

Best Practices from PhD to Professor: Career planning and mentoring

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EUGAIN features more than 150 members from over 45 countries, including 5 non-European ones. Its main aim is to improve gender balance in Informatics through the creation and strengthening of a truly multi-cultural European network of academics working on the forefront of the efforts in their countries, institutions and research communities. It builds on their knowledge, experiences, struggles, successes, and failures, learning and sharing what has worked and how it could be transferred to other institutions and countries.

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Executive Summary	1
Towards an Inclusive and Diverse Environment in Academia	2
The Need for a Change	2
Change the Culture not the Women	3
Career Development	3
Mentoring	4
First Steps Into Action	6
Organising the Culture Change	6
Setting up a Career Development Program	9
To be or not to be an academic	9
A first foot in the door	10
Success comes in different forms	10
Career-development recommendations relevant at any career stage	11
Setting up a Mentoring Program	12
Getting started	12
Addressing different mentoring needs	13
Establishing a pool of mentors and matching mentors and mentees	14
Format and frequency of meetings	14

Women are under-represented in academia, either because they do not consider an academic career as an option or because they drop out of the pipeline too soon.

In this booklet, we examine the main challenges that women face in advancing academic careers, and we propose concrete actions to address them focusing on three main directions that have been shown to foster women's advancement: build a supportive environment, build career development initiatives and establish mentoring programs.

We argue that the prevailing culture in many academic institutions is not supportive towards women and outline concrete actions to implement a culture change. We pinpoint the varied career paths that exist in academia, and propose career development recommendations relevant to all career stages, and ones tailored towards key career junctures. We also provide step-by-step actions to set up successful mentoring programs and address different mentoring needs.

This booklet is aimed both at management and women. It can help management start taking action towards supporting female students and faculty, and can guide women who work in non-supportive environments or are just looking to understand the system.

In recent years, much attention has been given, and much time expended, on understanding the challenges and barriers that women face in securing their education, progressing that education to take up places in academia, and in advancing within academic institutions.

The challenges faced are not only about diversity but also about equality and equity. This report discusses these challenges, and possible actions that can be taken to address these challenges. It should be noted that many of the actions that we list in this report can also be beneficial to others, even though our starting point is to improve the position of women in academia.

There are many reasons to address these challenges that women face, for example, because one feels that it is an injustice that should be repaired. However, there are also formal reasons to address these challenges: the EU has a treaty obligation to promote equality between women and men in all of its activities, which provides the basis for gender mainstreaming (Special Report 10/2021: Gender mainstreaming in the EU budget: time to turn words into action¹) and so we are mandated to address these issues that women face in order to join, remain, and progress in academia.

The Need for a Change

Women persistently face challenges and barriers that disadvantage them - regardless of the institution or agency they are working within. From the *glass ceiling*² [44] (*glass* (transparent) because the limitation is not immediately apparent or is often denied, and *ceiling* because it implies a limitation blocking upward advancement)- to the *sticky floor*³ [7] because women are concentrated in the lower-ranked and lower-paid occupations within a given profession - the barriers, invisible or otherwise, prevail.

Invisible barriers continue to exist, even though there are no visible or explicit obstacles keeping women (and other minorities) from acquiring advanced job positions. While the glass ceiling tends to cripple women from securing key decision-making, higher earning posts in the organisation, they also encounter the *glass elevator/escalator*⁴ [61].

Women are also likely to be 'caught in axis' of *horizontal and vertical segregation*⁵ [62].

The barriers within organisations remain scrutinised, however while *ceilings* and *floors* prevent upward mobility, women also face challenges before they ever join the organisation. When the process of recruitment is scrutinised it has been found that there is unconscious bias around the recruitment space. When algorithms or humans know the gender of the person, or have a picture of the person, there is an unconscious bias that kicks in and impacts on how that person is perceived – positive or negative – with direct impact on job success. Caroline Criado Perez (2022) found that "men think of 'a man' 80 % of the time they think of 'a person'", and the

¹Date: 26/05/2021, link: <https://www.eca.europa.eu/en/Pages/DocItem.aspx?did=58678>.

²*Glass ceiling*: the often invisible barriers that prevent women to rise to higher positions within an organisation simply because they are women.

³*Sticky Floor*: a discriminatory employment pattern that keeps workers, mainly women, in the lower ranks of the job scale, with low mobility and invisible barriers to career advancement.

⁴*Glass elevator/escalator*: the rapid promotion of men over women into decision-making and leadership positions, especially in female-dominated fields such as education or health.

⁵*Horizontal segregation*: the limited opportunities for one gender (i.e., women) in certain occupations or professions that are dominated by the other gender; *Vertical segregation*: the situation where people do not get jobs above a particular rank in organisations because of their race, age, or sex.

UN 2020 found that *90 % of men/women globally are biased against women* (Gender Social Norms Index - released by the United Nations Development Programme (UNDP) 2020). It has been found that *blind recruitment*⁶ removes unconscious bias.

Finally, the *glass cliff*⁷ (coined by Ryan and Haslam 2004) emerges as a more subtle barrier than the others above. It explains the phenomenon whereby women who are able to break through the glass ceiling are actually more likely than men to find themselves in positions of risk at the top. For example, if the organisation is in crisis, management more often turns to and promotes a woman, placing her in a likely position of failure. Research carried out by Haslam found that when 300 people were interviewed, when shown resumes of male and female candidates they chose the male candidate when the company was successful and the female candidate when the company was failing, suggesting that the '*old boy's network*' persists, and as soon as there is trouble the network won't want to give the job to 'their 'old boys', so a woman will be appointed/promoted.

Change the Culture not the Women

While we have documented the key issues that women face when they access institutions, the rhetoric that women often hear is that 'they should work hard', 'do their best', 'strive to excel' etc., and they will succeed. However we know that despite the best efforts of women everywhere, the barriers persist (see also [53]). The onus should *not* be placed on women to succeed, when we know that the barriers and challenges exist within the organisation, and are systemic. It is the culture and the environment that we need to change and the onus needs to be on the organisations and institutions to do just that [36, 34].

Thus, we need to change the culture of the organisation, and as a result change everybody's perspective on the position of women in the organisation. For this, two things are important: (1) both management, and everybody involved in decision making in the organisation should acknowledge that change is needed, and that this will be beneficial for the organisation as a whole, and (2) at the same time the management should provide support for women in the organisation to secure and improve their position. This document will discuss what can be done to realise this culture change, and it will interrogate and develop two lines of action to improve the situation for women in academia: *career development* and *mentoring*.

Career Development

According to *the Encyclopedia of Career Development* [22], career development is a multifaceted topic that can be explored from personal, organisational, social or legal perspectives.

From a personal perspective, career development is a process of exploration and action that an individual undertakes to fulfil professional aspirations. The strategies and decision-making styles vary according to the individual's abilities, personality and values system. In contrast, organisations consider career development as a series of programs and practices that help collaborators achieve success in their careers. For example, such programs include academic advising, career counselling, mentoring, and health/well-being initiatives.

The legal and social contexts also have a direct impact on how individuals and organisations approach career development. For example, labour laws on employment security and unjust termination and social class, culture and ethnicity can have a strong influence career decision making at both the individual and organisational levels [22].

⁶*Blind recruitment*: a recruitment process where all identification details are removed from the candidates' resumes and applications.

⁷*Glass cliff*: a situation in which women are promoted to higher positions when an organisation is facing severe challenges and when the chance of failure is more likely.

There is a consensus that women are not well-represented in academia, either because they do not consider it as an option all-together or because they leave it prematurely [18, 19]. Thus, it is very important to provide women active career development support since it has been demonstrated to increase motivation, empowerment and resilience [39].

In this booklet, we focus primarily on career development from personal and organisational viewpoints. We highlight the different career possibilities and paths that exist in the academic world and emphasise the main actions that individuals and institutions can undertake to support career development in academia.

Mentoring

Mentoring is a very broad term. It has served different purposes, been adopted in many different contexts, and taken many forms. This leads to a lack of agreement on what mentoring is and how the term can be defined, as concluded in a review by [41].

Meggison et al. [40] define mentoring as, “off-line help by one person to another in making significant transitions in knowledge, work or thinking”. According to Meschitti and Lawton Smith [41] “mentoring implies an exclusive relationship in which a more experienced person provides strategic advice to facilitate the professional and personal development of another, less experienced one”. “It is a voluntary and reciprocal learning relationship that offers professional and career development for the mentee, and opportunities for the mentor to grow through sharing their knowledge. It is typically mentee-driven” [2].

Although a multitude of mentoring definitions exists in the scientific literature, Cuerrier [23] explains: “Mentoring is a form of voluntary help, which is not necessarily gratis, which favours development and learning, based on an interpersonal relationship of assistance and of exchanges in which an experienced person invests their acquired wisdom and their expertise, in order to favour the development of another person, who has to attain some competences and professional objectives”. When applied more specifically such as to organisations, “mentoring should help the mentee to better understand the organisational context and career opportunities, avoid isolation, and access relevant networks”.

As can be observed in the above definitions, mentoring is most frequently conceptualised as a single, formalised, dyadic, hierarchical relationship between a senior and junior faculty member [65]. In this form, mentoring closely follows the definition of Kathy Kram (1985), an early mentoring researcher, who defined mentoring ‘as a relationship between an older, more experienced mentor and a younger, less experienced protégé for the purpose of helping and developing the protégé’s career [49].

However, nowadays, the word mentoring is often used interchangeably with such terms as, advising and supervising, coaching, and sponsoring. Therefore, Mullen [42] noted that the breadth of the definition can be problematic. The differences between mentorship and sponsorship can be very subtle. Both promote career advancement, and mentors may also be sponsors; however, while mentors provide guidance, feedback, and psycho-social support on an ongoing basis, sponsors provide specific strategic opportunities to an individual at a particular time [30]. It is also important to distinguish between mentoring and coaching, where the latter tends to be a short-term, self-reflective, goal- and skills-specific, and performance-driven and is useful when someone needs help to define what one needs/wants to improve and to achieve that goal or to acquire that [1]. While there are different nuances to each of these roles, much like the fact that the terms mentoring, sponsoring and coaching can be used interchangeably, it is also possible that the same individual takes on each and every one of these roles at some point.

Mentoring has been recognised as an important instrument for fostering academic women’s careers and addressing such imbalance [41]. In Science, Technology, Engineering, and Mathe-

ematics (STEM) fields women are still underrepresented, especially in the more senior ranks of academic careers, in which only 17.9% of the positions are occupied by women; this lowest proportion of women among grade A academic staff was a constant in Engineering & Technology fields, except for five countries: Cyprus, Luxembourg, Malta, Slovenia, and Israel [16].

Being less represented means women are at risk of being marginalised [41], and although they may not face direct discrimination [52], they are still often excluded from important networks [57]. To address these issues, both retention and progression are crucial, and mentoring can provide a valuable tool to women in their academic careers. The Guide to Best Practices in Faculty Mentoring [24], among others, highlights the following advantages of mentoring: increased organisational strength and productivity; enhanced productivity support and teaching effectiveness; the development of a more inclusive and supportive scholarly community; increased faculty retention, productivity and satisfaction, and the promotion of an overall more positive organisational climate. An important topic that has been previously emphasised and remains relevant today is that, in academia, women tend to take different career paths than men, with their CVs often showing less continuity, and face higher stress levels and a greater sense of isolation [48]. This said: mentoring can provide a particularly beneficial tool for helping women navigate their career path and better manage their career development.

Organising the Culture Change

Many academic organisations and institutions know that a culture change is needed, but they find it hard to take concrete steps to achieve this. Acknowledging the need for a change is the first step, but putting it into practice is an even bigger challenge. Moreover, to make things happen, an intrinsic wish to change things should be felt: often the management knows that something must be done to improve the position and opportunities of women in their organisation, but they do not feel an intrinsic motivation to actually change something, because they have not experienced the difficulties and challenges that women face themselves [12, 14].

Considerations to Realise a Culture Change If the need for a culture change is not felt intrinsically, then activities to improve the position and chances of women might lead to *negative reactions*. A change in how things are organised can disturb the existing members of a department (or other organisational unit), and they may begin to work against change covertly or openly.

Every change goes through five stages of grief [13]: denial, anger, bargaining, depression, and then acceptance. Until the organisation has completed these stages, change will not be properly implemented. So, when pushing for a culture change, it is important to take this into account and to manage the stress that members of the organisation might feel: they have existing ideas of how one should get the degree and position, and how one should be trained or supported. These existing ideas and unconscious biases might be conflicting with what one wants to achieve with the culture change, and need to be addressed. In the end, everyone needs to change their values, attitude, and behaviours.

It should further be noticed that the *size and composition* of a group or department can play a role in this process. Heterogeneous groups members might have different backgrounds and expectations, and cultural differences can make the culture change even more difficult.

To realise a culture change, lessons can be drawn from the Concerns Based Adoption Model (CBAM)⁸ that showcases the need for *learning using concerns* [26]. According to this model, there are seven stages of concern: from not being concerned at all – “*I think I heard something about it, but I’m too busy right now with other priorities to be concerned about it.*” – to refocusing – “*I have some ideas about something that would work even better.*”, and all the other stages in between. The stage of concern an organisation and its members are in, influences the attitude and behaviour of group members towards change.

It is also important to consider the *incentive for the organisation* to act and create a culture change. For example, from Rogers [50] we learn that only if the members agree that (i) the current situation is a serious issue for the organisation which should be addressed, and (ii) the organisation is able to realise the necessary change, and it will lead to visible benefits, then a culture change can be realised.

There can be various *reasons for an organisation* to realise that a change is necessary. This could be external factors, such as the university losing grants due to a lack of women participating in the projects, the realisation that scientific results are valid only for the male population, or the high demands from industry for more trained computer scientists, which can not be filled by men only.

⁸See <https://sedl.org/cbam/>.

The realisation could also come from organisational changes or developments, such as: two institutes or groups being merged; having a new leadership or management body; presence of social pressure (root out sexism, ageism, racism, or intolerance); new practices from human resources; technological changes (where women are equivalent or more suitable to do some tasks), or simply a change of generations.

Finally, it must be understood that culture as such is a feeling and cannot be changed directly. However, you can *change your values*, which leads to a necessity to change habits and behaviour. It is necessary to point out and praise small steps, take time for changes to take root, and to be ready for setbacks. To encourage people to accept the changes, management should explicitly support the need for a change in culture.

Concrete Actions to Implement a Culture Change The first step to work towards a culture change, is to *raise awareness* of the problems and the need for a culture change among current employees and leaders. This can be achieved by organising *training* or *open table sessions* to talk about unconscious biases, the challenges that women face, such as: glass ceilings, sticky floors, etc., but also about sexism, ageism, racism, or intolerance. These sessions should be aimed at everybody in the department and participation should be mandatory. The main goal of such sessions initially should be to create awareness and solutions do not have to be found immediately. There should be an open and safe atmosphere, where all participants feel they can share their personal experiences. Ideally, such sessions are led by somebody from outside the organisation, who can handle negative reactions and ensure that an open and safe atmosphere is maintained.

Additionally, the members of the department should learn about the literature that shows the value of diversity, not only on the benefits of leadership diversity, but also on the fact that diverse teams perform better, etc. Given that we are working in academic organisations, this information should be given with a sound scientific basis, and not just be based on sentiments.

Once the majority of (or all) the members of your organisation have become aware of why a culture change is necessary, the next step is to develop concrete actions that can be taken to improve the situation. First of all, this requires a more concrete understanding of what are the organisational issues that hinder women (and other diverse employees) in their developments. This should be a organisation-wide action, where all the different stakeholders are involved (management, the human resources department, female/diverse employees, and all other employees). All stakeholders can mention possible problems they have encountered and an open discussion about this should be held. If the issues are clear, an action plan can be developed on how to address the concrete problems. This can be a change in policies, redefining evaluation criteria, changes in the organisational structure, etc.

One action can be to improve the *communication*, both internally and to the outside, about the internal organisation, and to make sure that this communication explicitly demonstrates the inclusive values of the organisation. Concrete suggestions on how this can be done are:

- Set a standard that the organisation's newsletters and websites show for example a 50 % female presence;
- Identify female role models (with a diverse background), and showcase the importance of their (scientific) contributions (see e.g., <https://www.aliceandeve.nl/> and [29] for an example of how the contributions of women in computer science can be celebrated).
- Have management explicitly make a statement about the importance of diversity and inclusion, which is communicated both internally and externally (e.g., on the organisation's website);

- Have the organisation explicitly contribute to celebration days, such as International Women’s Day.

Another field of action is to offer *training* to make all employees aware of challenges related to diversity and inclusion, such as *active bystander training*⁹, diversity proof selection¹⁰, unconscious bias training, etc. [38]. Participation in these training should be enforced and the managers should also take part in those training themselves. Moreover, it should be ensured that new employees also have a chance to take part in such training, i.e., this should be a continuous process, and not a single moment of action.

Further, the organisation can work explicitly on the *empowerment of women*, by explicitly acknowledging their contributions, and providing support wherever needed. A concrete way to provide support is to establish an *ambassadors program*, whose members can be ambassador for the women in the organisation. Moreover, the women in the organisation also should be facilitated to get together and to exchange experiences, for example, by creating a *women’s leadership club* where they can share best practices. It is important that the organisation of such activities is explicitly supported, e.g., by providing secretarial support, explicitly counting it is an organisational task, and encouraging new female staff to join such meetings. Finally, it is important to explicitly pay attention to how women are treated in the organisation, and that they are not overloaded with administrative tasks. This is always a challenge: if the organisation has not so many women, then they get asked for every committee, to ensure the diversity of the committee, and this leaves them without time for developing their research. It is important to pay attention to this and that somebody supports the women to identify which organisational tasks are beneficial to them, so that they can make a choice about which tasks to take on, while keeping also time for activities such as research and education. Of course, also setting up a mentoring program, as described in Section is one of the actions that can be developed as part of the culture change.

Another point where concrete actions can be taken are in *recruitment and promotion procedures* [28, 8]. First of all, it is important to ensure that enough women apply. This can be done by explicitly encouraging women - or other minorities - to apply. A concrete measure that can be taken is to ask every member of the hiring committee to suggest some names of suitable female candidates, and then ask them to contact them. Identifying potential female candidates is best handled as a long-term process, so it is also important to scout potential candidates for the years to come (identify the pipeline). Further, the conditions for the application can be made such that women feel encouraged to apply. Allow e.g., a minimum of three months for applications to be submitted, as reaching potential women for the position takes more time. In the vacancy text, avoid a long list of specific requirements, but rather describe in an open and global manner what you are looking for, to avoid that women do not apply because they do not fulfil all requirements listed. During the hiring process, the hiring committees should be trained to avoid biases. Naturally, hiring committees should always have at least one woman (and preferably more, to avoid that they are a small minority within the committee).

Similar advice applies to the promotion process [28]. An important action to be taken is that the goals for promotion should be clear and transparent: all members of staff should be aware of them, and the organisation should facilitate discussions about career ambitions on a regular basis. If a committee decides about a promotion, this committee again should be trained about their biases. Moreover, within the organisation there should be an open discussion about the recognition and rewards policies: traditionally academics get promotion

⁹ *Active bystander training*: a training that helps to challenge antisocial behaviour at work.

¹⁰ *Diversity proof selection*: a training that helps to make interactions and decision-making at the workplace occur in a neutral and objective manner (gender, question formulations, power relations, examples from practice, soft skills).

based on publications, citations and projects. However, organisations should also value other achievements such as collaborations, team science, industrial or societal impact. Moreover, also educational achievements should be explicitly taken into account, as should service, namely for mentoring students and/or peers. In the end, the decision on whether to promote somebody should be a balanced decision based on all these factors. Also career gaps should be taken into account: whether somebody has been working for a while in industry, or took a care leave for a certain period, career gaps should be taken into account when evaluating the person and should never be used against them.

Culture change also requires that the *daily practices* of the organisation become inclusive. The organisation should provide possibilities for flexible working hours and acknowledge that, in particular for working parents with small children as sometimes last-minute flexibility is needed. The working environment should be adapted to the needs of diverse people (for example, in particular women might need a quiet place for breast pumping, child care facilities, parental and care leave). Working and meeting hours should be aligned with for example school hours, and people should never be expected to work during evenings or weekends.

Setting up a Career Development Program

Women can benefit from career development programs at all stages in their career. For the sake of structure, we divide an academic career into three stages: 1) a training stage (graduate students and postdoctoral fellows); 2) an early-career stage (assistant professors, lecturers, etc.); and 3) a mid-to-late career stage which starts after getting the first promotion in academia. We provide recommendations that are relevant for all three career stages and those specific to key career junctures.

To be or not to be an academic

Statistics show that fewer than 1% of PhD students become professors [51]. While some of these students may have never had the intention to pursue an academic career, this statistic is still very alarming. In informatics, academic institutions are in a fiercer competition to recruit and retain the best and brightest due to the abundance of less competitive and more lucrative alternative career opportunities in industry. Below are some initiatives that academic institutions can adopt to inspire female Ph.D. students to pursue a career in academia:

- *Organize events to encourage female PhD students to become professors.* This may include seminars that showcase faculty who chose academia over industry and/or informational interviews and job shadowing opportunities. These events should highlight the unique opportunities available in academia such as sabbaticals, industry collaborations, startups, intellectual freedom, flexible schedule, work-life balance, meaning, long-term stability particularly after tenure, and staying at the forefront of a field.
- *Plan regular informal get-together meetings with successful female academics* to help dissipate some of the concerns about academic careers. In particular the additional responsibility, uncertainty and risk of attracting grants, running a lab, getting tenure, etc. Promote a transparent communication that highlights that academic success does not come as a series of constant successes, but that the road is full of setbacks and failures, e.g. CV of failure [56].
- *Support students to seek varied opportunities* such as serving as a teaching assistant, participating in conference organisation and embarking on internships in industrial research

labs. This will help them get, early on, a glimpse of the different possibilities after the PhD and start building their network for future collaborations.

- *Organize hands-on training sessions* to help students learn how to write and publish academic papers, communicate in an articulate way, navigate the relationship with supervisors, and teach effectively, etc.

A first foot in the door

Entry jobs in academia are diverse and can vary depending on the geography, the institution, the economic outlook and the individual's interest [43]. For example, some Ph.D. holders land their first assistant professor position right after graduation, while others need to first hold one or more postdoctoral positions. Some choose to embark on a teaching-only or research-only career while others prefer a combination of both. The first position is typically on a fixed-term contract but it can also be on a permanent contract. Compared to senior faculty, early-career faculty are at a higher risk to leave the pipeline [27]. Below, is a list of recommendations [55] that can help academic institutions retain and nurture early-career faculty.

- *Increase support for research and teaching* through internal grants/funds to purchase equipment, books, pay for travel and hire research/teaching assistants and lab technicians, pedagogical support from the institution's teaching center or senior faculty, and a reduction of the teaching/service workload for junior faculty.
- *Establish early-career grant development programs* that match junior faculty with senior faculty who have similar research interests, from different institutions. The Excellence in Africa (EXAF) initiative is a great example [15].
- *Put in place fair and transparent promotion processes* that clarify the promotion criteria, measures of success, and timeline while maintaining enough flexibility to evaluate faculty work from different disciplines. Besides, regular feedback should be provided to early-stage faculty to help them identify strengths and potential opportunities of improvement. While *strategic ambiguity* [9] remains a common flaw in promotion processes within academia, particularly when promotion concerns tenure, minorities including women tend to be more affected by this because they do not have an easy access to the "hidden rules" through informal social networks.

Success comes in different forms

Although some women choose to follow the conventional lock-step career track, moving from continuous full-time education to continuous full-time work, many find this progression to be incompatible with their personal choices [6], and opt instead for career trajectories that are protean [25] and boundaryless [31], i.e. nonlinear career progressions governed by individual choices and going beyond the boundaries of a single organization.

However, most academic institutions still adopt the lock-step career model as a yardstick for advancement and promotion [63], which contributes heavily to the leaky pipeline. To limit this leakage, higher education institutions need to support women in advancing according to their chosen career trajectory, while adopting a more holistic approach to the measurement of success which can be a continuum in the professorship, taking on leadership positions in the institution and/or engaging in an entrepreneurship endeavour. In the following, we outline some specific actions that organizations and/or scholars can undertake to support mid-level career development.

- *Help women overcome the even more ambiguous and hidden rules*, as they attempt to move up the professorship ladder [32], by supporting them in increasing their international visibility and impact, championing their applications to leadership positions within professional associations and inviting them to speak at high-profile conferences.
- *Encourage women who choose to become senior academic leaders* such as dean, provost or president, to build/hone the key competencies for effective academic leadership, while being careful to do so when outlooks are positive and not only during shaky organizational situations [46]. These can be grouped into social skills (e.g., communicate effectively, be a team player, accept criticism), personal capabilities (e.g., show empathy and patience, be decisive and fair, accept change, be well-organized, have a vision, know how to negotiate) and knowledge of academia (e.g., be a successful scholar, know the institution and how to navigate its politics) [21]. These competencies can be obtained with formal (e.g. mentoring and training) or informal activities (e.g., learning-by doing, networking, advice from experienced colleagues).
- *Assist women who are interested in becoming academic entrepreneurs*, i.e. create a spin-off out of their research results or launch a consulting business in their areas of expertise by providing the opportunities and activities that increase their self-efficacy, motivation, access to financing, mentoring and networking [45]. For instance, encourage women to participate in academic-industry research centres and partnerships, support them in expanding heterophilous social networks, and provide them with entrepreneurship education and mastery experiences that can help them acquire key entrepreneurship competencies in a safe environment, and match them with senior academic entrepreneurs that can provide positive persuasion and encouragement.

Career-development recommendations relevant at any career stage

Students, faculty and institutions alike benefit when the work environment is conducive to creativity and knowledge creation. We have summarized below some key recommendations that can women at all levels advance their careers in academia.

- *Create a safe and fair environment in academia*, which includes establishing an Ombuds Office¹¹. Office that helps mediate work-related conflicts in confidentiality, and putting in place implicit bias training programs targeted towards individuals involved in hiring and promotion committees, to help them assess their own biases, and provide them with research-based evidence, going beyond the ethical and moral grounds, that can help them dismantle common-held stereotypes [37](refer to section).
- *Establish policies and programs that support work-life balance* to allow flexible work arrangements (e.g., part-time work, flexible work hours), paid and unpaid leaves of absence for personal or family reasons, stop-the-clock options [5], and quality childcare/elderly care options. It is critical that these programs support women at all stages in their careers as they continue to play a major role in caregiving, though the nature of the responsibilities can change from caring for young children to caring for instance for elderly parents or adult children with special needs [47]. It is also of paramount importance to ensure fairness and alleviate the Fear Factor [58] that both faculty and institutions can experience

¹¹The Ombuds Office idea was proposed originally in the Scandinavian countries to protect citizens against arbitrary and wrongful governmental actions. It has the authority to file complaints, undertake judicial action and propose reforms [33]

about effectively applying these policies, in particular with regards to losing academic credibility.

- *Support women to engage career development opportunities* such as networking events (e.g. the Grace Hopper Conference [20]), mentoring/sponsoring activities, (refer to section), memberships in professional associations, and training programs that help them acquire critical non-technical skills such as time management, project management, grant writing and negotiation.

Setting up a Mentoring Program

This section provides an overview of steps that could be taken when setting up a mentoring program. It also provides insight on how to address different mentoring needs, create a pool of mentors, match mentors and mentees, and on the format and frequency of the meetings.

Getting started

The very first step is to define the goals of the program is to establish the purpose of the mentoring, whether it be retaining, progressing in the career, or supporting the transition to another field or career. Setting up a mentoring program can be a rewarding and impactful initiative. Here are some steps to help you get started:

1. Define your objectives: Determine the purpose and goals of your mentoring program. Clarify the intended outcomes, such as skill development, career advancement, or personal growth.
2. Identify the participants: Decide who will be involved in the programme. You can do this by surveying your colleagues to see a) who is interested; b) what they need (support in publishing, applying for funding, promotion, etc). Remember to consider the specific needs and preferences of both the mentors and mentees.
3. Recruit mentors: Reach out to potential mentors who possess the skills, knowledge, and experience relevant to the program's objectives. Consider creating an application process to evaluate their qualifications and commitment. Engage colleagues within or outside the University (current or emeritus) based on their experience and skills (promotion, networking, publishing etc). [Decisions such as 'should the mentor come from the same discipline as the mentee'; 'should the mentor be the same gender as the mentee'; 'should the mentor be internal or external to the university' will depend on a 'case by case' basis, and on the needs of the mentee]. Consider how to make mentoring attractive to your colleagues – formal recognition of the work, award a small amount of money, access to a research fund, or time in lieu (buy out) of other duties e.g. reduced load of admin or teaching etc.
4. Recruit mentees: Attract mentees who are interested in receiving guidance and support. Promote the program through internal communications. Clearly communicate the benefits and expectations of being a mentee.
5. Pair mentors and mentees: Match mentors and mentees based on their goals, interests, and compatibility. Consider their personalities, areas of expertise, and the desired duration of the mentoring relationship. Provide an opportunity for mentors and mentees to meet and establish rapport before committing to the partnership. Be creative – the mentor:mentee can be individuals or a group, depending on needs and preferences of all.

Have a mechanism in place to ensure that all participants are safe, and all parties have an opt out option, with a safe pathway to exit if the relationship does not ‘work’.

6. Establish guidelines: Develop a framework for the mentoring program, including guidelines, expectations, and timelines. Define the frequency and duration of meetings, communication methods, and confidentiality agreements. Ensure that both mentors and mentees are aware of their roles and responsibilities.
7. Provide training and resources: Offer training sessions or workshops for mentors to enhance their mentoring skills. Provide resources such as templates, toolkits, or recommended reading materials. Encourage mentors to share their expertise and knowledge effectively.
8. Monitor progress and provide support: It is crucial to maintain a regular ‘check-in’ with mentors and mentees to assess the progress of their mentoring relationships. Address any challenges or concerns that may arise. Offer ongoing support, guidance, and resources to ensure the success of the program.
9. Evaluate and adjust: Periodically evaluate the effectiveness of the mentoring program. Gather feedback from mentors and mentees through surveys or interviews. Use this information to make necessary adjustments, improve the program, and align it with the evolving needs of participants.
10. Recognise and celebrate achievements: Acknowledge the efforts and accomplishments of both mentors and mentees. Celebrate milestones, success stories, and positive outcomes to motivate and inspire others to participate in the program.

Setting up a mentoring program requires careful planning, effective communication, and ongoing commitment. It is crucial to have sufficient resources (human, financial, etc) if you are planning a programme.

Addressing different mentoring needs

In academic settings, mentoring requirements may vary depending on the career stage. For instance, when PhD students begin their studies, the focus of mentoring may be on enhancing their research and presentation abilities and on fostering a productive relationship with their supervisor. On the other hand, as PhD students near the completion of their work, mentoring shifts towards exploring post-PhD possibilities, such as deciding between staying in academia or pursuing opportunities in industry.

Results from a European project involving six European country case-studies highlight distinct experiences with mentors between the PhD stage and later stages of an academic career, where “During the PhD, interviewees looked to their supervisors for guidance in academic writing and thinking, networking, and general “socialization in the discipline” [54]. Later, as postdocs or assistant professors, individual responsibility emerged, where individuals felt they were expected to work autonomously and make progress on their own, without substantial support or guidance from a mentor or external resources.

Mentoring can assist junior faculty in developing the key competencies required for a successful academic career, e.g., scholarly independence, educational skills, and preparation for advancement, and foster constructive professional relationships within the institution and beyond, which are crucial for career development [65, 10]. Furthermore, mentoring can be enhanced by a network of individuals. It’s not just limited to junior faculty, as mid-level and senior faculty may also benefit from mentoring when transitioning to new career paths.

Skill development is crucial when moving PhD to Professor, i.e.: "...equipping people with the skills to be fully functioning members of the scientific community, able to prepare grant applications, review manuscripts, speak at conferences and engage with scientific administrators in a constructive manner. Such a holistic approach to running a scientific group will ultimately bring benefit to the group's alumni, giving them all the skills necessary to carve out their own niches in the academic world" [35]. This being said, at a later career stage, mentoring may shift towards career perspectives, work-life balance, leadership and management skills development. These are skills that colleagues at a more advanced career stage may help to develop. Creating mentoring programs that can address these diverse needs is crucial.

Establishing a pool of mentors and matching mentors and mentees

When establishing a pool of mentors, you may locate and contact known mentors and check whether they can put you in touch or follow up with their connections. Furthermore, you can conduct a general search or identify connections through events and exchanges such as meetings, seminars, workshops, conferences, career fairs and other places where individuals with the expertise and knowledge you are looking for can be found. Alumni networks or industry contacts are also a useful source to expand your potential mentoring pool. When establishing a mentoring network, "networking diversity" that is mentors from diverse backgrounds and "'networking range' [11] that is the extent to which mentors, "'originate from different contexts or social origins' should be ensured. Smaller departments that do not have enough senior faculty to serve as mentors can identify faculty from other departments. Cross-departmental matching has proven an effective way to ensure confidential information could be discussed with the mentor [17].

The matching process is based on a set of common characteristics or similar interests [65] and relevant experience. In matching mentors and mentees, mentor profiles can also be made available to be viewed by prospective mentees, who may indicate their preferences and they are then matched to one accordingly [4]. Furthermore, it is worth considering matching female mentees with female mentors, as studies have noted that the male style of mentoring may "not fit the socialization and styles of most women and their orientation to integration rather than separation, interdependence rather than either dependence or independence and collaborative rather than competitive task engagement" [59].

Format and frequency of meetings

Online mentoring can facilitate finding more suitable mentors. However, on-site mentoring should be given priority considering the importance of establishing local mentors from the home institution as they can provide, "'critical input into sharing heuristic knowledge needed for successfully navigating a particular place or work environment." [60, 64].

Mentees stress that one of the most beneficial aspects of the mentorship relationship is "having regularly scheduled, one-on-one, confidential time with the mentor". According to the Mentoring & Tutoring: Partnership in Learning, 2014, findings from their mentee survey data, in terms of types of and frequency of contact with mentors, the highest occurrence stood at 74 % (N = 31 mentees) representing in-person contact, once a month. Other means included more than once a month, more than once a week, via email, phone and spontaneous contact. Recurrent contact between the mentor and mentee is essential and ensures fruitful collaboration, "Those pairs that had the most frequent, regular contact rated their relationships as above average or excellent much more frequently" [4]. From the beginning, mentoring pairs or peers must agree to respect privacy and understand that all information disclosed during the mentoring sessions

will be kept strictly confidential. While these are essential, mentoring should follow a Code of Ethics, such as the one developed by The European Mentoring & Coaching Council (EMCC) [3].

The program may be initiated at a mentorship program level, for example by a plenary session for both mentors and mentees to provide them with an overview of the programme and promote interaction and the exchange of ideas. After that, and given the matching mentor mentees has been done, it is up to the pair to establish the frequency, duration and values and principles they should abide by. The mentor may lead the first meeting, in which goals are set and an understanding is built on the circumstances of the mentee at the time, but after that, it is important for the mentees to take initiative. Finally, while mentees prefer one-on-one meetings, group mentoring sessions can and should still be arranged to build capacity on more general topics and to foster networking.

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