Gender Equality in Research and Innovation

Dr Charikleia (Charoula) Tzanakou
Co-Director of the Centre for Diversity Policy Research and Practice
Oxford Brookes Business School
Structure of the presentation

• PART 1 +3.1 : Understanding current situation of gender equality in Europe and Greece/Why it matters?

• PART 2: What is sex/gender?

• PART 3.2: Gender dimension in research
Gender equality policy landscape

Two decades of gender equality policy in research and innovation...

- too few women in science
- slow career progress
- under-representation in research decision-making
- lack of gender perspective in teaching and research
Women are close to reaching gender parity among doctoral graduates...

48.1% of doctoral graduates in EU 27 (2018, Eurostat)

Source: European Commission (2021)
Women are close to reaching gender parity among doctoral graduates...

48.1% of doctoral graduates in EU 27 (2018, Eurostat)

47.4% in Greece

Source: European Commission (2021)
Women are under-represented at the highest level in academia...

Source: European Commission (2021)
Women are under-represented at the highest level in academia...

Overall, women account for 42.3% of academic staff

Source: European Commission (2021)
In Greece 36.54% 

Source: European Commission (2021)
### Representation of women by academic grade (higher education sector)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Representation</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>♀♀♂♂♂♂♂♂♂♂♂♂♂♂</td>
<td>26.2%</td>
</tr>
<tr>
<td>B</td>
<td>♀♀♀♀♂♂♂♂♂♂♂♂♂♂</td>
<td>40.3%</td>
</tr>
<tr>
<td>C</td>
<td>♀♀♀♀♀♀♀♀♀♀♀♀♀♀♀♂</td>
<td>46.6%</td>
</tr>
<tr>
<td>D</td>
<td>♀♀♀♀♀♀♀♀♀♀♀♀♀♀♀♀♂</td>
<td>47.1%</td>
</tr>
</tbody>
</table>

*(2018, DG R&I Women in Science database)*

Source: [European Commission (2021)](https://ec.europa.eu)
## Representation of women by academic grade (higher education sector)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Women</th>
<th>Men</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6</td>
<td>9</td>
<td>26.2%</td>
</tr>
<tr>
<td>B</td>
<td>8</td>
<td>12</td>
<td>40.3%</td>
</tr>
<tr>
<td>C</td>
<td>12</td>
<td>14</td>
<td>46.6%</td>
</tr>
<tr>
<td>D</td>
<td>16</td>
<td>18</td>
<td>47.1%</td>
</tr>
</tbody>
</table>

(2018, DG R&I Women in Science database)

Source: European Commission (2021)
23.6% of heads of higher education institutions are women
(2019, DG R&I Women in Science database)

Source: European Commission (2021)
16% in Greece

Source: European Commission (2021)
UoC faculty

Representation of women

- Physics: 4.7%
- Maths: 7.6%
- Comp sci: 8.7%
- Chemistry: 9%
- Economics: 9%
- Politics: 13%
- Biology: 23%
- ...
- Preschool education: 62.9%

**Table 10. UoC faculty by gender and rank (2018-2019)**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Number</th>
<th>Percentage (%)</th>
<th>Ratio</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>W</td>
<td>M</td>
<td>W</td>
<td>M</td>
</tr>
<tr>
<td>Professor</td>
<td>30</td>
<td>151</td>
<td>16.6</td>
<td>83.8</td>
</tr>
<tr>
<td>Associate Prof.</td>
<td>54</td>
<td>101</td>
<td>34.8</td>
<td>65.2</td>
</tr>
<tr>
<td>Assistant Prof.</td>
<td>51</td>
<td>70</td>
<td>42.1</td>
<td>57.9</td>
</tr>
<tr>
<td>Lecturer</td>
<td>2</td>
<td>1</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>323</td>
<td>137</td>
<td>70.2</td>
<td>29.8</td>
</tr>
</tbody>
</table>

*Source: data for 2018-19, GEP online*
ERA Communication 2012

Three priorities

• gender equality in careers at all levels;
• gender equality in decision making;
• integration of the gender dimension into Research and Innovation (R&I) content

Reflected in funding from framework programmes-Horizon 2020
Horizon 2020-SwafS Gender Projects

Implement the 3 objectives of gender equality as an ERA priority through Gender Equality Plans

RPOs and RFOs - Partners at a starting stage - Professional associations – Link with national level

Support from the highest management level
- GENERA
- LIBRA
- PLOTINA
- SAGE
- EQUAL-IST
- Baltic Gender

Explain role of middle management
- TARGET
- GEECCO
- CHANGE
- SUPERA
- R-I PEERS

Make use of the GEAR Tool (2016)
- Gender-SMART
- GEARING-ROLES
- SPEAR
- CALIPER
- LeTSGEPs
- EQUAL4EUROPE

For more information on the projects, click here

EC GEP Cluster event (28 Feb 2018)
EC GEP Workshop (4 March 2020)
New measures to strengthen gender equality in Horizon Europe:

- An initiative to increase the number of women-led technology start-ups
- Funding for gender and intersectional research will also be made available
- The possibility to require a gender equality plan from applicants
Gender Equality Plans as an eligibility criterion in Horizon Europe

From 2022 onwards, having a GEP (Gender Equality Plan) will be an eligibility criterion for all public bodies, higher education institutions and research organisations wishing to participate in Horizon Europe, see here and here.
GEP building blocks

**1. Publication**
a formal document published on the institution’s website and signed by the top management.

**2. Dedicated Resources**
a commitment of resources and expertise in gender equality to implement the plan.

**3. Data Collection & Monitoring**
sex/gender-disaggregated data on personnel (and students, for the establishments concerned) and annual reporting based on indicators.

**4. Training**
awareness-raising/training on gender equality and unconscious gender biases for staff and decision-makers.
Recommended priority areas

Recommended GEP content areas

- **Work-life balance and organisational culture**
- **Gender balance in leadership and decision-making**
- **Gender equality in recruitment and career progression**
- **Integrating gender into research and teaching**
- **Gender-based violence, including sexual harassment**

Essential factors for gender equality in R&I
Fixing the numbers

Fixing the institutions

Fixing the knowledge

See: Gendered Innovations and Gendered Innovations 2
Any questions/comments?
Why gender equality matters?
HOW DO WE UNDERSTAND GENDER EQUALITY?

Source: Agents of Good https://agentsofgood.org/2017/05/08/

What implications for institutional change?
Why it matters?

• The right thing to do – (moral case)
• The smart thing to do – (business case)
  – Labour market participation
  – Diversity of talent
  – New business ideas
  – Performance

Sources: Hoogendoorn, Oosterbeek, & Van Praag, 2013; Roh & Kim, 2016; Özbekgin et al. (2013); Equal Opportunity Commission, 2005
Denial: there is a not GE problem

• Academia is meritocratic

• Pipeline problem?
  – Not enough women
  – But => 50% of women PhDs in Biological/social sciences

• Childcare problem?
  – Not enough time for research
  – Childcare or societal problem?
    • Role of working fathers
    • Role of the institution/national welfare system – daycare
    • Women with no children – not progress as quickly as men
• If you have heard the following riddle please do not answer
A riddle

A father and son are in a horrible car crash that kills the dad. The son is rushed to the hospital; just as he’s about to go under the knife, the surgeon says, “I can’t operate—that boy is my son!”

How do you explain this?
Orchestras in the US

1970s:
5% of musicians in top 5 orchestras in US were women

2021:
A third of the Boston Symphony Orchestra were women
Half of the New York Philharmonic were women

What changed?
Blind auditions
Bias in CVs

- Yale Study: a man and a woman applied for a laboratory manager position at a university.
- Identical, had the same qualifications.
- Science faculty rated the man as significantly more competent than the woman, more likely to hire him.

Gender and race bias experiment

• Emails sent to 6,500 professors at 258 U.S. universities representing 89 different disciplines.
• Meeting requests from prospective PhD students
• Names of students varied to indicate
  – Sender as man, woman
  – White, Black, Hispanic, Indian or Chinese
Results

Faculty significantly more responsive to Caucasian men than other categories of students collectively, particularly in higher paying disciplines and private institutions.

Implicit bias

“Implicit bias is an automatic reaction we have towards other people. These attitudes and stereotypes can negatively impact our understanding, actions, and decision-making.”

• Project implicit – Harvard university

• Scientific collaboration
  – Raise awareness about bias, understanding biases, stereotypes
  – Virtual lab for data collection

Take the test
• [https://implicit.harvard.edu/implicit/takeatest.html](https://implicit.harvard.edu/implicit/takeatest.html)
Unconscious bias

• Training: debate about its effectiveness
• Concerns that it might even make people to take no action (since their biases are unconscious!)
• Training needs – connect biases with how people behave and how it affects their decisions (and impact on other people)
• Training – starting point: Continuous discussion and reflection
• It doesn’t consider systemic issues (hostile environments, unfair policies)
What can universities/uni staff can do?

• Know the data, understand how gender influences evaluations/rewards
• GE requires continuous and consistent effort – not a quick fix
• Accountability is required from top to bottom
• Experiment with activities, if they fail, redesign
• Check our biases/reflect upon them

(Source: Valian, 2004)
What is Sex/gender
Sex is a biological marker, with people typically attributed to the categories ‘female’ and ‘male’ at birth.

Note however, that some people do not fit into this binary, e.g. unclear genitalia or different chromosomes sets, and are therefore intersex people.

Gender is a social construction, which for most people is aligned to the sex at birth.

Gender is about the categories of ‘women’ and ‘men’, but here again not everybody fits neatly into these categories.

People may identify as non-binary, or live their life in their preferred gender, even if that is not aligned to their sex.

See Guenther, Humbert and Kelan (2018)
See Guenther, Humbert and Kelan (2018)
Intersectionality

- Ethnicity
- Gender identity
- Disability
Gender norms

- Produced through social institutions (families, schools, work places); social interactions (family members, colleagues, partners) and wider cultural products (literature, film).
- Refer to attitudes and expectations about which preferences, professions and behaviors are appropriate for men, women, gender diverse individuals.
- Are dynamic and can change in different contexts (location, point in time).

Source: Gendered innovations
• refer to how individuals or groups perceive and present themselves in relation to gender norms. Gender identities may be context-specific and interact with other identities, such as ethnicity, class or cultural heritage.

Source: Gendered innovations
PART 4: Gender dimension in research
Gender dimension in research

**Gender dimension** means integrating sex and gender analysis into research [...] integrating into all phases of basic and applied research—from setting priorities, to funding decisions, to establishing project objectives and methodologies, to data gathering, analysing results, and evaluation.

Source: Gendered innovations
Why is gender dimension important?

Gendered innovations, Stanford University - Professor Londa Schiebinger

https://www.youtube.com/watch?v=GAOLxEpHrwQ
Fetal deaths related to maternal injury

H B Weiss, T J Songer, A Fafio

Abstract

Context: Maternal and fetal trauma is an important cause of adverse fetal outcomes. However, systematic exclusion from US injury surveillance programs of even the most severe outcome, fetal/neonatal death, has led to a lack of understanding about frequency, causes, and prevention.

Objective: To determine the rate of traumatic fetal deaths reported in state fetal death registries and the types of trauma and physiologic diagnoses associated with these deaths.

Design and setting: Retrospective descriptive study of fetal death certificates from 1995 through 1997 obtained from 16 states, which accounted for 15% of US live births and approximately 15,000 fetal death registrations per year.

Main outcome measure: Rate of fetal injury deaths, based on fetal death certificates coded with an underlying cause of death due to maternal injury at 20 weeks' gestation or later, by cause.

Source: Gendered innovations
**Gendered Innovation 2: Creating Intersectional Training Datasets**

The accuracy of FRSs is determined by the set of images or videos collected for testing. For the FRSs to perform well, training data must be sufficiently broad and diverse to enable the predictive model to accurately identify faces in a variety of contexts.

Zhao et al. (2017) found that when photographs depict a man in a kitchen, automated image captioning algorithms systematically misidentify the individual as a woman, in part because training sets portray women in cooking contexts 33% more frequently than men. The trained model amplified this disparity from 33% to 68% during testing. It is crucial to get the training data right.

In the now well-known Gender Shades study, Buolamwini & Gebru (2018) measured the accuracy of commercial gender classification systems from Microsoft, IBM and Face++, and found that darker-skinned women were often misclassified. Systems performed better on men’s faces than on women’s faces, and all systems performed better on lighter-skin than darker-skin. Error rates were 35% for darker-skinned women, 12% for darker-skinned men, 7% for lighter-skinned women and less than 1% for lighter-skinned men.

To overcome these problems, the team developed and labelled an intersectional dataset to test gender and race classification performance on four subgroups: darker-skinned women, darker-skinned men, lighter-skinned women and lighter-skinned men. Since race and ethnicity labels are culturally specific, the team used skin shade to measure dataset diversity (Cook et al., 2019). Their dataset consisted of 1270 images from three African countries (Rwanda, Senegal and South Africa) and three European countries (Iceland, Finland and Sweden).

An update to Gender Shades retested the three commercial systems previously examined and expanded their review to include Amazon’s Rekognition and a new system from a small AI company called Kairos. They found that IBM, Face++ and Microsoft had all improved their gender classification accuracy for darker-skinned women, with Microsoft reducing its error rate to below 2% (Raji & Buolamwini, 2019). Amazon’s and Kairos’s platforms, however, still had accuracy gaps of 31% and 23%, respectively, between lighter-skinned men and darker-skinned women.

Source: Gendered innovations
Added value of gender dimension in research

Research and Engineering:
Excellence and quality in outcomes, creativity and innovation, new perspectives/new questions

Society:
More responsive to social needs

Business:
Developing new ideas, patents, technology

Source: Gendered innovations
Integrating sex and/or gender analysis into research and innovation:

• helps researchers and innovators question gender norms and stereotypes, and rethink standards and reference models;
• leads to an in-depth understanding of diverse gender needs, behaviours and attitudes;
• enhances the societal relevance of the knowledge, technologies and innovations produced;
• contributes to the production of goods and services better suited to new markets.

Source: Gendered innovations report 2
Gender dimension and funding

Encouraging/requiring researchers to include gender dimension in proposals

• **European Commission**: Gender dimension in research – one of six key priorities of the European Research Area (ERA)
  - As part of the Excellence criterion in proposals (Horizon Europe Funding): Describe how the gender dimension and other diversity aspects is taken into account in the project’s research and innovation content [e.g. 1 page]. If you do not consider such a gender dimension to be relevant in your project, please provide a justification.

• **UKRI Global Challenges Research Fund (GCRF) and Newton Fund**: Gender equality statement (mandatory)
  - ‘meaningful consideration as how project contributes to reducing gender inequalities’ (1p) (Consider involvement of different genders; impact on people of different genders/impact on relations/risks and consequences to GE might be mitigated/avoided; outcomes/outputs with data disaggregated by age and gender)
Funding and publishing - gender dimension

Major Granting agencies worldwide:


• Require/encourage/encourage + evaluators have to score this element

Peer reviewed journals


- Guidelines for authors/reviewers
- Biomedical research
- SAGER Guidelines (Heidari et al.2016)
• Any questions/comments?
Resources/ How to include the gender dimension?

- Gendered innovations (EC and Stanford University) - 2009 -
  - Expert groups
  - Provide practical methods, case studies
  - Collaborations with more than 200 experts worldwide

- Toolkit for integrating gender in EU funded research (2011)
  - Gender Sensitive Research Cycle
Improving research

Sex, Gender, and Intersectional Analysis
Enhances all phases of research

- Setting Research Priorities
- Making Funding Decisions
- Establishing Project Objectives
- Developing Methodologies
- Gathering & Analyzing Data
- Evaluating Results
- Developing Patents
- Transferring Ideas to Markets
- Drafting Policies

Source: Gendered Innovations
Toolkit for integrating gender (EC, 2011)

4 PHASES

**WHO**

- Equal opportunities for men and women in research

> Encourage equal participation of men and women in research teams at all levels
> Create working conditions and culture that allow men and women to have equally fulfilling careers

**WHAT & HOW**

- Gender in research content

> Address both women's and men's realities
> Consider gender-specific research to fill knowledge gaps
Gender-sensitive research cycle (EC, 2011)
Equal opportunities for women and men in research

- Is there a gender balance in the project consortium and team, at all levels and in decision-making positions? Is your team diverse?
- Do working conditions (working hours, tasks) allow all members of staff to combine work and family life in a satisfactory manner? (e.g. will people with caring responsibility receive adequate support in carrying out their job.)
- Are there mechanisms in place to manage and monitor gender equality aspects, e.g. workforce statistics?
- Have you noticed a pattern of hierarchical gendered relations in your team?
- If there is a significant gender imbalance in your research group and other protected population groups are missing, how do you encourage people belonging to the minority groups to apply for a new position in your project?

*Sources: 6, 9*
Research ideas phase

• Have you considered how assessments of sex/gender, including stereotypes about what is considered “female” or “male”, can affect what you want to investigate, what questions you ask and how to answer them?

• Did you have different groups of men and women and gender minority people in mind when you formulated the research question? When identifying a research problem, did you consider how men, women and people from gender minority groups differently relate to that problem?

• Have any potentially relevant groups of research subjects been left out (e.g., female animals in animal research, men in osteoporosis research, pregnant women in automotive engineering)?

• Is sex/gender important for understanding the phenomenon you will investigate, and if so, how? Are there other dimensions that can be considered in relation to sex/gender, such as age, ethnicity, educational level, income, occupation, geographical location or technical competence?

• Have you reviewed literature and other sources relating to sex/gender in the research field? Have you looked for gender sensitive literature or research projects in your field? What is the current state of knowledge of sex and gender (norms, identities, or relations) in a given area of research or development?

Sources: 1,6,9
Proposal phase

• Does the project’s research topics and methods take the sex/gender dimension into account? Does the proposal explain how the sex/gender dimension will be handled?

• Are researchers trained in gender studies included in the research group?

• Have you considered whether the results of the research can have different effects on women and men, boys or girls? Can the research contribute to the advancement of gender equality?

Sources: 1, 6, 9
Research phase

• Are research methods, such as questionnaires, focus groups, etc., designed in a way that considers possible sex/gender differences and similarities between gender? Will sex/gender-differentiated data be collected? Have you ensured that samples, test groups or other involved in the project are diverse in terms of sex/gender, age and other background variables?

• Will sex/gender be a variable in the analysis? Will other variables be included in relation to sex/gender in the analysis?

• Are unconscious (stereotypical) assumptions about sex/gender implicit in the interpretation of data? Are there dimensions other than sex/gender that are important to consider?

• Also consider the gender/sexuality of the researcher who collects the data and how these might be affected especially in methods (interviews, ethnography, f2f SURVEYS)

Sources: 1, 6, 9
Analysing sex

1. Reporting the sex of research subjects or users. This is a prerequisite to sex analysis.

2. Recognising differences that exist within groups of females and males/women and men. Both biological and sociocultural factors differ substantially among individuals within each sex over their respective lives.

3. Collecting and reporting data on factors intersecting with sex in study subjects or users/consumers.

4. Analysing and reporting results by sex. Sex-specific analyses should be conducted and the findings reported.

5. Reporting null findings.

Source: Gendered innovations
1. What are the researchers’ or engineers’ gendered assumptions and behaviors that affect the proposed research? (assumptions about men/women, choices for research subjects/users)

2. What are the research subjects' and users’ gender needs, assumptions, or behaviors as they affect the proposed research

3. How do #1 & #2 interact? How do the genders of the researcher and the genders of the subject/user interact?

Source: Gendered innovations
Other factors intersecting with sex and gender

Genetics
Age
Sex Hormones  Reproductive Status  Body Composition
Comorbidities
Body Size
Disabilities
Ethnicity
Nationality
Geographic Location
Socioeconomic Status
Educational Background
Sexual Orientation
Religion Lifestyle
Language
Family Configuration
Environment

Source: Gendered innovations
Dissemination phase

- Is the sex/gender dimension included in the presentation of findings?
- If the sex/gender dimension is included, is it done in a way that does not reproduce stereotypical notions about gender, but also looks at variations within the gender categories?
- Have you considered that dissemination of the research findings can be directed towards networks, institutions, journals and conferences that address gender issues?
- Have you checked if your publication presents images of different genders? Have you considered whether these image might reproduce stereotypical gender roles?
- Have you considered how people of different genders could use the project results in different ways? In what ways do your research outcomes relate to gender inequalities in the society?

Sources: 1, 6, 9
Problems to avoid when analysing gender

Problems can arise if researchers assume that:

• all women as a group, all men as a group and all gender-diverse people as a group (their attitudes, preferences, needs, behaviours and knowledge) are the same;
• women, men and gender-diverse people are completely different;
• observed differences between women and men are solely biological in origin;
• observed gender differences hold across cultures;
• life conditions and opportunities are similar for women, men, and gender-diverse people;
• birth sex can be used as a proxy for gender identity in surveys;
• certain questions are relevant to only one gender (e.g. survey questions about caregiving relate primarily to women or questions about the strain of physical work primarily to men).

Source: Gendered Innovations Report 2
Gender dimension in research - caveats

• Not always relevant?
• Not only for researchers interested in gender
• It is not about counting the number of women and men
• It is not about emphasizing the differences between men and women
• Could involve different theoretical and methodological approaches
• Important to understand how gender relations work in different contexts and how the intersection with other variables such as income level, ethnicity, geographical position, age might be relevant

Source: Gendered innovations
Checklists to keep in mind

- Health & Medicine
- Tissues & Cells
- SABV in Biomedicine

(Gendered innovations website)

- Checklist (UKRI)
- Gender sensitive research cycle checklist
Case studies

Useful interdisciplinary case studies
Useful resources

1. Gendered innovations: https://genderedinnovations.stanford.edu


3. Institute of Gender and Health: http://www.cihr-irsc-igh-isfh.ca/?lang=en


