

# International Mentoring for a Diverse STEM-Professor Talent: Establishing the Future Female+ Faculty Program

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## ABSTRACT

One of the main challenges faced by under-represented communities in STEM is the limited access to information, mentorship, and social network support crucial for pursuing a career in academia. In this work, we present **F+Cube**—the Future Female+ Faculty mentorship program, which connects self-identified female senior PhD students and postdocs in computer science internationally with faculty members at TU Delft in the Netherlands. Over the past three years, F+Cube has attracted thirty four and hosted eighteen participants, some of whom have transitioned to faculty roles. Here, we share insights, lessons learned, and best practices gathered from our experience so far. Through this contribution, we hope to elicit future participation of PhDs and postdoctoral students as well as inspire other universities to emulate TU Delft’s leadership in fostering diversity by adopting the F+Cube framework.

## KEYWORDS

female faculty, international mentorship, addressing gender gap

## 1 INTRODUCTION

Dutch STEM-related research is increasingly prominent in the international academic scene, attracting numerous faculty applicants each year. However, according to reports from the Dutch “Women Professor Monitor” site [6], the growth in the percentage of female professors in technical universities has been decreasing, reaching the record low of the past 8 years with 0.9% in 2023. The situation is not unique to the Netherlands—it is rather common worldwide. For example, the “leaky pipeline” has also been observed in technical universities in Austria [2]. Recent anthropological exploration from Denmark [8] sheds light on experienced barriers to attracting and retaining a diverse STEM-talent pool in academic positions at Danish universities. The five key barriers they identify confirm our observations, that female scientists aspiring to a career in academia feel they 1) do not fit the profile, 2) do not belong, 3) lack access to informal networks to be “in the right place at the right time”, 4) require specific traits to thrive 5) have an ambition to be “more than just a scientist” conflicting with their academic ambition.

To reduce the gender gap in STEM, particularly in computing, TU Delft has undertaken several endeavors. Emerging findings repeatedly asserted the lack of access to strategic networks and knowledge to be the main barriers for academic and industrial researchers in computer science and AI at various career stages. As these researchers cross continents to transfer their expertise, little discussion is devoted to the diversity of country-specific career paths. Incomplete information about cross-border differences appears to be a common roadblock, especially for under-represented communities. In collocation with the flagship conference in AI, the 30th International Joint Conferences on Artificial Intelligence, we brought together AI researchers from six continents to share their experiences in building academic and industrial careers [3]. Gathered insights and constructive ideas to bridge the gap between career expectations and reality laid the foundation of the Future Female+ Faculty program (**F+Cube** or  $\mathcal{F}_+^3$ ) [4].

## 2 FRAMEWORK OVERVIEW

In the rest of this section, we share our insights on program implementation and propose best practices for program participants. Note that although the program implementation requires adherence to specific local requirements, the conceptual idea of the framework is agnostic of the discipline or academic institution.

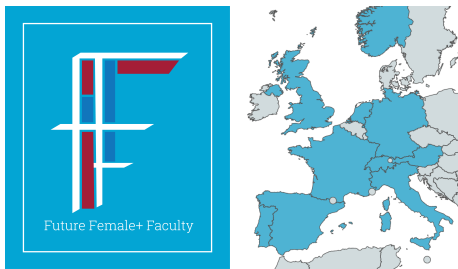
The F+Cube program rests on three **pillars**: (1) Initial information session. (2) Regular mentorship. (3) On-campus visit.

We find mutual understanding of **roles and goals** fundamental for a successful mentor-mentee relationship. We aim to take tangible steps towards entering the competition for faculty positions. Guided by the four key assessment criteria for junior faculty—*research, education, leadership, and valorization*—we encourage mentorship to focus on one or two of them. Hence, we differentiate among four *mentorship roles* required for advancing each criterion:

- (1) A topic mentor advises about research opportunities, e.g. in applying for personal funding and academic awards, or building collaboration network.
- (2) A general mentor, in contrast to the topic mentor, should not have any conflict of interest with the mentee and ideally come from a different research area. They give feedback on the mentee’s academic profile and guidance in general aspects of academic career.



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**Figure 1: Left: Official TU Delft logo of the F+Cube program. Design inspired by the art works of Piet Mondrian and  $\mathcal{F}_+^3$ . Right: Location of F+Cube mentees during the program.**

- (3) A sponsor is typically a prominent figure in the academic world, who can help a mentee increase their visibility in the key communities and their opportunities for valorization.
- (4) A coach is the most involved role, assisting the mentee's development of their personal leadership.

Depending on mentees' needs, we assign one or two mentors with different roles.

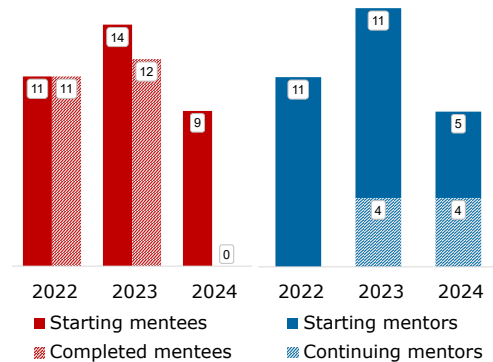
We designed the **timeline** such that the *scouting* for mentees falls on the period popular for conferences attended by TU Delft faculty. Our practice shows that most participants were personally approached by our professors. We learned that *matching* is most effective when performed based on the filled intake forms, for which we acknowledge the current lack of automated procedure. This is followed by an introductory meeting, where a mentor agrees with a mentee on specific goals and a schedule for the next two-three *remote meetings*. As a culmination of the program, which proved to be highly influential for mentees, is a *joint week-long training* on TU Delft campus. Beside meeting a relevant research group, mentees receive training in teaching, leadership, and research pitch; they also meet female role models in a panel discussion.

### 3 IMPACT & FUTURE CHALLENGES

In the past three years, F+Cube attracted thirty four mentees from all over Europe (Fig. 1-right), and thirty one mentor from TU Delft (Fig. 2). Since its inception, F+Cube received university-wide recognition [1, 5] and stimulated interest for academic career among mentees and their network. To quote a participant: "I would surely encourage female researchers to join the next year."

Given the positive feedback from mentees and mentors, we expect the participation to grow in the future, with more female+STEM-researchers becoming faculty. This requires a model of distributed ownership and rotation of program chairs, as, for instance, implemented by SIGPLAN-M [7], designed for international long-term mentoring at all career stages.

The successes of F+Cube and similar mentoring programs fuel our motivation to continue the initiative and expand its range of impact. F+Cube targets self-identified female researchers who aspire to become professors or are exploring the faculty job market after their PhD and postdoc, thereby actively contributing to reducing the gender gap in computing. We call for more participating universities and mentees to join this endeavor, as this is a long-term



**Figure 2: Distribution of international participants (solid red, left) and TU Delft mentors (solid blue, right) during the first two iterations of F+Cube, as well as ongoing applications.**

effort with immense potential to significantly impact the future landscape of academia.

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