MAchinE Learning for Scalable meTeoROlogy and climate

Plan for Gender Balance

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D4.3 Plan for Gender Balance

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Dissemination Level: Public

Date: 29/07/2021
Version: 1.0
Contractual Delivery Date: 30/06/2021
Work Package/ Task: WP4/ 4.3
Document Owner: FZJ
Contributors: All partners
Status: Final

MAELSTROM

Machine Learning for Scalable Meteorology and Climate

Research and Innovation Action (RIA)
H2020-JTI-EuroHPC-2019-1: Towards Extreme Scale Technologies and Applications

Project Coordinator: Dr Peter Dueben (ECMWF)
Project Start Date: 01/04/2021
Project Duration: 36 months

Published by the MAELSTROM Consortium

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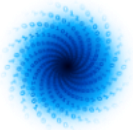
The MAELSTROM project has received funding from the European High-Performance Computing Joint Undertaking (JU) under grant agreement No 955513. The JU receives support from the European Union's Horizon 2020 research and innovation programme and United Kingdom, Germany, Italy, Luxembourg, Switzerland, Norway



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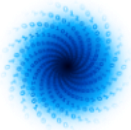
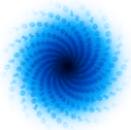


1 Executive Summary

As in science, technology, engineering, maths, and medicine (STEMM) subjects in general, MAELSTROM has a large bias towards male scientists. However, excellence requires diversity, and MAELSTROM at the organisational level aims to balance this by active recruitment endorsing the principles of the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers. MAELSTROM will put specific efforts in attracting female researchers for positions by advertising through Women in HPC (https://womeninhpc.org/) and will develop an action plan of appropriate measures as, e.g., recommended in the European Gender Toolkit. At the project level, MAELSTROM will support researchers with children or other dependants and will not schedule web meetings late in the day, try to minimize face-to-face meetings, and arrange meeting times to reduce time loss due to travel. Engagement with target audiences, and when designing information and services, will be gender-neutral. Two of the five WPs of MAELSTROM are led by female scientists.

This document contains a Plan for Gender Balance that outlines specific steps towards equal participation of men and women in all aspects of work, activities, and exploitation of outcomes of the MAELSTROM project. The plan is encouraging partners to highlight successful female colleagues on partner websites. Partners should use this information to promote project activities, achievements, role models, and training opportunities among existing female scientists and a young diverse population considering careers related to the project disciplines of weather and climate science and high-performance computing. The plan also includes the usage of dissemination approaches such as social media to provide useful links to gender networking. The gender balance links will be promoted among the staff of MAELSTROM partners and their associated institutions. Additionally, all MAELSTROM documentation review processes will include proofreading to avoid gender bias and utilise gender-inclusive language to ensure an inclusive communication style and work environment. This plan also promotes and supports flexible working for female researchers with children or other dependents.



2 Introduction

2.1 About MAELSTROM

To develop Europe's computer architecture of the future, MAELSTROM will co-design bespoke compute system designs for optimal application performance and energy efficiency, a software framework to optimise usability and training efficiency for machine learning at scale, and large-scale machine learning applications for the domain of weather and climate science.

The MAELSTROM compute system designs will benchmark the applications across a range of computing systems regarding energy consumption, time-to-solution, numerical precision and solution accuracy. Customised compute systems will be designed that are optimised for application needs to strengthen Europe's high-performance computing portfolio and to pull recent hardware developments, driven by general machine learning applications, toward needs of weather and climate applications.

The MAELSTROM software framework will enable scientists to apply and compare machine learning tools and libraries efficiently across a wide range of computer systems. A user interface will link application developers with compute system designers, and automated benchmarking and error detection of machine learning solutions will be performed during the development phase. Tools will be published as open source.

The MAELSTROM machine learning applications will cover all important components of the workflow of weather and climate predictions including the processing of observations, the assimilation of observations to generate initial and reference conditions, model simulations, as well as post-processing of model data and the development of forecast products. For each application, benchmark datasets with up to 10 terabytes of data will be published online for training and machine learning tool-developments at the scale of the fastest supercomputers in the world. MAELSTROM machine learning solutions will serve as blueprint for a wide range of machine learning applications on supercomputers in the future.

2.2 Scope of this deliverable

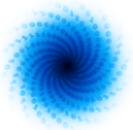
2.2.1 Objectives of this deliverable

This document defines the gender balance plan for the MAELSTROM project.

2.2.2 Work performed in this deliverable

The MAELSTROM Gender Balance Plan addresses the following aspects relating to the under-representation of women in STEMM:

- Popularise women's success stories through partners' website.
- Promote women's participation in the application, workflow and system developments as active members of research/engineering teams (WP1 - WP3).



- Ensure female participation in visible / prestigious roles (e.g. WP1 and WP2 work package leadership, inviting female researchers to give lectures at events organised within the MAELSTROM project)

- Ensure promotion of gender equality and diversity in the activities involved in the outreach and training activities such as hackathons and dissemination workshops.

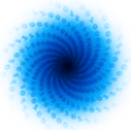
- Utilise social media to provide useful links to gender networking, the dissemination of the project information and events.

- Promote partner activities that implement equal opportunity policies in MAELSTROM's partner organisations.

- Promote and support the flexible working for female researchers with children or other dependents. Avoid schedule web meetings late in the day, minimize face-to-face meetings and arrange meeting times in a way that is reducing time loss due to travel.

2.2.3 Deviations and counter measures

No deviations have been encountered.



3 Gender Balance Plan

MAELSTROM brings together a wide range of project partners covering various European and national research institutions, such as universities, research institutes, meteorological centres and computing hardware vendors. Each institution also represents a broader community, with interests expanding well beyond the scope of this project. All partners work within a common open-source framework for development, where the outcomes of the undertaken work cycle through work packages W1, WP2, and WP3 in an iterative process. This framework promotes and requires a large amount of interaction between individual project partners, the broader Weather and Climate, and extends to general Science, engineering, high-performance computing, and machine learning communities. This high level of interaction process provides a significant opportunity to engage with women working in a broad range of disciplines, with a particular focus on young professionals and students in Weather and Climate, machine learning, and computational Science. This creates an opportunity to engage and attract a diverse network of talent to enhance European strength in high-performance computing portfolios and to pull recent hardware developments driven by general machine learning applications toward weather and climate applications.

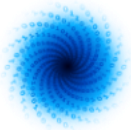
3.1 Gender Balance Actions in MAELSTROM

3.1.1 Role models: Examples of successful career paths

The underrepresentation of women in STEMM subjects has remained fairly constant over the past decade, even as women's share of the college-educated workforce has increased[1]. According to e.g. [2]–[6], the key issues related to under-representation of women in physical, engineering, and computer science arise from the need to encourage a young generation of women to study a mix STEMM subjects as well as computer science. Another important aspect is an increase in the proportion of the female workforce among senior professional staff in these disciplines. For instance, the data from a study [7] in 2010 shows that more than twice the proportion of male (33.2%) than female (14,3%) STEMM graduates enter professional jobs in science, engineering and technology in UK . More recent studies, e.g. [8], show that women represent 59 percent of the graduate pool within the EU-28. However, the percentage drops to 18 percent when it comes to the pool of academics holding full professorship at universities.

However, it is interesting to notice that in some countries the situation is reversed at least in computer science. In Malaysia, computer science is dominated by women [2], [9]. There is evidence that having examples of successful career paths and positive experiences have a pronounced effect on women's choices and their long-term commitment to vocational routes in computing, science, and engineering. This can be addressed by taking steps to promote women role models to increase confidence in opportunities for career progression [10], [11].

Partners will be encouraged to display profiles of successful female colleagues on their webpages. It will also be assessed how successful female colleagues could be highlighted on the project website, together with career opportunities and role models for women in the project-related subjects. The invitation to ask for role model examples for the web page will target the female speakers of MAELSTROM activities, some training events and workshops, and partner institution. Such requests



would ensure that professional profiles are showcased for scientists at all stages of their careers, thus making it easy for female scientist to relate to them.

Action: Encourage partners to highlight successful female colleagues on partner websites. Assess how this could also be achieved on the MAELSTROM website.

3.1.2 Networking

Despite the evidence highlighting the importance of networking for career development that can positively impact women's participation, there are still many difficulties experienced by female scientists in male-dominated environments [12]–[14]. The difficulties happened during the establishment of a women's professional credentials each time they encounter a new situation, colleague or even during the professional review processes of scientific outputs and funding proposals.

To address this issue, it is essential to get active support from male colleagues to gain access to inner circles and networking that can be difficult for women in male-dominated environments. However, it is still difficult to participate in professional networks' core activities and be considered for prestigious roles, establishing collaborations, or receiving invitations to participate in essential activities. There are no easy solutions to this issue. However, at least to some extent, women may benefit from establishing links with other female scientists through networks of women in computing and science or as immediate colleagues[14].

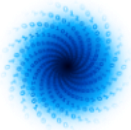
To aid career development for women, MAELSTROM members will provide information promoting network events and will maintain such information links to leading internet webpages and social media which present networking support for women in science and engineering. The networking webpages and social media include but are not limited to Research gate; LinkedIn; Twitter; The European Association for Women in Science, Technology, Engineering and Mathematics (WISE EU) WiTEC EU[1]; ACM-W; European Centre for Women and Technology ECWT[2]; European Platform of Women Scientists EPWS[3]; STEM women[4] ; Association for Women in Science (AWIS)[5].

Action: Establishing links to MAELSTROM on the "Women in Science" page on the networking sites for female scientists and researchers in the related disciplines to the project. These links will promote the participation of women in Science and provide information of the MAELSTROM events and outcomes.

3.1.3 Gender Balance in participating institutions

Getting support from the middle and high-level management at organisational level to promote and improve gender balance in Science, computing and engineering is significantly important to achieve

[1] https://www.witeceu.com/
[2] http://www.ecwt.eu/en/home
[3] https://epws.org/
[4] https://www.stemwomen.co.uk/
[5] https://www.awis.org/



success in diversity policies. The positive endorsing gender equality activities of the MAELSTROM partners will be provided as examples linking to the MAELSTROM webpage.

The MAELSTROM Gender Balance webpage will be provided during MAELSTROM dissemination activities such as training events, conferences, and materials, to enhance the awareness of gender balance issues. In addition, we will promote practices in gender equality among MAELSTROM partners through gaining information on gender balance and training activities from partners and including them in the MAELSTROM Gender Balance webpage.

Action: Promote MAELSTROM gender activities through various dissemination activities such as training and hackathon events. This is facilitated by obtaining and disseminating information from the partners for MAELSTROM Gender Balance webpage.

3.1.4 Inclusive communication style

Gender-natural or gender-inclusive is important to avoid word choice which may be interpreted as bias, discriminatory, also helps reduce gender stereotyping and contribute to achieving gender equality [15]. The female scientist can be discouraged from undertaking careers in STEMM by the perception that these subjects are exclusive of women[16]. The style bias towards male participation in verbal and written communication can be the reason for this perception. The report [15] gave several examples of using the generic pronoun “he” when referring to professional staff and computer or code users. It also points to talks, invitations, letters and other written communication where the recipients are addressed as “Sir”, or “Gentlemen.” Other examples include the term ‘guys’ to address a mixed-gender group, perhaps unconsciously, excludes anyone who doesn’t identify as male [17].

MAELSTROM aims to create an inclusive work environment, alerts all the partners using an inclusive communication style through this report and other communication events, such as meetings. We shall also ensure that all reports, code documentation and user-guides, teaching, and publicity material are inclusive of all members of society.

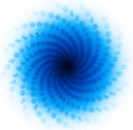
Action: Through proofreading for Gender Equality of MAELSTROM’s reports, webpages posts, training materials by MAELSTROM internal reviewers to ensure inclusive communication style and work environment.

3.1.5 Work-life balance

The studies have shown that flexible working could be a useful tool to enhance gender equality further. Flexible working can be adopted to allow mothers to maintain their working hours after childbirth and maintain the work-life balance[18].

At the project level, MAELSTROM will support researchers with children or other dependants and will not schedule web meetings late in the day, try to minimize face-to-face meetings, and arrange meeting times to reduce time loss due to travel.

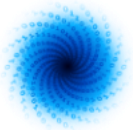
Action: promote and support the flexible working for female researchers with children or other dependents. Avoid scheduling web meetings late in the day, minimize face-to-face meetings and arrange meeting times in a way that is reducing time loss due to travel.



3.2 Gender Balance Milestones

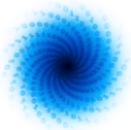
Table 1 List of Gender Balance activities

Activity	Time of Action	Leading MAELSTROM partner
Encourage partners to highlight successful female colleagues on partner websites. Assessment on how this could also be achieved on the MAELSTROM website.	Aug 2021	ECMWF/FZJ
Material collection of MAELSTROM Gender Balance Information	Duration of the project	FZJ
Establishing links to the MAELSTROM "Women in Science" page on the networking sites for female scientists and researchers in the related disciplines to the project. These links will promote the participation of women in Science and provide information of the MAELSTROM events and outcomes	Duration of the project	FZJ/ECMWF
Issuing invitation for talks and participation in the MAELSTROM events to female scientists and the popularization among partners of good institutional gender balance practices	Duration of the project	FZJ/ECMWF
Through proofreading for Gender Equality of MAELSTROM's reports, webpages posts, training materials by MAELSTROM internal reviewers to ensure inclusive communication style and work environment.	Duration of the project	All MAELSTROM partners and reviewers
Promote and support flexible working for female and male researchers with children or other dependents. Avoid schedule web meetings late in the day, minimize face-to-face meetings, and arrange meeting times to reduce time loss due to travel.	Duration of the project	All MAELSTROM partners



4 Conclusion

This documentation offers a concrete plan for the enhancement of Gender Balance within the MAELSTROM project. This plan aims to promote gender diversity within the working environment and culture, including all dissemination and training activities. The proposed measures are proportionate and attainable within the scope of MAELSTROM project and ambitious enough to encourage engagement through a potentially wider pool of talent for the weather and climate and HPC communities. Some specific measurements of the plan include the encouragement of the usage of gender-inclusive languages throughout all the internal and external dissemination activities. This plan also utilizes the MAELSTROM Gender Balance webpage, that is developed at the early MAELSTROM project, to maintain the social media networking sites for women-in-science. This network will highlight the potential avenues of engagement to women-in-science.



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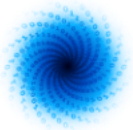

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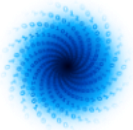

Document History

Version	Author(s)	Date	Changes
0.1	Bing Gong (FZJ), Daniel Thiemert (ECMWF)	16/06/2021	Initial Version
0.2	Bing Gong (FZJ), Daniel Thiemert (ECMWF)	20/07/2021	Version of Review
1.0	Bing Gong (FZJ)	28/07/2021	Final Version

Internal Review History

Internal Reviewers	Date	Comments
Peter Dueben (ECMWF)	23/07/2021	Approved with revisions
Timo Schneider (ETHZ)	26/07/2021	Approved with comments

Estimated Effort Contribution per Partner

Partner	Effort
FZJ	0.3
ECMWF	0.1
Total	**0.4**