



Regional, Age and Gender Demographics in the ATLAS Collaboration

Luis R Flores Castillo, for the ATLAS Collaboration
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ATLAS

Aspects of demographics and diversity in ATLAS

- In particular the relative fraction of women
- From various demographic perspectives
- Share of contributions to, and recognition by, ATLAS





Founded in 1992

Goal: construct & operate the
ATLAS detector @ LHC

~5,300 members

(May 2016)

Nationalities from 94
countries

Of them, ~3,000
scientific authors:

From 182 member
institutions in 38
countries



Diverse in age, gender, sexual orientation, gender identity, culture, physical ability, ethnicity, appearance, religion background.

Study group on Diversity established in 2015.

Goals:

- Assess diversity
- Make recommendations to best support it
- Collected data on demographics, participation, leadership filling, recognition of contributions

Presented here...

Snapshot as of Spring 2016 + updated plots

Correlations of world region & gender with

- Contribution to ATLAS
- Leadership
- Recognition

The role of women in Physics has been studied extensively;
hopefully these data will contribute

ATLAS Composition

Basic demographic information

- mostly provided by members when joining
- Institution, self-declared info on gender (with only M/F available), date of birth, profession, nationality

Augmented by DB's with member contributions, technical & leadership roles, recognitions

Explored for correlations with gender & regional distributions

May 2016: 5,300 ATLAS members

Complete DB info: 5,060 members. This is the set used.

4,102 men, 958 women (19%).

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

From ATLAS administrative DB. Each member in one category.

- Largest: “physicists” with PhD or equivalent; 44%
- Second: Doctoral or masters students (“students”, 36%)

Fraction of women varies significantly

- Largest: admin support staff, (62%)
- 22-27% (non-engineering) students
- 17% of physicists
- ~10% among engineers and technicians

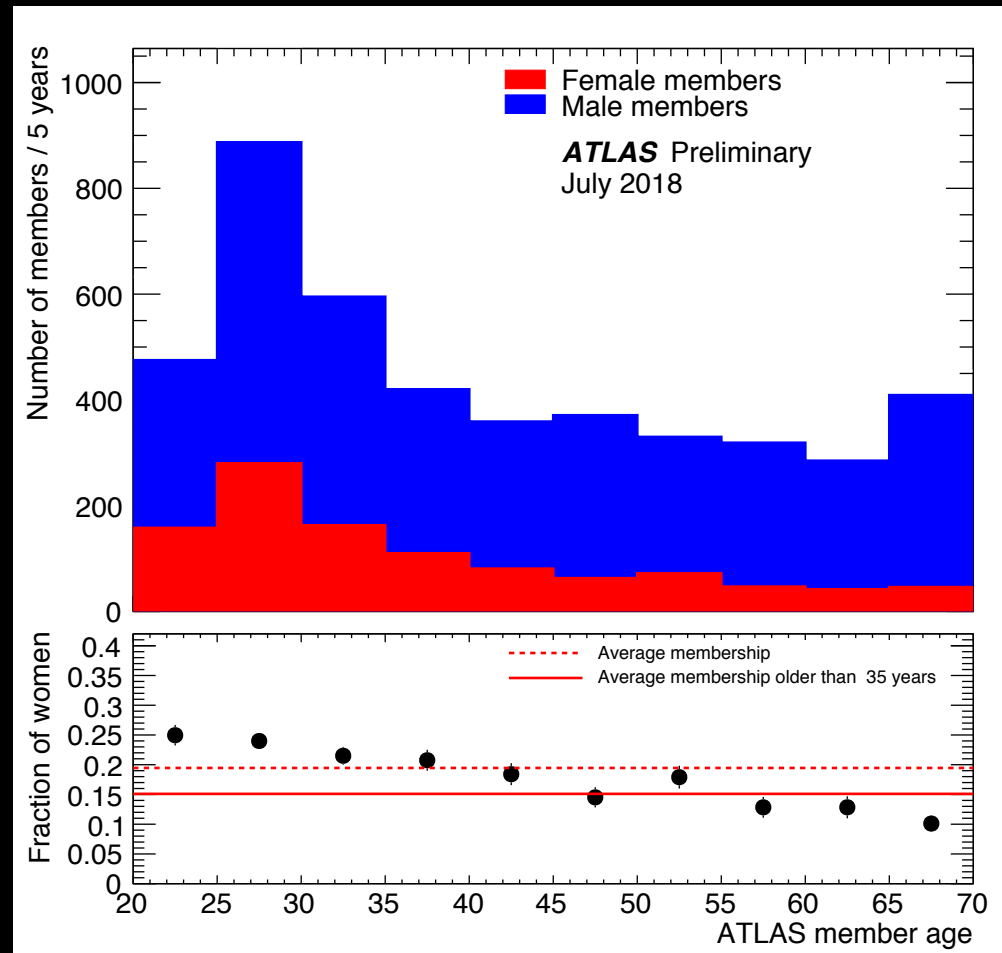
Age of ATLAS members

Members' ages span over seven decades

~ half (2,483) < 35 yo

Fraction of women vs age:

- Largest: age < 25 (~ 25%)
- For age ≥ 65 , it falls to ~ 10%
- Age ≤ 35 : 23 ± 1 (%)
- Age ≥ 35 : 15 ± 1 (%)



Age of ATLAS authors

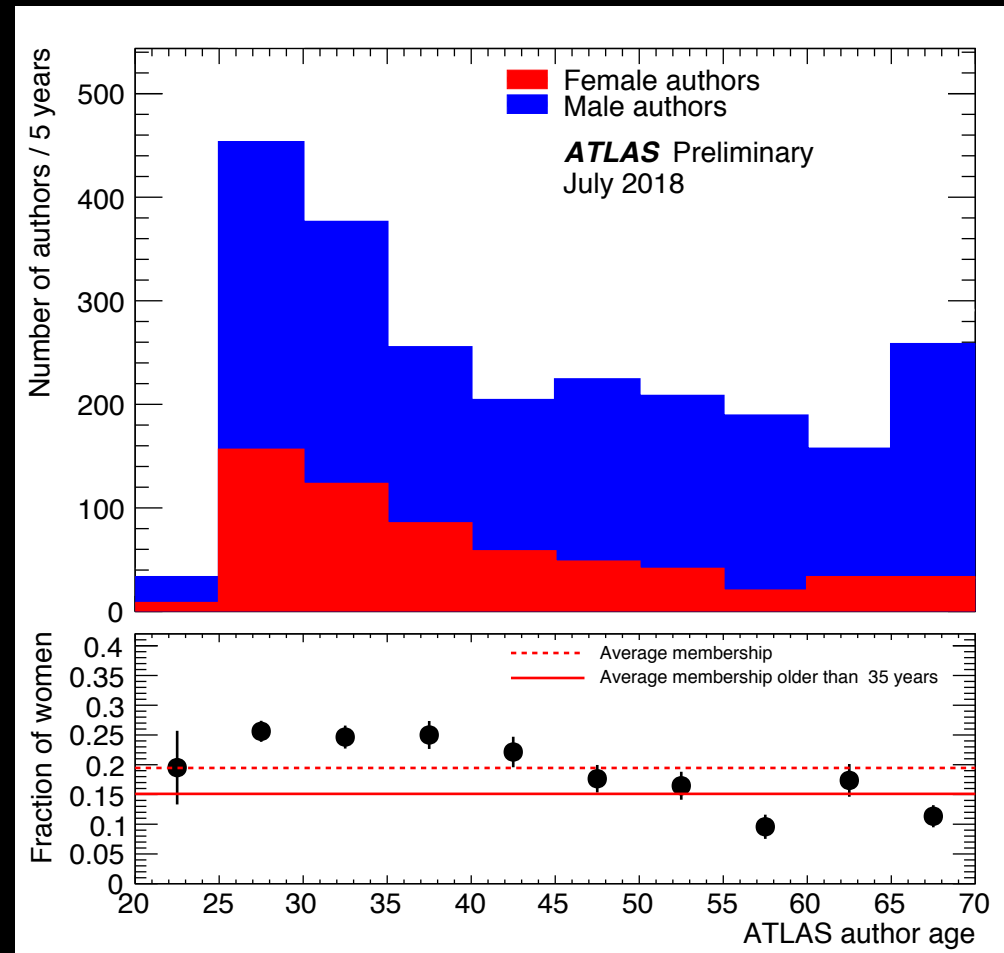
Mainly physicists and doctoral students

Fewer below 25 yo

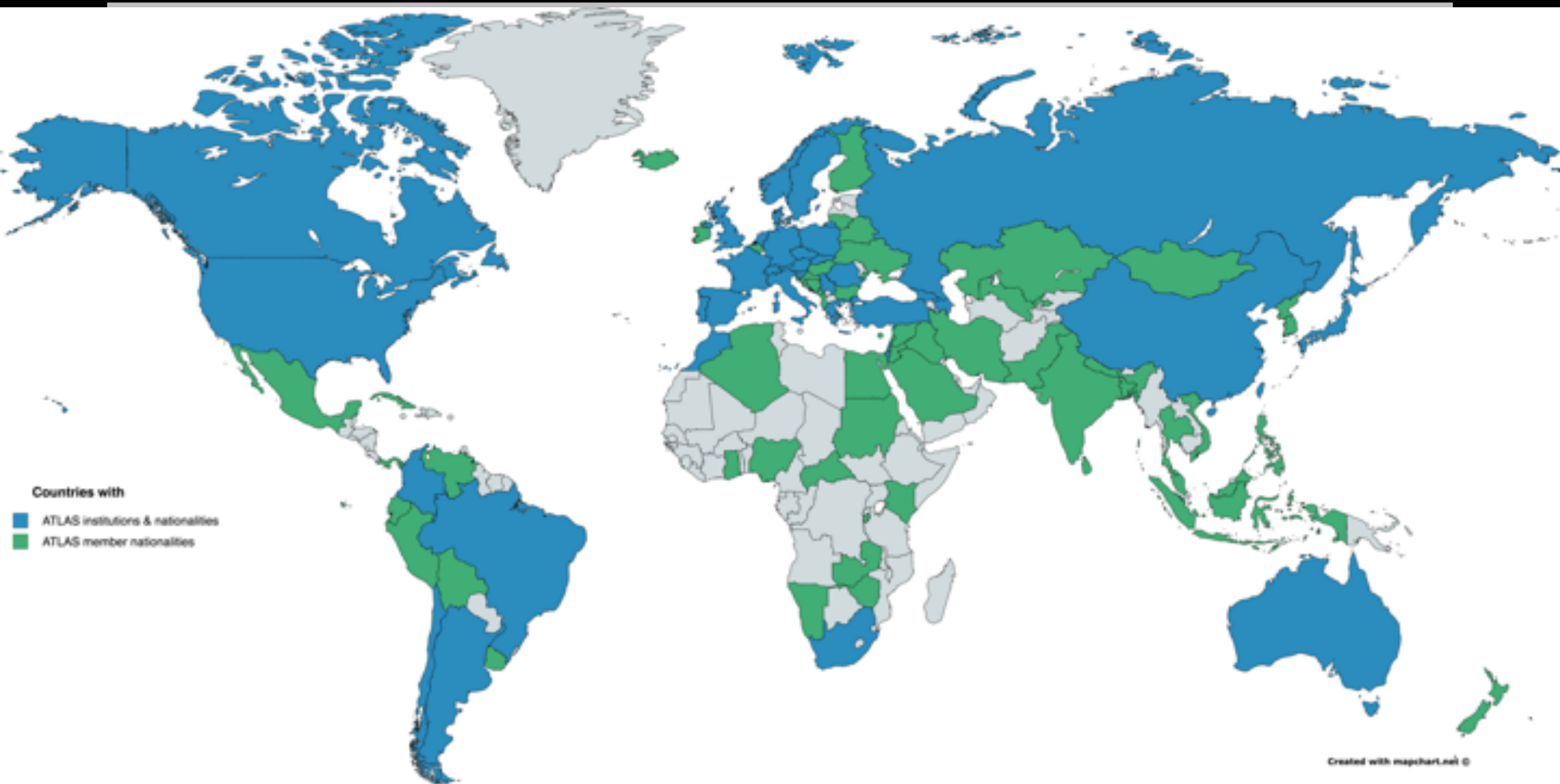
- Undergraduate & masters students normally are not authors

Fraction of women: 20%

- Decreases with age as for all ATLAS members



Region



38 countries with member institutions; green: at least one ATLAS member

Gender vs Region

Regions:

- assigned by home institution (not nationality, residence, whether based at CERN)
- ad-hoc definitions (by proximity & to have sufficiently large memberships to discern correlations):

Asia: Armenia, Azerbaijan, China, Georgia, Japan, Taiwan

Eastern Europe: Belarus, Czech Republic, Poland, Romania, Russia (including JINR Dubna), Serbia, Slovakia, Slovenia

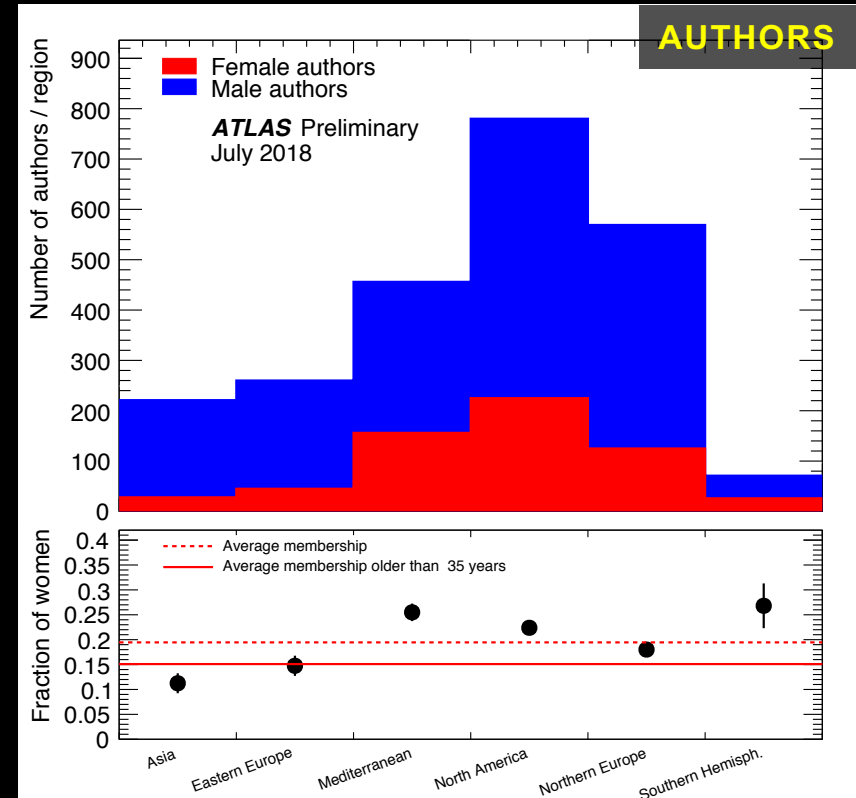
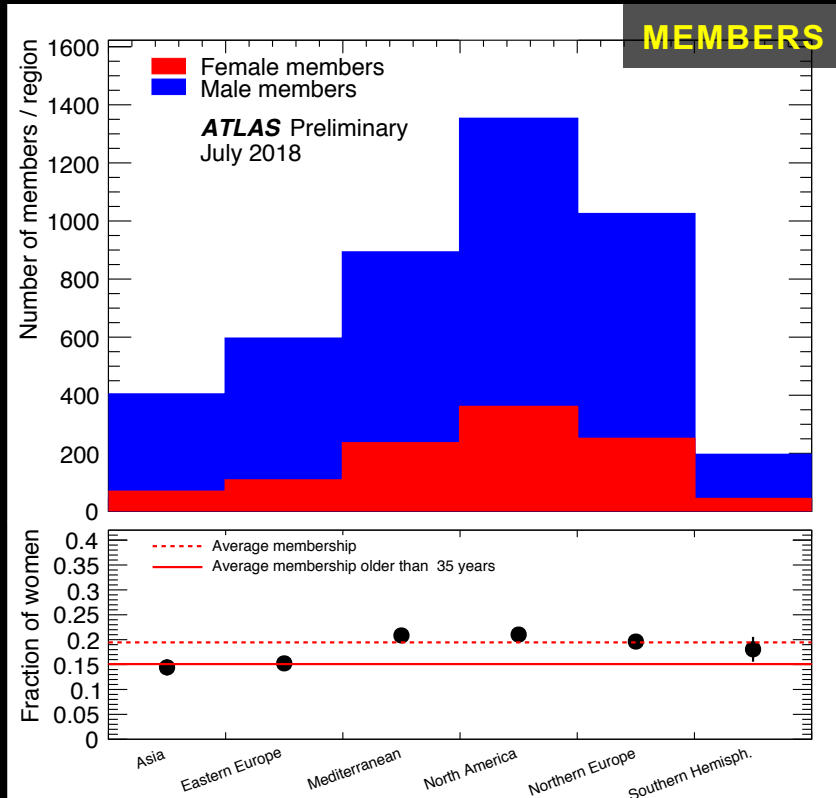
Mediterranean: France, Greece, Israel, Italy, Portugal, Spain, Turkey, Morocco

North America: Canada, USA

Northern Europe: Austria, Denmark, Germany, the Netherlands, Norway, Sweden, Switzerland (including CERN), UK

Southern Hemisphere: Argentina, Australia, Brazil, Chile, Colombia, South Africa

Gender vs Region

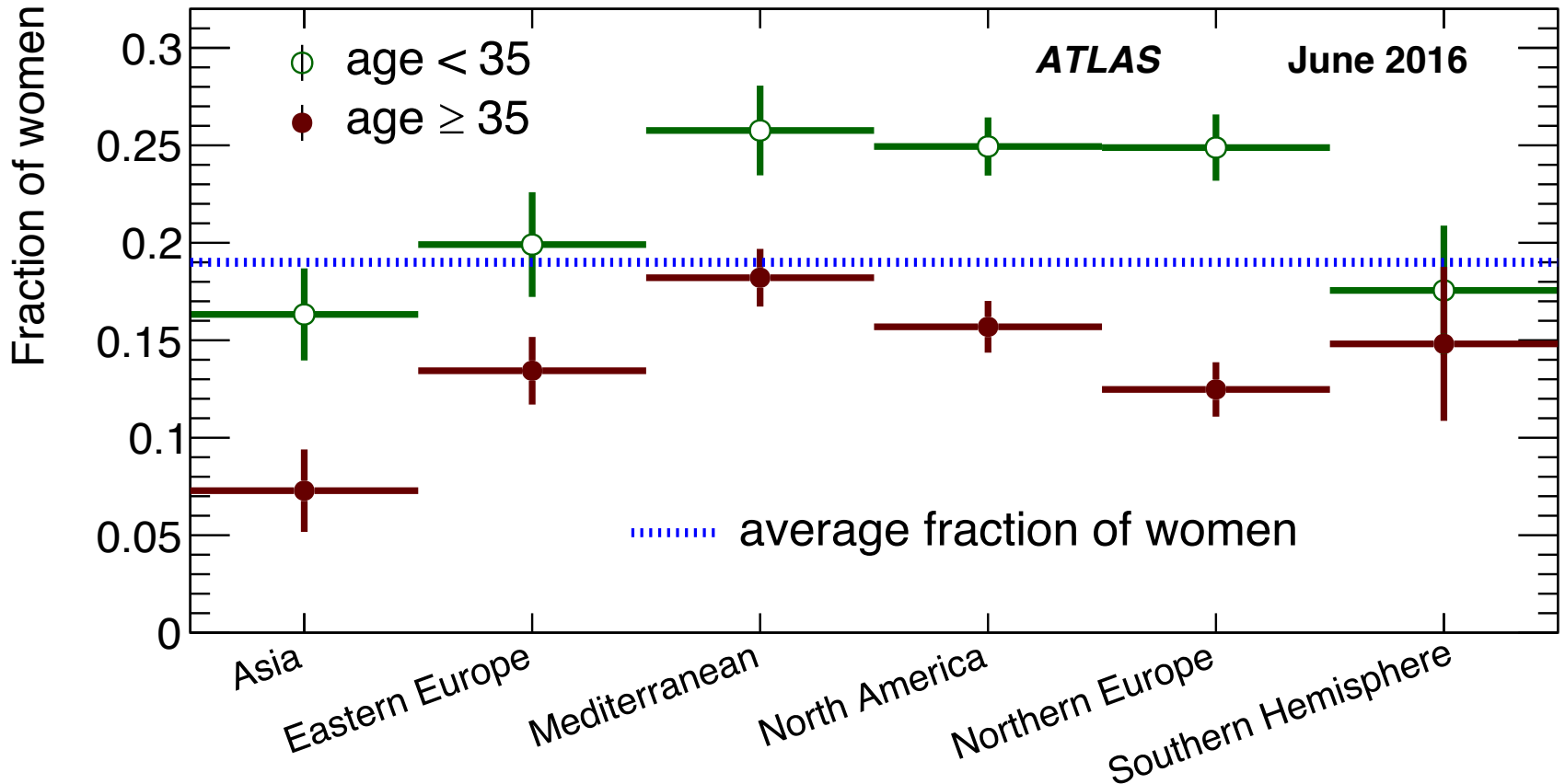


Fraction of women: 12 to 23%

Lowest: Asia; highest: Mediterranean, North America, Northern Europe

Larger amongst younger members in all regions

Gender vs Region



Larger amongst younger members in all regions (plot: 2016 data)

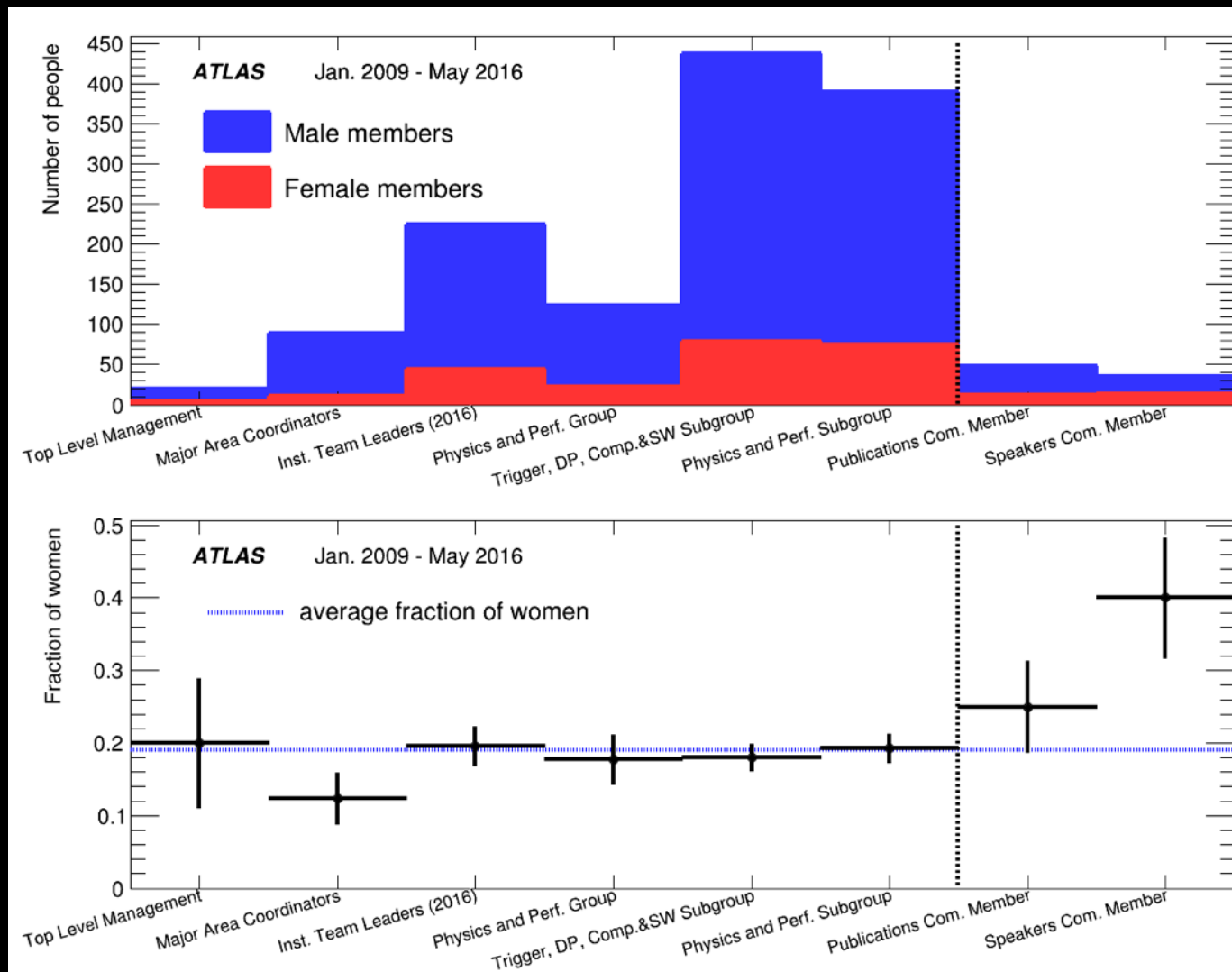
Leadership positions

Many within ATLAS:

@ {senior, junior levels} ⊗ {design, build, operate ATLAS; analyze & interpret ATLAS data}.

Leadership roles' 7 categories:

- “Top level management”: spokesperson, 2 deputies, technical & resource coordinators.
- “Major area coordinators” of detectors (9) or activities (5).
- Institution Team Leaders 225 Team Leaders, 44 are women.
- Physics Coordination area: 15 groups. Each convened by 2 people.
- Trigger, Data Preparation, Computing. Since 2009, 223 in T, 101 in DP, 113 in C&SW.
- Subgroups of the 15 Physics Coordination groups: ~ 5 each, each convened by 2 people.
- Two large committees:
 - Publications Committee: publication process, 12 members.
 - Speakers Committee: allocate talks to ATLAS members, 15 members.



Leadership roles in ATLAS, ordered ~ level of responsibility.
 Speakers Committee has a fraction of women larger than average.

Executive Board

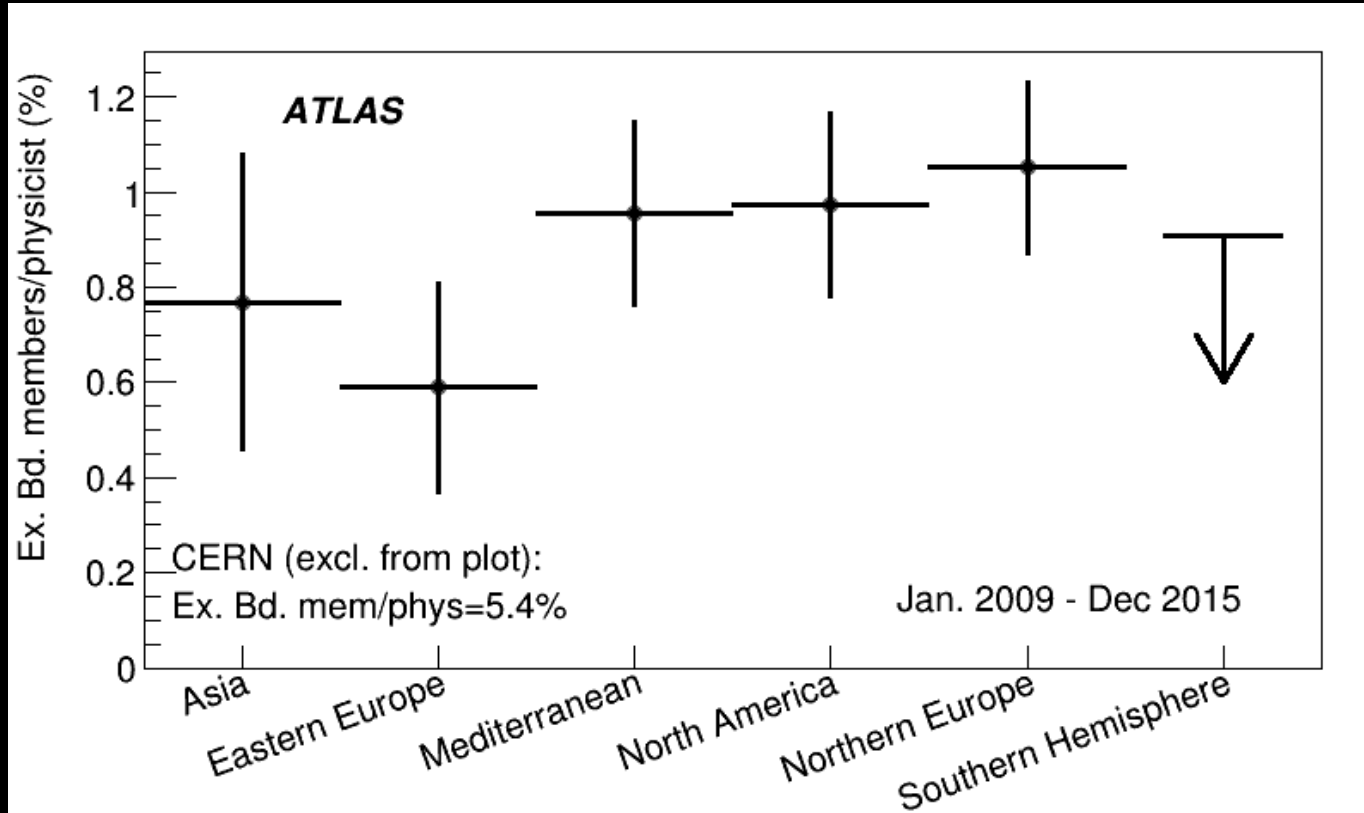
Main body steering ATLAS

- Chair: spokesperson.
- Deputy chair: Technical Coordinator.
- Members:
Top Level Management + Major Area Coordinators + chair of PubCom
+ 3 members at large

Fraction of EB affiliated with CERN: ~5% (excluded from next plot):

- > any region.
- Expected from CERN's special role in ATLAS operation; CERN staff resident in area, lower personal & prof constraints (some leadership positions require residency @ CERN).
- Technical & Resource coordinators are formally requested to be CERN staff members.

Executive Board



Members affiliated with CERN excluded (~ 5%)

None from Southern Hemisphere, but 95%CL upper limit is consistent with avg.

Contributions & talks

Talks on behalf of ATLAS are allocated by the Speakers Comm.

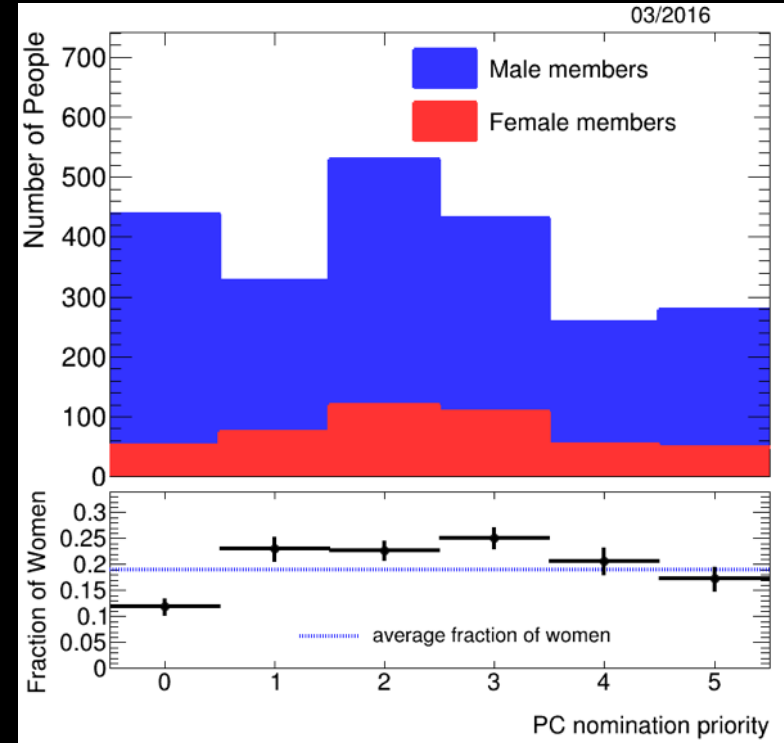
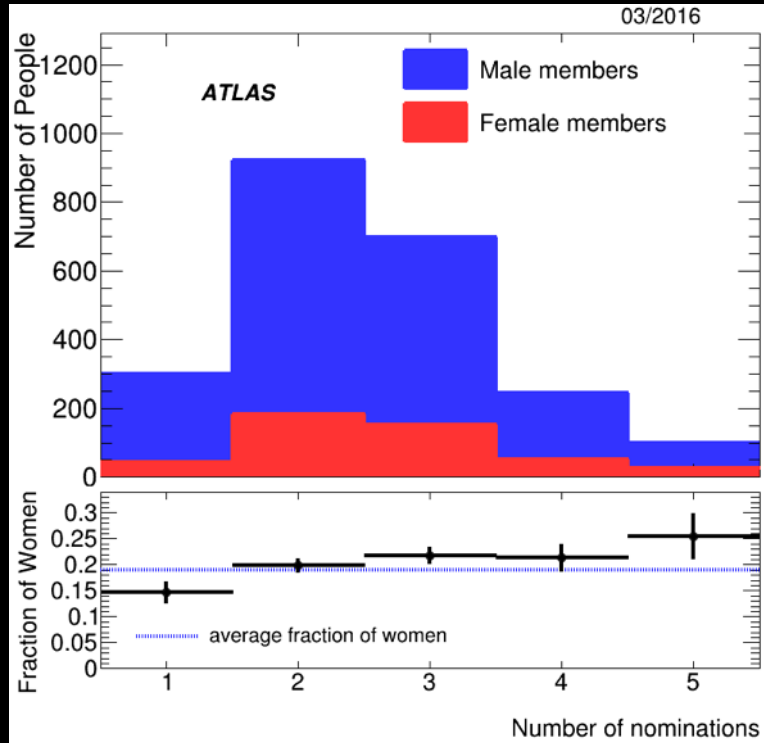
Large # ATLAS members → significant # able to give any particular talk. Procedure designed to be equitable.

Suitability:

- Number & priority of talk nominations
(by institute Team Leaders + Major Area coordinators)
- Time contributed to the successful operation of the experiment
- Current need for professional advancement
- How long since last talk

For analysis: only physicists & physics PhD students
(because only ATLAS public talks on physics were considered).

Contributions & talks



(1: highest, 5: lowest; 0: no nominations)

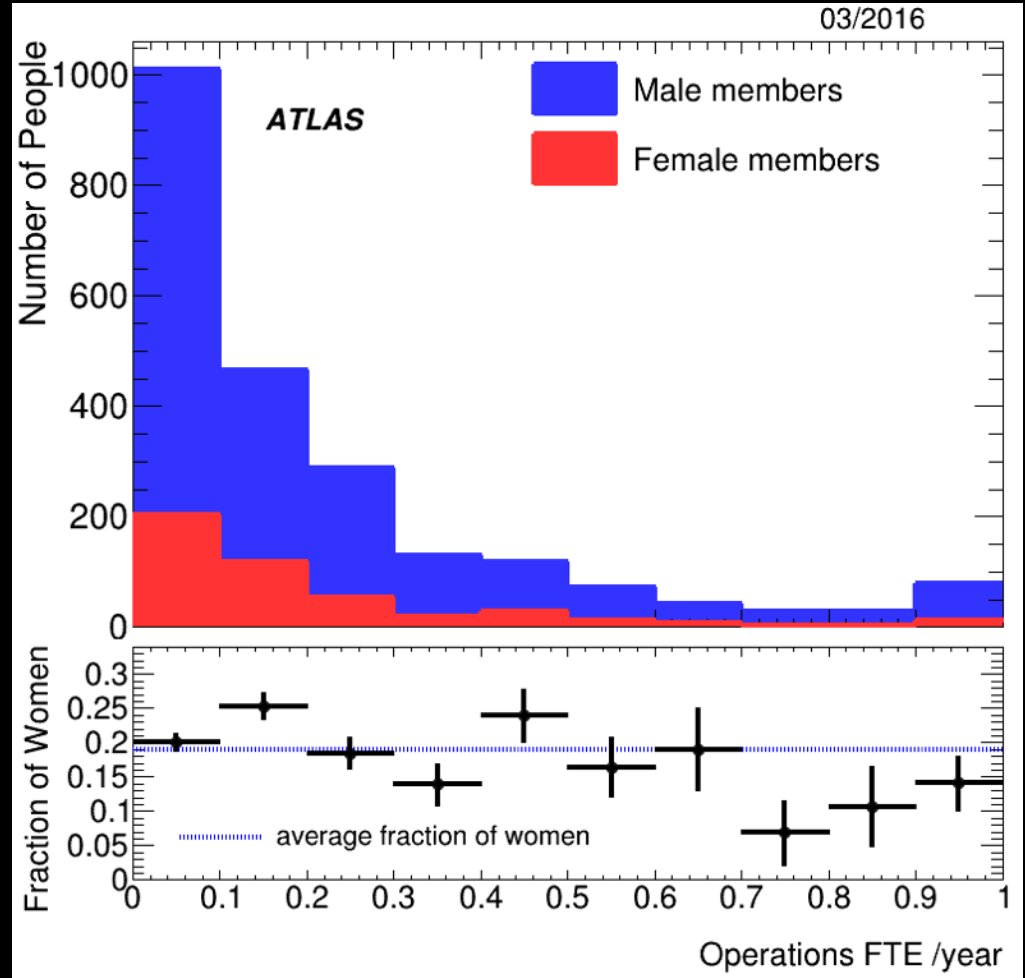
- Number of nominations for women \approx men
 - From Physics Coordination (PC):
 - fraction of men with 0 (no nomination) $>$ for women.
- On average, women receive stronger nominations

Operational tasks

Time recorded in a DB

FTE (Full Time Equivalent) contributed in the last 4 years

No statistical difference between men and women



International talks

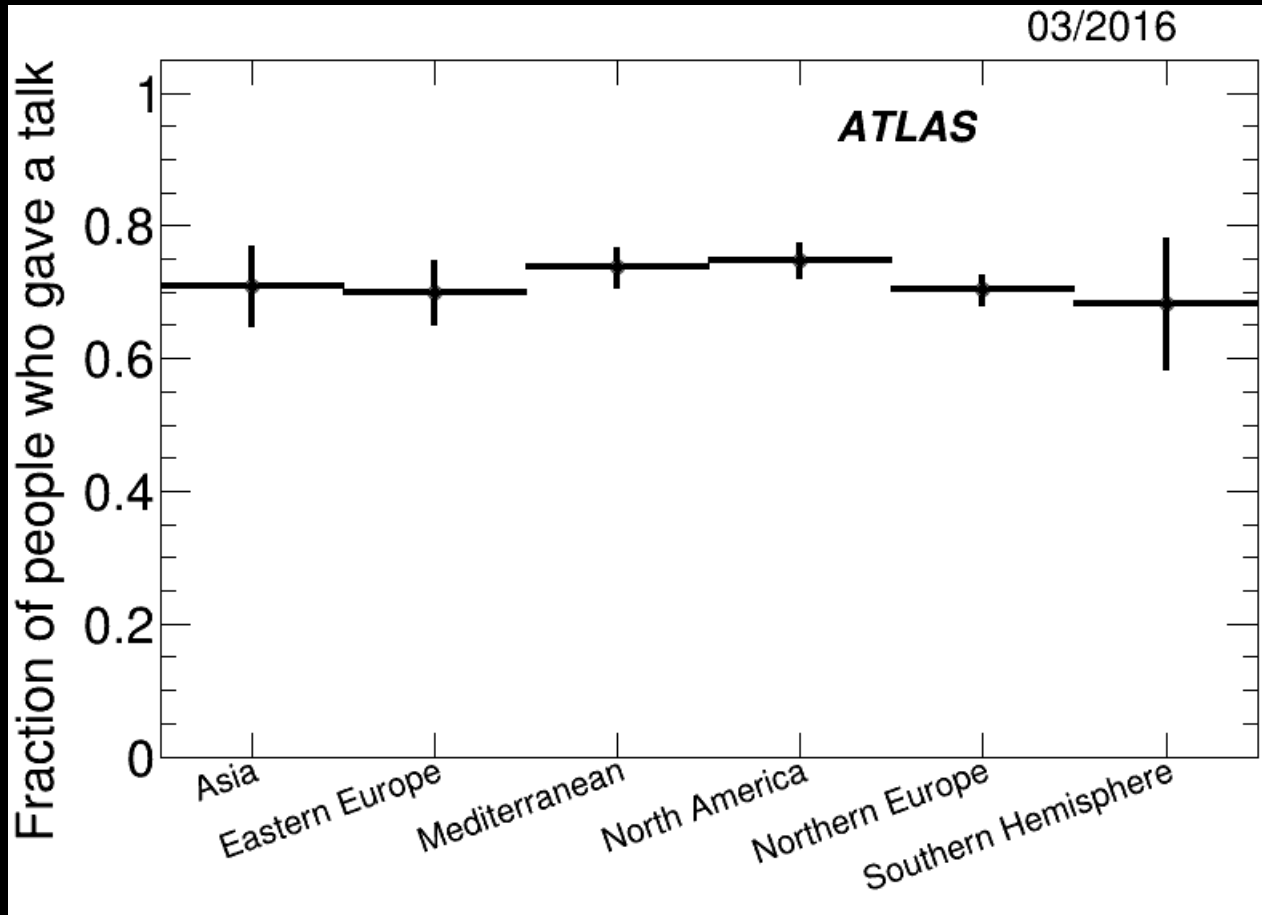
Fraction of men and women with at least 1 international talk since 2010. Only contributors to operational aspects:

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 tend to be given relatively more talks than men,
- Especially members with over 15y with ATLAS.
- For students, ~ same between men and women.
- Similar trend for talks in the last 3 y.

Due at least in part to the stronger nominations by the ATLAS' Physics Coordination

Talks vs Region



Fraction of physicists who have given at least one talk on behalf of the ATLAS Collaboration since 2009 versus the world region

ATLAS Overview Week

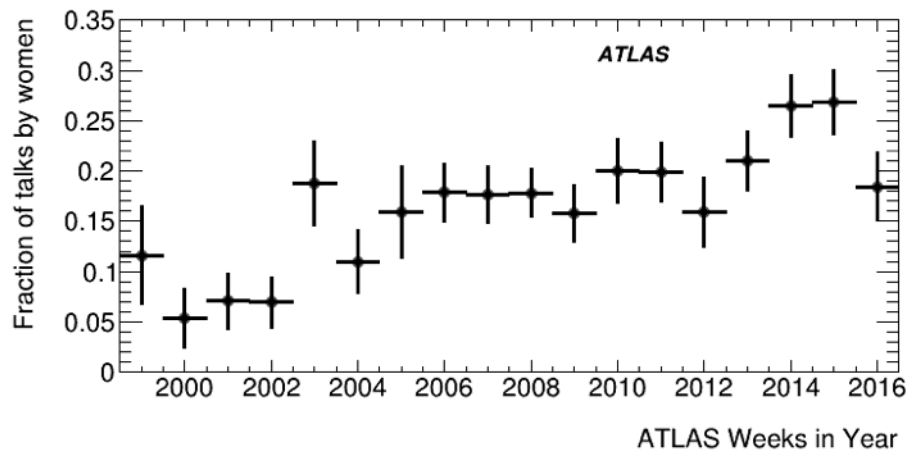
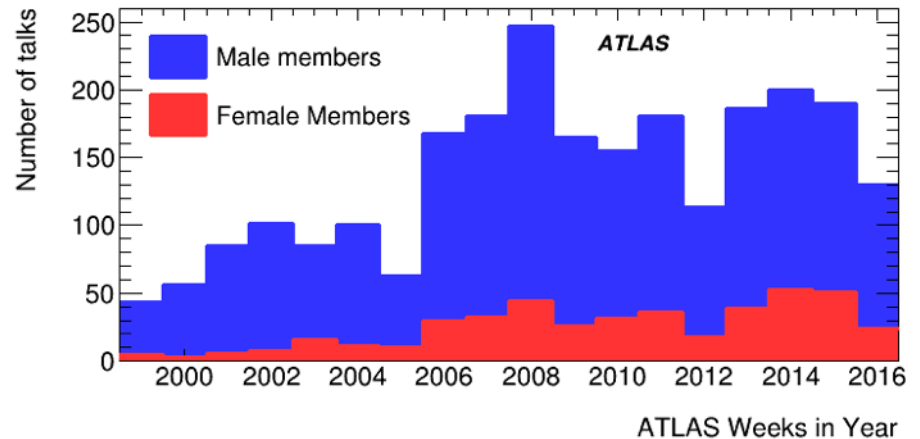
Week-long collaboration meetings, 3 times/y.

Plenary talks given by members playing key roles in the relevant areas; a form of recognition.

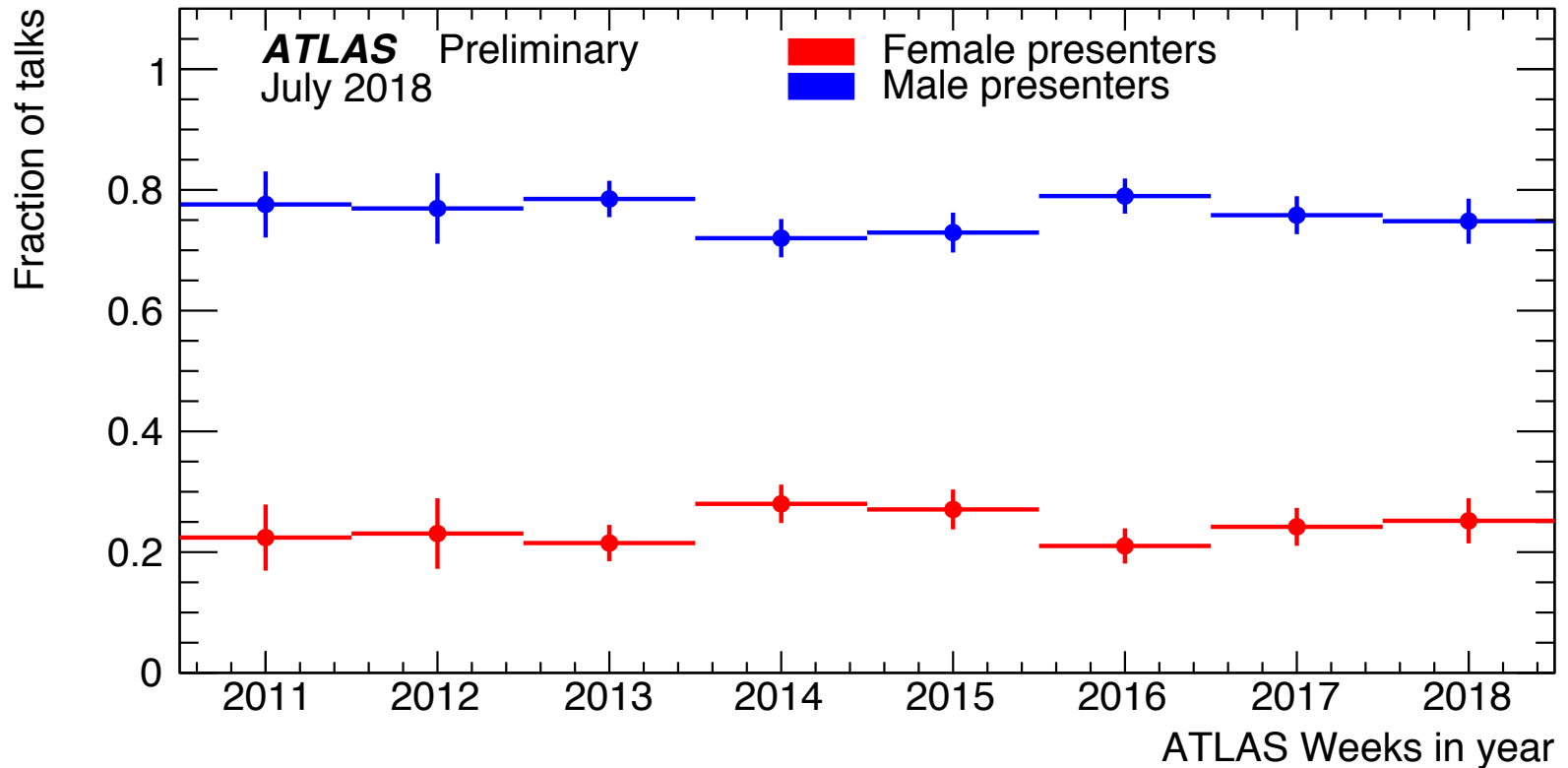
Time evolution of plenary talks:

Increasing fraction of women speakers with time.

Recently consistent with avg. fraction of women in ATLAS (19%)



ATLAS Overview Week



Final comments

- ATLAS has collaborators with over 90 nationalities, ~ 20% women.
- The fraction of women declines with increasing age
 - Slow & steady increase of women's participation in Physics & Engineering, "Leaky pipeline" (continuous loss of women as they climb the career ladder), or combination?
 - The reason could not be determined with the information available
- At this level of scrutiny, data indicate that ATLAS is engaging women in leadership and recognizing their contributions in a manner proportional to men.
- Similar level of equity in recognition through allocation of conference talks
- World regions representation in leadership and recognition ~ proportional to # members from each region
- Results available at <http://atlas.web.cern.ch/Atlas/GROUPS/PHYSICS/PUBNOTES/ATL-GEN-PUB-2016-001/>

Backup

Leadership roles' 7 categories:

- **“Top level management”**: spokesperson, 2 deputies, technical coordinator, resource coordinator. 2y terms. SP renewable once. The ATLAS Collaboration Board (1 rep per member state) elects the sp, endorses depts and c's.
- **“Major area coordinators”** of detectors (9) or activities (5). Term: 2y (detectors+upgrade) or 1y. Coordinate 10s-100s of people. Selection: activity c's: CB elects from a list from a search committee; detectors: within subsystems.
- **Institution Team Leaders** (182 ATLAS member institutions). 225 TL's, 44 are women. Selected within institution; no coherent scheme.
- **Physics Coordination area**: 9 PAG's, 6 CPG's. Each convened by 2 people, staggered 2y terms. Selection: Phys coord w/help from a search committee.
- **Positions in Trigger, Data Prep, Computing**. Since 2009, 223 in T, 101 in DP, 113 in C&SW. Coordinate 5-100 people. Term: 1 or 2y. Selection: activity coordinators.
- **Each PA & CP groups**: ~ 5 subgroups. Each convened by 2 people, 1y term. Convene 10s-100s. Selected by group conveners.
- **Two large committees**:
Publications Committee: publication process, 12 members, 2y term,
Speakers Committee: allocate talks to ATLAS members; ~800 talks/y; 15 members, 3y term. Selection: general nominations, search committee, elected or endorsed by CB.