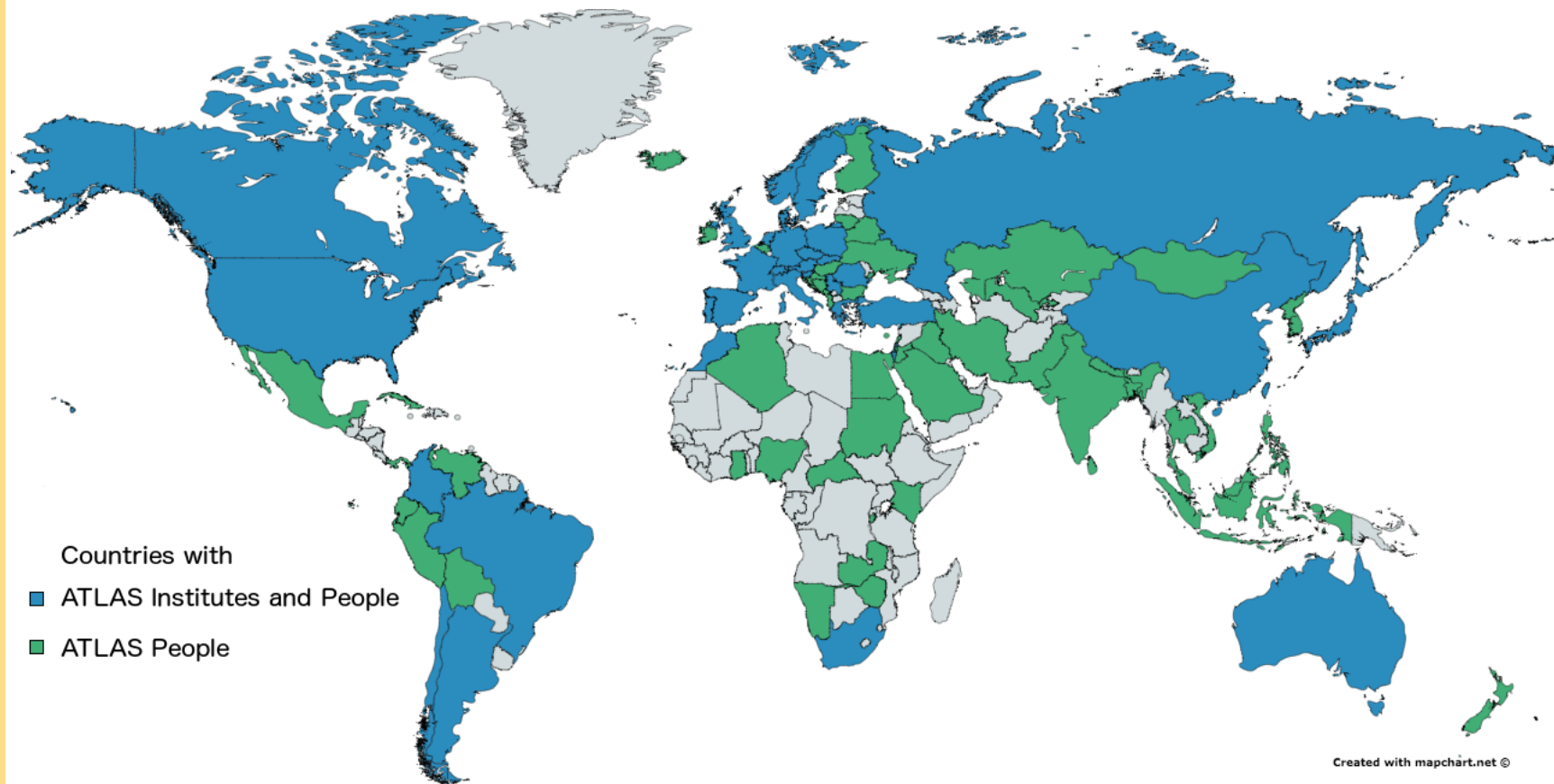


Geographical Diversity



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38 countries have at least one ATLAS member institution
94 nationalities are represented in the Collaboration

Correlation of Gender with Region

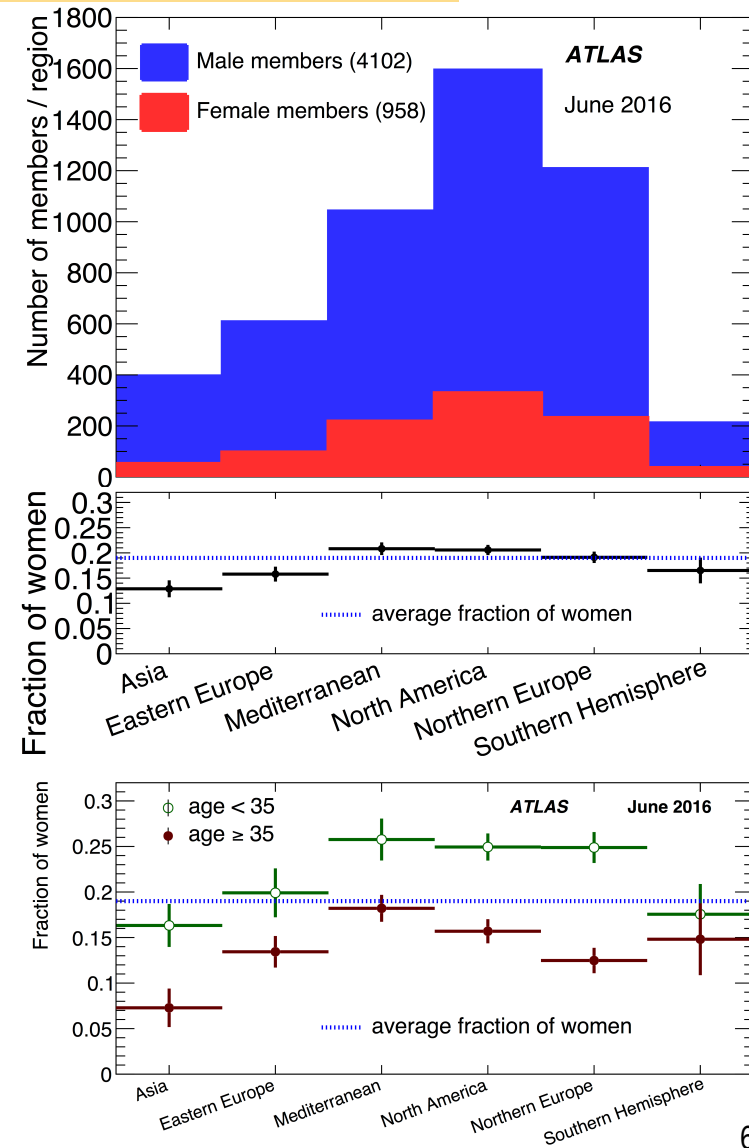


Sorted members into six world regions according to their institution of affiliation

- regions are defined by geographical proximity and to create large, similarly-sized groups
 - see backup slide

Highest fractions of women are in Mediterranean, Northern Europe and North American institutions

- more women among younger half of the collaboration but regional variation is similar

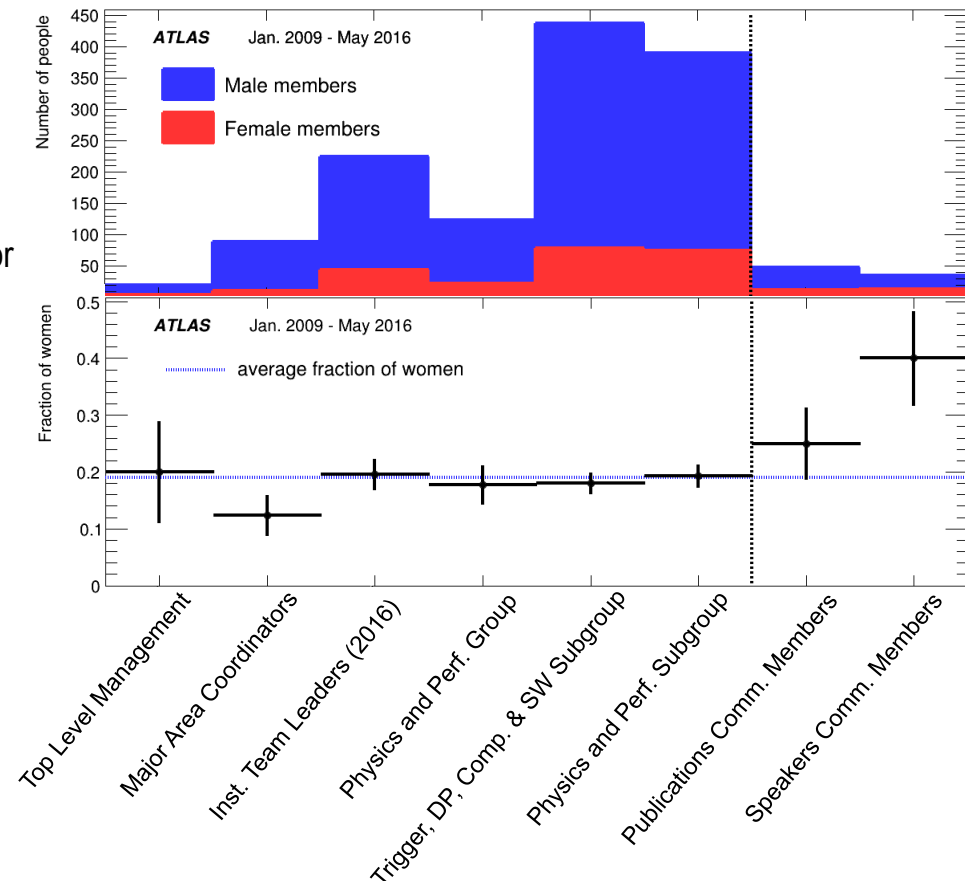


Gender and Leadership



Main leadership categories:

- **Top Level Management**
 - Spokesperson, two deputy Spokespersons, Technical Coordinator, Resource Coordinator
- **Major Area Coordinators**
 - responsible for a detector sub-system or a major activity (e.g. Physics analysis, Trigger, Computing, ...)
- **Institution Team Leaders**
 - 182 Institutions, 225 Team Leaders
- **Convenors of Physics Analysis groups:**
 - 9 analysis groups
 - 6 combined performance groups
 - plus associated subgroups
- **Leaders of Trigger, Data Preparation and Computing/Software subgroups**
- **Publications Committee and Speakers Committee members**



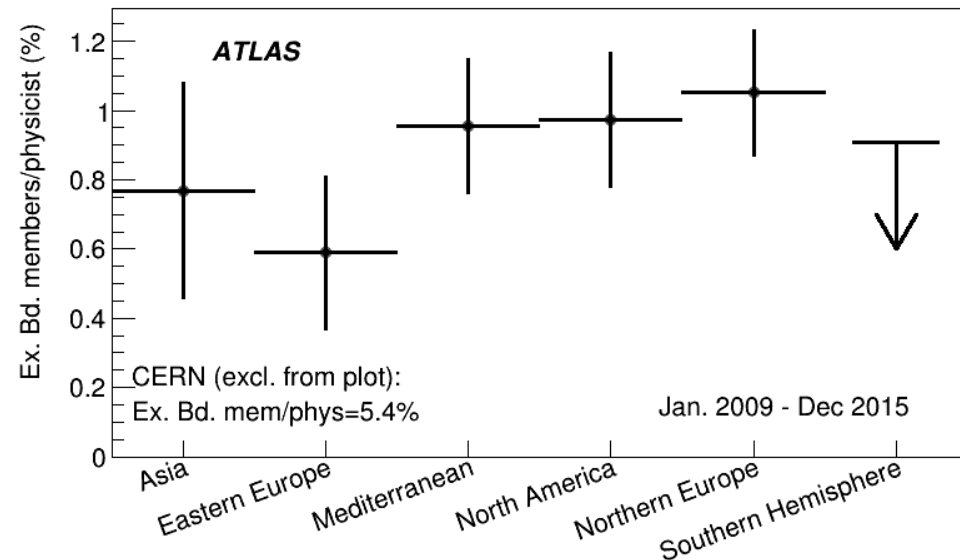
Women hold leadership roles in similar proportion to men

Governance v. Region



Executive Board is the main steering body of the collaboration:

- Spokesperson (chair)
- Top Level Management
- Detector Project Leaders
- Major Area Coordinators
- Chair of Publications Committee
- Three members-at-large from the Collaboration



Geographical affiliation shown (last six years)

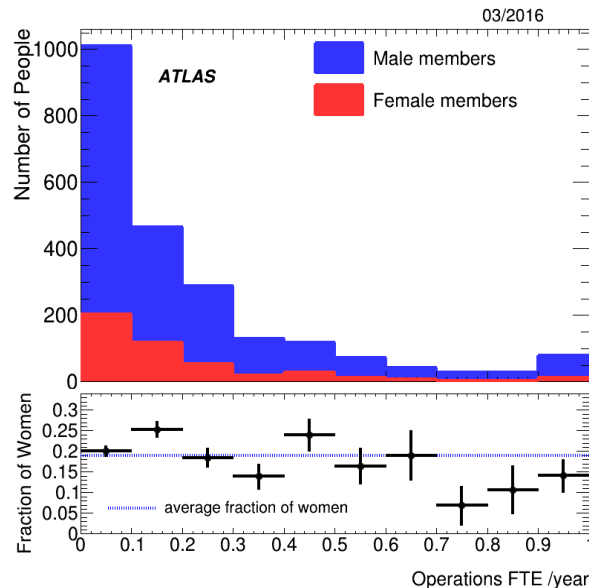
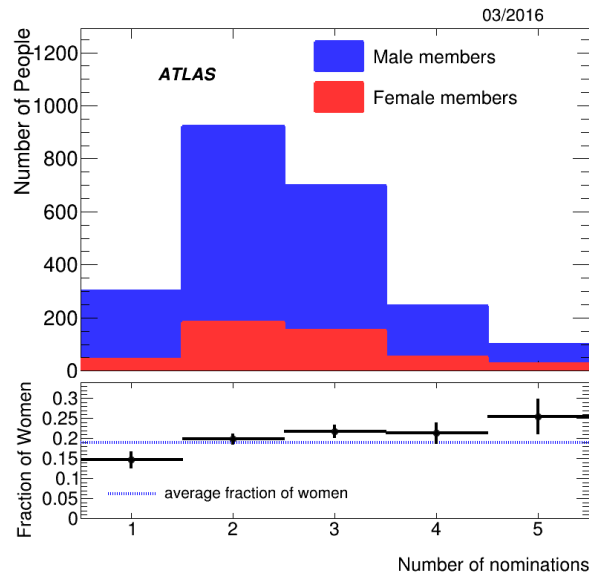
- Fractions are relative to number of authors from that region
- larger fraction of CERN staff are members
- no members yet from Southern Hemisphere (95% C.L. limit shown)

Recognition through Talks



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Talks are allocated by a Speakers Committee, using a consistent procedure designed to be equitable

- A person's suitability to give a talk is quantified by the number and 'priority' of nominations from the relevant Team Leaders and Activity Coordinators
 - women are receiving on average more nominations (see plot), also generally higher-priority nominations (see backup slide)
- The amount of time a candidate contributes to operational tasks is also considered
 - women contribute proportionately to men

Recognition through Talks, continued



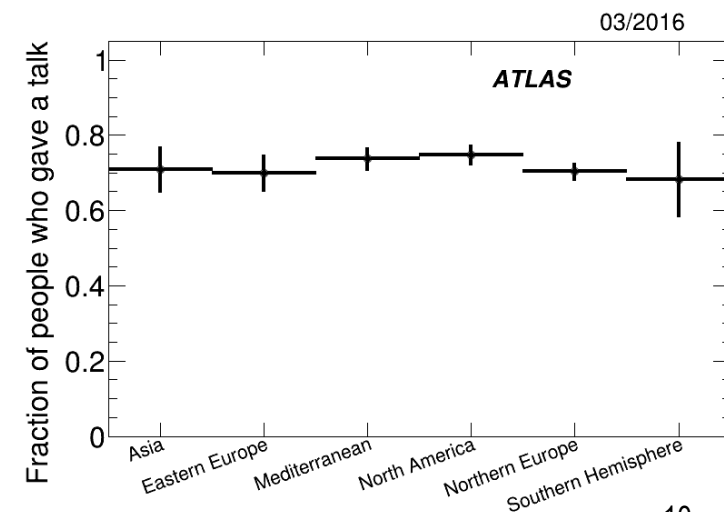
The table shows the fractions of men and women who have given a physics talk at a conference or workshop since 2010

Selection	time as ATLAS author	Fraction of men (%)	Fraction of women (%)
Physicist	2–7 years	83 ± 3	91 ± 4
Physicist	7–15 years	81 ± 2	94 ± 3
Physicist	> 15 years	55 ± 4	77 ± 8
Student	> 2 years	62 ± 5	57 ± 8

- women give more talks than men, especially among longer-time collaborators
 - partly due to stronger nominations

Also looked for regional correlation

- none seen (plot covers past six years)

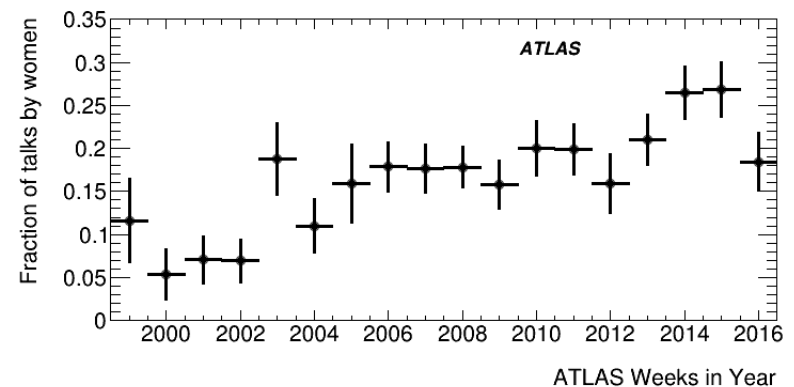
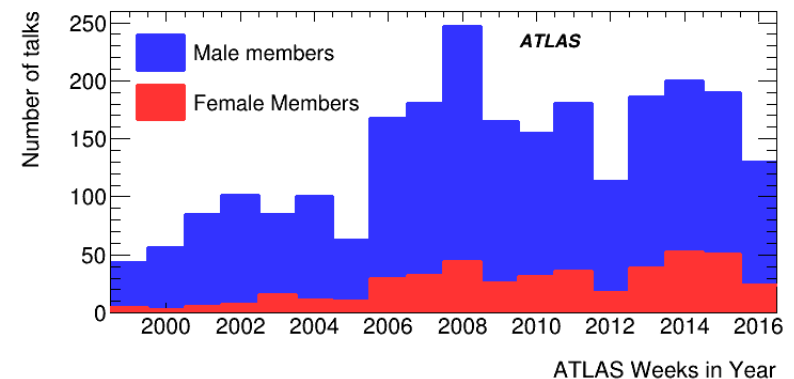


Collaboration Meeting Talks



ATLAS holds week-long collaboration meetings three times a year:

- Plenary talks are given by members playing key roles
- Plots show time evolution of these talks:
 - top plot is talks by men (blue) and talks by women (red)
 - bottom plot is fraction given by women
 - has increased with time
 - recent years are consistent with current fraction of women
 - older data on gender composition not available for comparison



Summary and Conclusions



The ATLAS Collaboration has ~5000 members

- About 19% are female
 - Women contribute proportionately to the experiment and are represented proportionately in leadership roles and as speakers at international conferences and in internal meetings
- 94 nationalities are represented
 - the various world regions are represented proportionately in leadership positions and recognition
- The fraction of women decreases with age
 - The reason is not clear; possible explanations include
 - an increase over time of women's participation in physics and engineering
 - the “leaky pipeline” effect

Details of this study are available as an ATLAS note:

- <https://cds.cern.ch/record/2202392>

Backup Slides

Definition of “Regions”



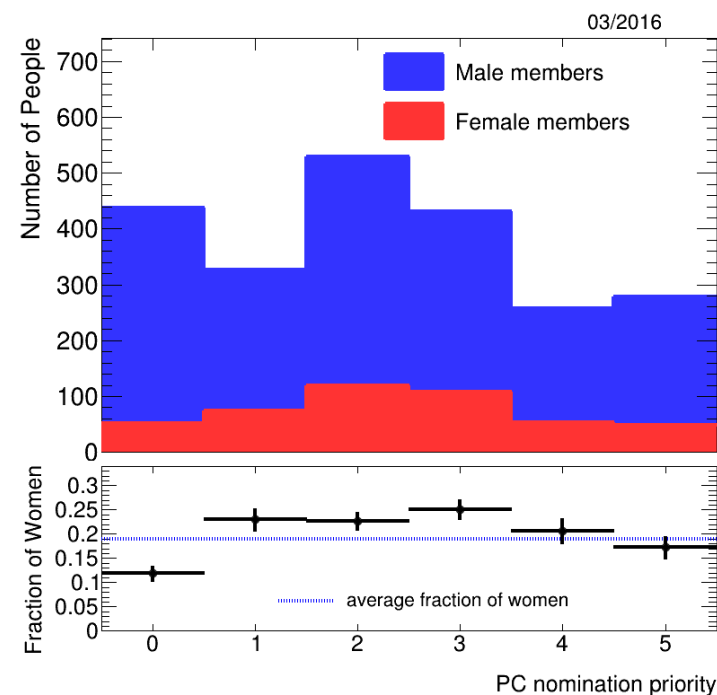
1. **Asia**: Armenia, Azerbaijan, China (incl. Hong Kong), Georgia, Japan, Taiwan
2. **Eastern Europe**: Belarus, Czech Republic, Poland, Romania, Russia (incl. JINR Dubna), Serbia, Slovakia, Slovenia
3. **Mediterranean**: France, Greece, Israel, Italy, Portugal, Spain, Turkey, Morocco
4. **North America**: Canada, USA
5. **Northern Europe**: Austria, Denmark, Germany, the Netherlands, Norway, Sweden, Switzerland (incl. CERN), United Kingdom
6. **Southern Hemisphere**: Argentina, Australia, Brazil, Chile, Colombia, South Africa

Speaker Selection Process



In addition to the criteria on slide 9, the Speakers Committee considers

- The 'priority' of nominations from the relevant Team Leaders and Activity Coordinators
 - e.g. the priority of the Physics Coordination team's nominations is shown at right
 - women are receiving on average more and higher-priority nominations
- need for professional advancement
- time since last talk



Plot key:

- A nomination priority of 0 means no nomination was received
- Priority 1: highest weight nomination
- Priority 5: lowest weight nomination