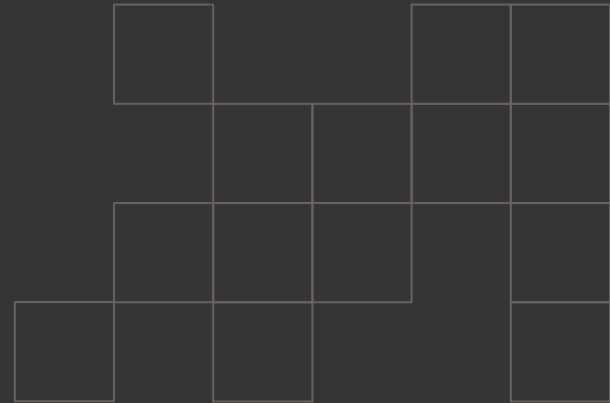


Who Builds Open Source? Measuring Women's Participation in Key Roles

by Monica Homescu, Msc Computing Science



university of
 groningen



Principles of OSS

Transparency

Open access to code and information

Collaboration

Anyone can contribute and improve existing work

Inclusive Meritocracy

The best ideas can come from anyone

Community

Built around shared goals and collective effort

Women's Participation in OSS

Women's Participation in Open Source Software: A Survey of the Literature

BIANCA TRINKENREICH, Northern Arizona University, USA

IGOR WIESE, Universidade Tecnológica Federal do Paraná, Brazil

ANITA SARMA, Oregon State University, USA

MARCO GEROSA, Northern Arizona University, USA

IGOR STEINMACHER, Universidade Tecnológica Federal do Paraná, Brazil and
Northern Arizona University, USA

- ❑ Women are significantly underrepresented in OSS communities
- ❑ Typically only 4% –14% of contributors are women
- ❑ Only about 5% of projects have women as core developers
- ❑ Women also author less than 5% of pull requests

Women's Contributions

Women's Participation in Open Source Software: A Survey of the Literature

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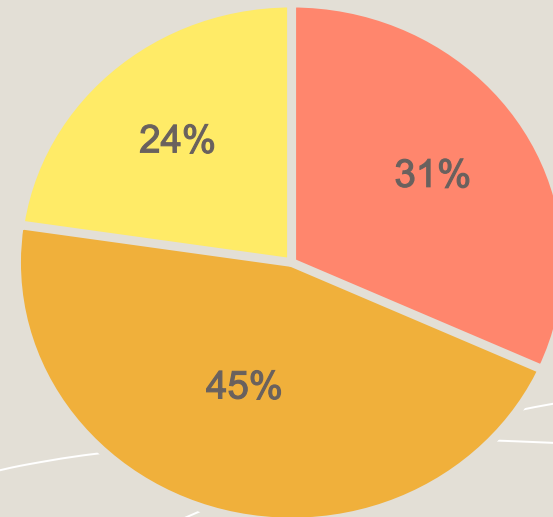
MARCO GEROSA, Northern Arizona University, USA

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Northern Arizona University, USA

- More involved in *community - centric roles* than project - centric roles

- Coding activities
- Non - coding activities
- Both



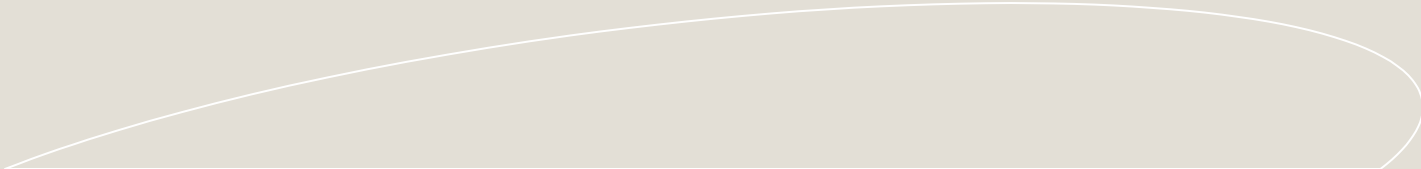
Challenges Women Face



Socio-cultural barriers

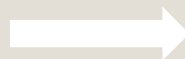
- Lack of peer parity
- Stereotyping and gender bias
- Toxic community culture

Contribution barriers

- Lower acceptance rates when gender is visible
 - Longer waiting times for code review
- 

Why This Project?

- ❑ Clear gender gaps in OSS
- ❑ Evidence mainly in academic literature
- ❑ No diversity data on GitHub



*Gaps remain
invisible in practice*

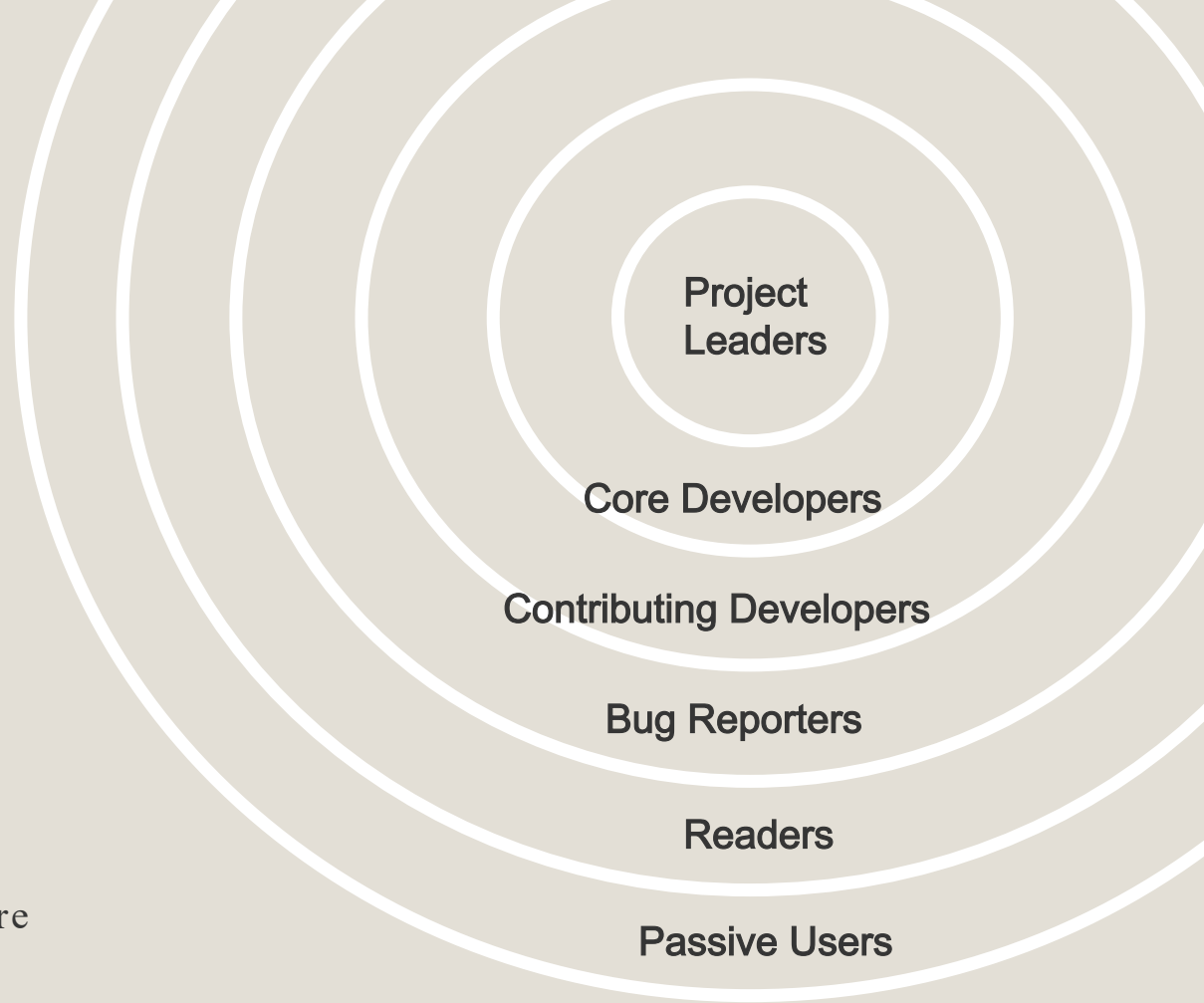
*What if we could make this visible directly on
GitHub?*

Goal → Build a tool to analyze and visualize gender representation in core roles

Who do we consider
core contributors?



The Onion Model



- ❑ Contributors are organized based on involvement
- ❑ Closer to the center → more *influence* and *responsibility*

Core vs Non-Core Contributors

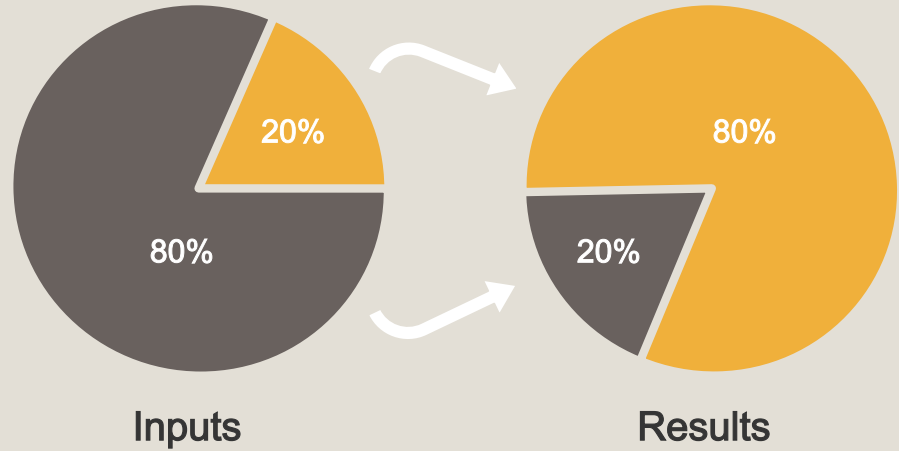
CORE

- Most active developers
- Produce a large portion of the code
- Often influence project decision

NON - CORE

- Contribute occasionally
- Usually make smaller changes
- Less involved in decision making

The Pareto Principle



- ❑ In OSS?

20% Developers → 80% Commits

- ❑ A simple way to identify *core and non-core contributors*

How do we identify
women?



Gender Inference

- ❑ GitHub profiles can include *self-declared pronouns*
- ❑ The plugin prioritizes explicit information from users:
 - ❑ *Pronouns field*
 - ❑ *Pronouns mentioned in bio*

GenderComputer

- ❑ When explicit pronouns are not available, the tool uses *GenderComputer*
- ❑ Infers gender based on:
 - ❑ *First names*
 - ❑ *Geographic information*

Name: Andrea
Italy → Male
Germany → Female

93%
precision

How can we measure
diversity?



Blau Index

- ❑ Measures how diverse a group is
- ❑ The plugin computes:
 - ❑ Diversity score for the *core team*
 - ❑ Diversity score for the *non - core team*



Blau Index

Male	Female	Non - binary	BI (normalized)
100%	0%	0%	0.00
70%	30%	0%	0.63
50%	50%	0%	0.75
33%	33%	34%	1.00

How does the
tool work?



The Tool

The screenshot shows the GitHub repository page for `facebook/react`. The repository is public and has 544 branches and 146 tags. A file browser shows the `main` branch with a search bar and an `Add file` button. The file list includes `.codesandbox`, `.github`, `compiler`, `fixtures`, `packages`, `scripts`, and `.editorconfig`.

Overlaid on the right is a diversity analysis tool for the repository `facebook/react`. The tool shows the following data:

- Commits: 1000
- Analysis period: 2024-10-09 to 2025-06-29
- Gender distribution:
 - Female: 12.5%
 - Male: 76.14%
 - Non-binary: 2.27%
 - Unknown: 9.09%
- Team diversity breakdown:
 - Core Team: 3 Female, 6 Male, 0 Non-binary, 0 Unknown
 - Non-Core Team: 8 Female, 61 Male, 2 Non-binary, 8 Unknown
- Average based on 5 other repo(s) analyzed up to date:
 - Core Team Diversity: HIGH - 1, current - 0.667, average - 0.333, LOW - 0
 - Non-Core Team Diversity: 1 - HIGH, 0.373 - current, 0.371 - average, 0 - LOW

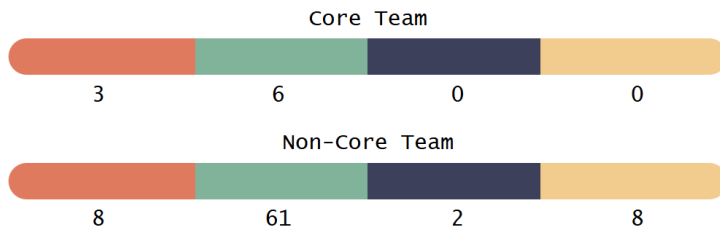
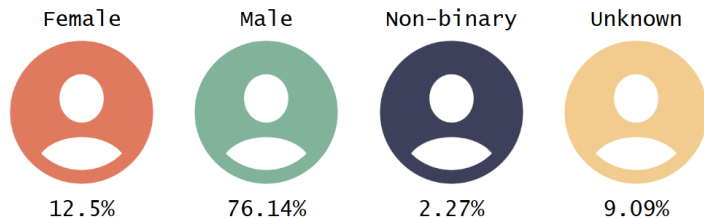
The Tool

facebook/react

Analyze

Commits: 1000

**Analyzed 1000 commits (2024-10-09 <-> 2025-06-29)*



**Average based on 5 other repo(s) analyzed up to date*

Core Team Diversity

HIGH - 1
current - 0.667
average - 0.333
LOW - 0



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Non-Core Team Diversity

1 - HIGH
0.373 - current
0.371 - average
0 - LOW



Next Steps

- ❑ **Overcome hosting limits**
 - ❑ Processing commits is computationally expensive → exceeds free-tier limits
 - ❑ Explore other hosting options and public release (e.g., Chrome Web Store)
- ❑ **Grow benchmarking dataset**
 - ❑ More users running the tool adds data, improving cross-repository comparisons
- ❑ **Scale with interest** → explore new features and extensions as adoption grows

Towards More Inclusive Open Source



Medium Post



Installation Guide



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