



Motherhood in Science – How children change our academic careers

Experiences shared by the
GYA Women in Science Working Group

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Preface

The modern scientist’s journey towards excellence is multidimensional and requires skills in balancing all the responsibilities consistently and in a timely manner. Even though progress has been achieved in recent times, when the academic is a “mother”, the roles toggle with different priorities involving career, family and more. A professional mother working towards a deadline may change her role to a full-time mother once her child needs exclusive attention. The experience of motherhood is challenging yet humbling as shared by eight-teen women from the Women in Science Working Group of the [Global Young Academy](#) in this publication.

The decision of a woman to become a mother is rooted in a range of reasons – genetic, cultural, harmonic, societal, and others. A planned pregnancy and motherhood brings happiness to an already happy environment but in many cases, the delight of motherhood can be negatively influenced by the surrounding conditions. Social and cultural expectations often create added pressure, challenges and complexities during motherhood. Regions where patriarchal practices are prominent expect mothers to be the primary caregiver, often the sole caregiver. A mother in the role of primary caregiver is societally and culturally acceptable. However, a professional mother often faces criticism; she may be accused of prioritising her career (over motherhood). It is forgotten that there is no inherent conflict among these roles and one can perform them in harmony, as long as mothers have the support they need.

Another challenge to address comes from a personal image of a perfect mother where the mother blames herself for not being able to meet an imaginary image of motherhood. This image is often created from societal views and backgrounds. A desire to become a better parent is required when a new mother is continuously learning, experiencing and exploring motherhood. This enjoyable experience can turn into self-imposed pressure that often creates difficulties.

It is enlightening to find out how support from our close circles paves the way to better experiences of mothers pursuing their careers and excellence. In our continuously progressing world, the roles of women have changed drastically over the years. The personal image influenced by societal expectation requires continuous adaptation and redefinition. There has to be connectivity and support within communities reflecting the joy of motherhood and allowing imperfection.

This book's stories of motherhood are from mothers with differences varying in geographic location, discipline, experiences and outlook, but they are also stories from mothers with similarities in challenges, societal pressures, everyday routines, cultural expectations and achievements in being mothers and scientists.

These are stories of women whom we meet every day in random places, we engage with in our work or social environments; they are our mothers, wives, friends, sisters and colleagues. These women have shared their personal stories of motherhood that may help one to dream bigger, hold to one's desire a bit longer and make pathways where new stories will be created. We welcome you to the journey of motherhood.

Nova Ahmed
Executive Committee, Global Young Academy (GYA)
On behalf of the GYA mothers in science

Chapter 1: Introductory thoughts

Flavia Ferreira Pires, Social Anthropologist, Brazil, mother of two girls born in Brazil

Özge Yaka, Sociologist by training – geographer at heart, Germany, mother of one girl born in Germany

The idea of this book was initiated by a sub-group of the Women in Science Working Group of the Global Young Academy (GYA) that identified a mutual characteristic in their lives: since having children their professional and personal lives have been influenced in distinct ways. Although that is true for mothers in general, the group's work in academia and science found them in similar challenging conditions with, however, a positive commonality: their achievements and excellence in their work that led them to being selected as GYA members.

In a world where in most cases nearly all the emotional labour of caring for a new-born weighs upon the mother, the decision to have children affects the academic careers of men and women in different ways. Mary Ann Mason, the faculty co-director of the Earl Warren Institute for Law and Social Policy at the University of California, Berkeley, draws on census data to argue that academia is even more punishing for mothers than other demanding professions. Women academics sometimes give up on having children to advance in their academic careers. Those who do not want to give up on having children often have to work even harder to “compensate”. Reading through this book gives the reader an idea about the everyday hard work of being an academic mother. The book also contains many examples of difficult decisions women around the world make every day to be able to keep working as scientists and scholars.

It is clear from the narratives of the seventeen scholars, who share their experiences as mothers from different parts of the world, that the academic world is not set up for meeting our needs. We are under tremendous pressure to perform throughout our pregnancies and after giving birth, even as our kids grow up into teenagers and beyond, no matter the hardship we experience as mothers. We want to point out that such pressure has the potential to be counter-productive.

An interesting finding of this book is that contrary to expectations, the majority of our contributors did not experience a loss of productivity and managed to “succeed” in balancing their dual roles. However, in most cases they paid a socially and psychologically high price and were overwhelmed by this venture. As the reader will easily notice, different narratives in this book display serious global discrepancies in terms of how motherhood as an institution is construct-

ed throughout the globe, which directly affect the mothering experience of young scholars. However, it is clear that the labour of mothering still weighs upon the mother and comes with serious struggles and feelings of guilt for women in science.

We do see the classic “mother’s guilt” in many stories – either guilt about working when a baby is waiting at home, or guilt about missing work during the first years of their babies’ lives. We believe in the importance of disclosing different experiences and narratives that reflect different structural conditions, cultural contexts and personal circumstances. Some narratives present cases where women became more efficient and managed their time more effectively; while others reported longer work hours scheduled around family responsibilities. Overall, there is a common theme of the importance of support networks that can make the difference between thriving and struggling in these multiple roles.

If having children affects productivity for women in science, are there ways in which it enhances our skills and capacity too? This book suggests that the lessons and challenges of having and educating children are so intense that, in the long term, these mothers may become successful scientists because of the dramatic learning curve of the motherhood period. So, is it despite the challenges or is it because of all the challenges that mothers become more resilient and empowered? In this sense, children are not obstacles, but quite the opposite, as Sandra López-Vergès, a virologist from Panamá, states in her chapter:

“That is how motherhood changed my life: my children gave me the force to overcome any situation, any issue, they made me stronger (...).”
- Sandra López-Vergès

The aim and focus of the group of authors is the experience of motherhood, particularly in science. We also acknowledge that the profile of the mother is not homogenous. The stories include not only mothers who have the support of partners, but also single and divorced mothers and those with different cultural challenges. Despite the problems we face, we recognise the fact that as women in science and academia, we enjoy more privileges than the majority of mothers in the world. Some of us can pay for nannies and house cleaners, our children go to good schools, some of us can count on the real support of the fathers of the children or our families, like grandparents, some have the luxury of maternal leave and the option to return to work. This is not the reality for many others. Our intention is not to exclude or underestimate the challenges

of mothers in other sectors or places in life. In the same manner, we do not want to underestimate other groups in science that face challenges too: fathers in science, scientists who do not have kids or have chosen not to have kids, and others. These are important topics for proper discussion elsewhere, to take account of the fact that the issues and the policies involved, even if some do overlap, are different. The most similar, if considering specifically parenthood policies, are the fathers in science. We agree that examining fatherhood in science would be greatly complementing our publication. However, in this case, it is important to stress that in most countries, women still have the biggest part in child care responsibilities as well as in domestic duties; so they still have the biggest burden and it is one of the biggest reasons of the “pipeline leaks” during the early- to mid-career stage. The complementary issues of fatherhood in science and others are issues that need their own attention and we hope that with this book we will open the broader debate.

We hope our initiative will help the wider academic community to understand the impact of childbirth and child raising on women scientists around the world. We also hope this book contributes to the transformation of academic structures, as well as attitudes and expectations to meet the needs of mothers in academia. We hope that our stories will inspire women in science by showing them that they are not alone in their challenges and that they can overcome them. Our contributors call for respect and recognition for the care required to raise children, as well as for the role children play in our families and societies. They are our best asset.

Section 1: Setting the scene of motherhood in science nowadays

Chapter 2: Why do we translate family and employment as competitive spheres?

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"I wanted to be a knight and I wanted not to stop being a woman, certainly not that; I did not want to reject, I wanted to find, I did not want to deny anything, least of all my feminine condition" - María Zambrano (quoted in Perez, 1998)

Not only in academia, although especially in this context, one speaks about motherhood as if both spheres, family and employment, compete, diminish female opportunities in one of the realms, professional or family (Lyon and Woodward, 2004; Lamolla and González, 2018). This statement crosses the minds of women and men, superiors and managers, to sum up, makes up the culture and values of those stand-up social institutions. This "natural order of things" perpetuates gender roles and gendered distribution of work. Despite women incorporation at the workplaces, women still are associated with strong family bonds, subordinated to family issues and intimate spaces. The echoed message reinforces androcentrism and explains why women remain behind or accomplish their careers with great suffering. The shape of family and the organisation of academia, as social institutions, the work-time arrangement, how men or women use time for family and time for themselves, interfere on socialisation, how men and women interiorise their roles, particularly, gender scripts, that frequently discourage women to enhance their scientific careers.

Women as well as men are called by scientific vocation, they are not merely motivated by a salary or an economic rationality, they display huge aspirations and endeavour for achieving a great success in their area of expertise (González Ramos and Rätzl, 2018). Therefore, why do we think women are split by motherhood and work? Why are these two spheres depicted in competition? Why do we only talk about women and motherhood, as if only they should decide about this dilemma? Why not men? What happens on the male side? Are they not moved by fatherhood? Do they develop a weaker link with their kids? Why do we think great endeavour in scientific career is decisive between 25-45 just for the motherhood cohort? Is it impossible to develop an excellent

career across different cohorts? Even if we accept this time-line, why do we not change this pattern to assure that future generations of women win influence in science and technology? Most importantly, what is excellence (González Ramos and Revelles-Benavente, 2017)?

Scholars are working on this issue to discover influential factors that retain women in the intermediate and bottom ladders of the professional careers, and hinder women advancement in scientific careers. On the contrary, academia and public policies should organise the support of young women to incorporate them in science because they are prime to design the society where we will live. A great number of studies over time have highlighted obstacles and opportunities that women have found in the advancement in academia (Lyon and Woodward, 2004; Jolanki, 2015). A variety of studies based on data, interviews, biographies undertaken in different countries (which means diverse culture, labour markets, public agenda...) have emphasised increasing participation of women in science, but also the difficulties on reaching the top positions, leadership, recognition, and governance management in academia. Those studies point to a similar set of variables influencing scientific careers that operate on diverse countries and impact to varying degrees in every context (meaning culture, policy, gender regimen, and patriarchal mainstreaming). In all of them, motherhood is revealed as a primary factor that everyone states in counterbalance to the professional domain.

Women want what men have always had

The introductory citation by the philosopher María Zambrano talks to us about her first awareness of gender inequality. She tells us that she was walking by a medieval city and her father explained to her she could not be a knight because she was born as a woman. Her memories state contradictory feelings of women when envisaging their future, when they are aware that the most stimulating roles in society are denied to them. They want to perform them without rejecting womanliness; we want to perform both male and female promises. Despite the elapsed time, women find similar obstacles, motherhood, loneliness and lack of support in their trajectories, social prejudices that limit their aspirations and that ignore their work and achievements. If we would be aware of the common factors behind the subordination of women in society, it would be easy to transform conditions to facilitate the entrance of women in every sphere, however, counter discourses hide main factors of discrimination (although, as mentioned above, common evidence discloses solid arguments about how we can close the gap).

First evidence, men and women are strongly oriented towards work. Particu-

larly, about scientific vocation, women and men show the same love and enthusiasm for the purpose of their work. Studies suggest men and women in science display an emotional and symbolic attachment with work (Hochschild, 1997; Hochschild and Machung, 2012; Lamolla and González Ramos, 2018), not mere instrumental rationale. Although when we ask women scientists, they usually describe their objectives in science as a collective benefit, whilst men show instrumental purpose, linked to prestige and salary (González Ramos and Rätzzel, 2018).

Secondly, men and women make similar efforts in order to accomplish successful merits, depending on scientific areas men and women follow similar traces and rewards, e.g. aspiring to a number of articles in a set of prestigious journals. However, it seems that women receive lower numbers of citations than their male colleagues. Women submit valuable project proposals to receive funding and their success ratio in diverse calls are similar but they ask for a lower amount of money than men do (González Ramos, Navarrete Cortés and Cabrera Moreno, 2015). Findings exhibit precocity of women when these merits are related to individual performance but for those of them depending on a collegiate decision, such as tenure track position, appointment into governance positions in academia, women remain behind men.

Thirdly, related to this idea, data present women conquering spaces in academia, widening the base of the pyramid and climbing through intermediate towards tenure track positions, but they remain a minority in the highest positions (full professor, dean and rector, leader of research teams and research institutions). Across countries, women share 40-50% in low and intermediate categories of the scientific career, but scarcely representing 20%, or less, in the top positions (González Ramos and Revelles-Benavente, 2017). Explanations associate this picture with the lack of interest of women for reaching high positions, and women abandon high performances (or maybe go slower than men). This, consequently, yields an insufficient number to make up a pool of women to be selected for these appointments. Regarding the first argument, truly, some women feel they do not want to pursue power, they prefer to avoid the stressing situations and the conflicting relationships associated with these positions; some women express this is not for them, and that power play is a thing for men. Their words express what we call androcentrism because the organisation was designed by (and for) men only (O'Neil et al. 2008; Fischer and Kinsey, 2014; González et al. 2015); thus, women feel disconnected from this aim. Regarding the second argument, women find numerous obstacles along their life course, motherhood is one of the most important, but also prejudices and subtle discrimination (sometimes even ignored by them but influential) remain unchange-

able and impact on their aspirations (both what they pursue and how they are perceived, as solid or weak leaders, by gatekeepers of organisations). Despite evidence of various profiles of scientists, an ideal model of a worker (Bagilhole and Goode, 2001; van den Brink and Benschop, 2012; González Ramos and Revelles-Benavente, 2017) is the primary idea to judge the performance attainment of each professional, and women's profiles appear to be greatly deviating from this ideal.

Fourthly, along with the previous argument, there is a false idea about an ascendant and accumulative trajectory. The examination of every male and female trajectory in science shows multidimensional careers, changing over time to conform to the circumstances of the scientific labour market and to evolving family and care issues. Moreover, new family models are emerging over the world, as shown by the biographies of the women in this book. Men with high education grades show changing roles about family, they are more cooperative and engaged with the child care commitments (Moreno-Colom, et al, 2012). Men and women walk together on the creation of new patterns and structural changes, men should be aware of this new mission in which they are also protagonists. But still many social factors remain unchangeable: supported by female roles linked to care and household, limiting men roles to help (they do not share and support equally the family), and the organisation of careers' progression based on androcentrism, blind to gender, evaluating men and women as if they experience similar conditions, although women usually display more complex situations than men.

Fifthly, when Joan Ackers (1992) stated that institutions are gendered, she alluded to apparent neutrality (objectivity) which is really contaminated by gender attributions for men and women performing roles in organisations. Women are actors in respectful and ancient organisations designed by men; instead, they are traditionally the main characters of family. Androcentric organisations (designed by men and historically linked to male protagonists) ignore women specificities (how complex is daily life, their personal commitments and relationships, (dis)encouragement opinions and support received). One of the most relevant dimensions to pay attention to is time arrangement. Women appear to display different opinion about how they would like to spend their time, preferring to use their time at the office more efficiently, working less hours and spending more time out of the workplace (Lamolla and González, 2018). In addition, decision-making positions are old boys' clubs, gendered by male organisations (Gill et al., 2008; Hatmaker, 2013), which interfere on the (non-) appointment of women. This factor acts in a double negative direction, few women at the top means few role models and integrating supportive networks.

Van den Brink et al. (2010) explain that women in evaluation committees may feel uncomfortable selecting women because if they sustain a minority opinion they would be accused of being a feminist. Isolation is a common feeling for women in science, even if they are in comfort zones, as a result of the feeling of outsider in academia, a gendered organisation (González Ramos and Räthzel, 2018).

Brief notes about gender policies for the support of women scientists

In the late 1990s, a global strategy emerged for promoting gender equality. The gender mainstreaming addresses a broad comprehensive definition of gender equality in organisations (Directorate of Human Rights, 1998). The perspective aims to counterbalance male bias and foster changes oriented to eliminate structural gender inequality. Principal instruments are legislation and positive actions to promote significant changes in scientific institutions. Stakeholders are primary actors to lead the changes in organisations. Significant transformation of institutions depends on resources and continuity of the leaders managing the designed initiatives. The first step usually is centred on the identification of the problem (statistics to show the situation of women in science and evaluation of the gender gap), and, secondly, launching of the legislative initiative in every institution. However, resources are limited and leaders usually are relegated from this position of relevance.

Motherhood is a recognisable factor to explain the inequality of women in professional careers (really, motherhood is the most accepted category to explain gender gap in organisations, as it also hides diverse biases and inequality situations). Therefore, legislation sees work-family balance as the primary problem, and work-life balance policies are frequently adopted. These measures range from flexibility and teleworking at workplaces, part-time working policy, to parental leave, returning-to-work measures after maternity leave, and childcare facilities. To sum up, a set of labour policies and public services usually are the primary actions of different countries and institutions to fight against low representation of women in workplaces.

A second group of policies related to promoting gender based on active actions are discussed and accepted by colleagues. These initiatives are gender quotas (actually, the European Union has substituted these measures for a more balanced composition 60/40 in those places where women are a minority, for example, in evaluation committees), recommendations of non-biased practices during hiring and promotion processes, and good practices regarding improvement of women visibility and recognition (for example, appointment of women for prizes and awards, or invitation as guest speakers in relevant conferences). Gen-

der policy fosters solutions for people, comparison between national contexts are necessary to adapt measures for the target population. Examples of good practices provide learning and solutions but we need to analyse positive and negative directions this policy is moving into on every environment.

All these policies and initiatives have displayed some changes, as demonstrated by the figures of women enrolment in academia but also limited results: women remain in low positions of the scientist career (sticky floor phenomenon), and the glass ceiling appears unbreakable in general terms all over countries and knowledge areas. Two factors appear as explanation of this situation: the practices of neoliberalism and the lack of structural changes in social institutions in not only academia but also family and society. The introduction of neoliberalism practices in academia and excellence criteria in science have increased competitiveness (Deem, 1998; 2001; van den Brink and Benschop, 2012), working rhythms (acceleration time regimes) (Vostal, 2015) and precarity in labour conditions, uncertainty on research careers and high mobility from centre to centre, which shape researchers' career development. Likewise, family structure, well-being of all their members and the psychosocial risks for physical and mental health (Gill, 2009; Müller, 2014; Morley, 2016; Heijstra et al., 2017; Conesa and González Ramos, 2018) are shaping decisions of women and men in academia.

Excellence and efficiency in public and meritocratic institutions are hiding the impact on researchers from a gender perspective, not only on women but new masculine identity and, in a broad sense, overall family. Some prestigious institution in the U.S. have implemented family researchers' initiatives because they are aware that excellent scientists and high productivity are associated with good environment for the researcher. Institutions are launching measures to promote significant changes in their structures and cultural values. It also relates with family issues and transformation of traditional roles based on a male breadwinner model, not always working nowadays. Precarity for men and women has highlighted diverse models of family and organisation of key decision for the couple; the highest salary (or lesser precariousness) is sometimes decisive for women to step forward in their careers even over their partners. However, social prejudices remain, even in those cases where women play the breadwinner role, adding suffering feelings related to "being a good mother". It strongly influences the stakeholders' decisions (evaluators, hiring staff, colleagues...) because women are still associated with motherhood's priority over professional goals.

Culture is a slow changing thing; easily, people ignore significant changes on women's roles and family patterns. For example, the importance of childcare facilities, nannies and grandmothers/grandfathers are playing a role on career

development. As we mentioned above, excellent researchers hold a social position situated between privilege and precarity. Some of them have the complete support of the public services or the informal market of care; some of them, for example, global workers without informal networks, may spend nearly their whole wage on being mothers and scientists all together. However, as the narrations by the women in this book indicate, it is worthwhile. Policy-makers and gatekeepers should be aware of this situation because we lose a great amount of talent when women are isolated and discouraged to continue their scientific career.

I would like to finish this chapter with a message for the youngest readers who might be thinking about pursuing a scientific career. During our lives, unexpected events happen, opportunities and sometimes flaws that we would turn into opportunities; the excellence adopts multiple ways (González Ramos, 2018), there exists not one model but multiple models of careers; many ways to being happy with our goals including or not maternity, partners and teaching or researching achievements. The professional and personal strategies do not track a linear path nor an always successful one. It does need efforts and persistence in the main aims despite diverted tracks and obstacles.

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Chapter 3: The “Problem that Has No Name”: giving voice to invisible Mothers-to-Be in academia

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One of the most important insights granted to us by the post-structuralist and post-modernist paradigm shifts is the understanding that concepts and entities that we had previously assumed to be discrete and monolithic are in fact dynamic and polyphonic; they exist along continua rather than at fixed epistemological points. Motherhood is no exception; there are equally many kinds of mothers and experiences of motherhood as there are constructions of love, gender, or sexuality. With this in mind, my chapter addresses an often-overlooked form of mother labour: the desire and attempts to become a mother. Put differently, I seek to speak of a “problem with no name,” just as LGBTQ writers have sought to paraphrase Lord Alfred Douglas by discussing “the love that dare not speak its name.”

In this text, I prefer not to tell my own story, but to address the “problem with no name” from an impersonal, and thus equally “nameless”, perspective. I hope that presenting the experiences of mothers-to-be in my home country of Israel (but potentially also elsewhere) will allow me to give a voice to many invisible women whose experiences have long been perceived as irrelevant, especially from the perspective of motherhood. Furthermore, the choice of not writing a personal story like those included in the rest of the book is because the kind of motherhood experience I wish to discuss is unlike that of women who have actually given birth, which is why I feel that it is appropriate to speak of the “problem with no name” in a different narrative style.

Friedrich Nietzsche once said that “Everything about woman is a riddle, and everything about woman has one solution: that is pregnancy.”¹ This statement doubtless carries a ring of truth in innumerable societies, but in Israel—the Holy Land of compulsory motherhood—Nietzsche’s observation epitomises the core value that has made Israel the “fertility champion” among developed nations². In the Jewish State, being a Jewish mother is a national duty; and, as I have shown elsewhere, its entire legal system is conscripted to indoctrinate women to the belief that childbearing is the defining characteristic of the nor-

1 Friedrich Nietzsche, Thus Spoke Zarathustra: First Part on Little Old and Young Women, in *The Portable Nietzsche* 115, 178 (Walter Kaufmann ed. and trans., 1954) (1891).

2 Larissa Remennick, *Childless in the Land of Imperative Motherhood: Stigma and Coping Among Infertile Women*, 43 *Sex Roles* 821, 839 (2000).

mal and patriotic Israeli-Jewish (preferably Ashkenazi) woman.³

In Israel, the socio-legal construction of motherhood as a national mission has been driven by a constellation of complex historical, geo-political, and cultural influences: The pro-family Jewish tradition, the Holocaust, the existence of a substantial Arab-Palestinian minority within Israel, and the threat of attack by surrounding Arab nations all fuel a forceful drive for the proliferation of the Jewish population. While Israeli men exercise citizenship through participation in the military as the highest form of civic virtue, women’s substantive citizenship is expressed through motherhood—by giving birth to and nurturing Israel’s future soldiers. A recent newspaper article illustrated how deeply this national project is rooted in the collective Israeli consciousness, reporting that one of the most common questions among parents of toddlers with disabilities is: “Will my child be able to serve in the army when he grows up?”⁴

In countries like mine, women who struggle to conceive a child face unique pressures that adversely affect their ability to pursue academic careers. Many of these women undergo fertility treatments as part of a lengthy, physically demanding, emotionally exhausting, and financially debilitating process of becoming mothers. In my view, a book describing the experience of mothers in academia must carve out a space for the experience of these “Mothers-to-Be,” women who are simultaneously on the pregnancy-track and the tenure-track. In this chapter, I illuminate the invisible struggles, identify the “mother-labour” of these fertility-challenged women, and thus give voice to this century’s “problem that has no name.”⁵ I then argue that while academia has made great strides in recognising and accommodating the needs of mothers, it lags behind with respect to the needs of Mothers-to-Be.

Mothers-to-Be in the land of compulsory motherhood

In a land that binds women to the collective through their womb, infertility is considered a severe disability in need of rehabilitation. In Israel, compulsory motherhood has turned assisted reproductive technologies (ARTs) into a crucial part of the national Zionist project, as much a duty as it is a privilege. Accordingly, my homeland has made ARTs accessible on a scale unknown anywhere else in the world. There are more fertility clinics—and more fertility

3 Karin Carmit Yefet, *Born to Be a Mother: Anatomy, Autonomy, and Substantive Citizenship for Women in Israel*, 39 *Harv. J. of Law and Gender*. 257 (2016).

4 See also generally Shirli Werner, *Individuals with Intellectual Disability within Military Service: Impact on Quality of Life, Family Quality of Life and Community Attitudes* (2015).

5 The use of this expression is intended to paraphrase Betty Friedan’s canonical book *The Feminine Mystique* (1963), which is credited for sparking Second-Wave Feminism in the United States.

treatments—per capita in Israel than in any other country. Moreover, Israel is the only country with nearly full funding for procreative medical services, including an unlimited number of In-Vitro Fertilisation (IVF) attempts until a woman has had two children with her current partner. And indeed, Israeli women are the world’s heaviest consumers of ARTs.⁶

Echoes of Israel’s national procreative mission reverberate throughout its legal system. Israel was the first nation to legalise surrogate motherhood; it has legalised reproductive technologies prohibited in other advanced nations; and its labour laws prohibit employers from firing female employees for absence due to fertility treatments.⁷ Yet, despite Israel’s numerous incentives for the use of reproductive technologies, cultural forces implicit in its pro-natalist society make it exceedingly difficult and even shameful for women to acknowledge their fertility struggles. Accordingly, a policy of “don’t ask-don’t tell” has become the hallmark of the infertile woman’s experience, creating an environment in which the unprecedented empirical prevalence of ART in Israel - coexists paradoxically with its social invisibility.

Giving voice to the neglected experience of Mothers-to-Be means acknowledging the physical, emotional, financial, and logistical burdens of ARTs. During IVF, a woman must endure invasive surgical procedures such as hysterosalpingography (a uterine X-Ray), blood tests, hormone injections, egg retrieval, and embryo implantations. This intensely medicalised process expropriates the woman’s body and takes a toll on her soul.⁸ Fertility treatments are also a staggeringly time-consuming project that some fertility-challenged women have described as “total enslavement.”⁹ First, the Mother-to-Be is subjected to a battery of blood tests and gynaecological examinations. Then, she begins the process of “down-regulation” to suppress the normal hormonal process, followed by hormone stimulation to induce her body to produce as many healthy eggs as possible—a process commonly accompanied by such side effects as headaches,

6 Daphna Birenbaum-Carmeli & Yoram S. Carmeli, *Reproductive Technologies Among Jewish Israelites: Setting the Ground*, in Kin, Gene, Community, 1, 17 (Daphna Birenbaum-Carmeli & Yoram S. Carmeli eds., 2010).

7 *Id.*, at 264-265.

8 Professor Hilla Haelyon, who interviewed Israeli women undergoing IVF treatments, found that such women punish themselves through acts of self-violence. One woman, for example, described the deep disappointment in her own body: “I would change my whole body if I could. I would turn it into the body of a woman who could easily become pregnant... I was lying on the treatment bed and felt disappointment. I told my body: you let me down.” Hilla Haelyon, *A Garden Enclosed: A Body-Identity-Emotion Triangle Of Women Undergoing In Vitro Fertilization Treatments* 57 (2007).

9 Dalia Ben-Ari, *Ten Things that Should Be Said About Fertility Treatments*, At Magazine (April 16, 2017). An online copy (in Hebrew) is available at <https://goo.gl/Lg4jv2>.

bloating, nausea, blurred vision, and hot flushes. During this phase, the Mother-to-Be must take hormone injections at precisely calculated intervals two or three times a day; even an hour’s delay can trigger a hormonal imbalance and disrupt the process. Then, because follicular development must be closely observed, the Mother-to-Be must visit the clinic as often as three times a week for vaginal ultrasounds and further blood tests. Once the follicles have developed the Mother-to-Be advances to the next stage, that of egg retrieval—a procedure performed under general anaesthesia. The woman’s eggs are then stored in tubes, fertilised, screened for genetic abnormalities, and then transferred to the uterus, after which the woman receives daily hormonal support to encourage implantation. Ten to twelve days later, additional blood tests will confirm whether pregnancy has been achieved—an outcome that occurs in only a minority of treatment cycles. If the treatment does not result in a pregnancy, the woman typically undergoes another treatment cycle, a process that can last for years, with one cycle leading directly into the next.¹⁰

Mothers-to-Be who commit to this process necessarily relinquish control over their schedules. Their careers cannot possibly escape the fallout: women undergoing fertility treatments may find it difficult to commit to even local meetings or conferences; traveling abroad is categorically out of the question. Now imagine what it is like to have your calendar organised by the imperatives of clinic visits; needing unbroken access to a refrigerator for storing medications and hormones; and needing to administer time-sensitive injections. Still, despite reorganising their lives to conform to the rigors of their IVF protocol, many of these women—indeed, the vast majority—will receive a call from their doctors telling them that they remain non-pregnant. Many will receive this call during a meeting, or a conference, or a class, and will return to their professional environment overwhelmed by a grief that they need to hide.

At each step in the process, fertility treatments can dominate not only the schedules of Mothers-to-Be but also their spirits. For example, Shirley Buganim, a celebrated Israeli model, described the effects of fertility treatments on her career: “my whole life revolves around the treatments, they completely manage me. I cannot schedule work abroad in advance because I will not fly with a refrigerator full of shots. I also don’t know when the egg retrieval will happen, and the IVF is more important to me than anything else.”¹¹ Similarly, Ayelet Nahmias-Verbin MK, a member of the Israeli Parliament, candidly recounts:

10 Guide to In-Vitro Fertilization in Israel issued by the Israeli Ministry of Health, available at https://www.health.gov.il/PublicationsFiles/English/IVF-handbook_EN.pdf.

11 *Id.*

In the beginning, I hid the fact that I was undergoing treatments. I don't know how many days I took off from work just to keep it a secret. At one point, I decided to quit my job, simply because it was interrupting my treatments. During that time, I thought about less privileged women who don't have the option of doing what I did and who need to somehow manage to strike a balance between work and the treatments.¹²

In her new book, *Becoming*, Michelle Obama reflects on the inescapably gendered experience of putting your life and career on hold in order to pursue fertility treatments:

It was maybe then that I felt a first flicker of resentment involving politics and Barack's unshakable commitment to the work. Or maybe I was just feeling the acute burden of being female. Either way, he was gone and I was here, carrying the responsibility. I sensed already that the sacrifices would be more mine than his. In the weeks to come, he'd go about his regular business while I went in for daily ultrasounds to monitor my eggs. He wouldn't have his blood drawn. He wouldn't have to cancel any meetings to have a cervix inspection... his only actual duty was to show up at the doctor's office and provide some sperm. And then, if he chose, he could go have a martini afterward. None of this was his fault, but it wasn't equal, either, and for any woman who lives by the mantra that equality is important, this can be a little confusing. It was me who'd alter everything, putting my passions and career dreams on hold, to fulfill this piece of our dream. I found myself in a small moment of reckoning. Did I want it? Yes, I wanted it so much. And with this, I hoisted the needle and sank it into my flesh.¹³

Giving voice to Mothers-To-Be thus requires us to listen to their experiences and to acknowledge the adversity they face. It requires us to recognise that for this category of women it is precisely the lack of children that so fundamentally affects their careers. Moreover, unlike mothers, they only experience the sacrifices and the burdens of mother-labour without the joys and rewards of actually having children.

Don't ask-don't tell: the invisibility of Mothers-to-Be in academia

As women began entering universities in increasing numbers both as students and as faculty members from the 1970s onwards, academic institutions have gradually awakened to the need to balance the “greedy institutions” occupy-

ing women's lives—family and work.¹⁴ However, the implementation of family-friendly work policies—while a welcome development—has not been free from blind spots. A wealth of literature concerning gender differences in academia has examined the needs of mother scholars; but the studies have almost entirely overlooked the Mother-to-Be-scholar. Accordingly, most gender-sensitive policies concern women who are already mothers and reflect little awareness or understanding of the distinct challenges faced by women on the pregnancy-track. This omission inherently trivialises these women's struggles, and sends a powerful message, viz., that institutions will protect women from gender inequality once they become mothers; but so long as they fail in their efforts to fulfil their “natural”—and, in Israel, national—mission, their challenges will remain invisible and their needs unmet.

Third-wave intersectional feminism has taught us that women are not a monolithic group, and that dismantling the multitude of obstacles they face and acknowledging their adversity requires us to acknowledge their diversity. Indeed, “a truth,” Foucault posits, “is a set of procedures that lead to a certain result, which, on the basis of its principles and rules of procedure, may be considered valid or invalid.”¹⁵ Along the lines of Foucault's games of truth, I offer to rethink the set of rules that produce the “truth” of being a mother. The concept of motherhood need not—and, I argue, should not—be confined to the quality of having a living child; the category of mother must be negotiated and its boundaries expanded and redrawn to encompass women on the pregnancy-track. Given the enormous amount of time, money, energy, and substantive mental and physical effort that Mothers-to-Be typically invest in their quest for motherhood, their experience, too, must be recognised legally and institutionally as mother-labour.

The need for institutional recognition and legal protection of Mothers-to-Be is apparent from the following examples of well-intentioned initiatives that fail to meet the particular needs of this class of women. Academic institutions in many countries now offer adjustments to the tenure clock to accommodate young mothers. Family-friendly policies in force at the University of California, Berkeley, the University of Chicago, and Princeton University, for example, offer female candidates an automatic one-year extension of the tenure clock

12 Liat Rotem Melamed, Women Pay a Great Price for Fertility Treatments, YNET (March 6, 2013). An online copy (in Hebrew) is available at <https://www.ynet.co.il/articles/0,7340,I-4352619,00.html>.

13 Michelle Obama, *Becoming*, 189 (2018).

14 Londa Schiebinger and Shannon K. Gilmartin. “Housework Is an Academic Issue.” *Academe* 96.1 (2010): 39–44. <https://www.jstor.org/stable/20694619>.

15 Michel Foucault. “The ethics of concern of the self as a practice of freedom.” *Michel Foucault: Ethics, Subjectivity and Truth - Essential Works of Michel Foucault 1* (New York: The New Press 1997), 297.

for each child.¹⁶ Policies such as these are laudable; yet they are cold comfort to Mothers-to-Be, who have invested a different—yet equally significant—kind of mother-labour in the arduous, yet often fruitless, path toward pregnancy. Similarly, numerous opportunities for research grants and other academic benefits



The gift God gave me after countless fertility treatments

offer accommodations to offset the special burdens placed on mothers. The European Research Council (ERC) Starting Grant, for instance, one of the world's most prestigious grant for junior scientists, allows mothers (and fathers) to account for periods of parental leave in applying the strict eligibility criteria for young scholars, which are based on the date

of the PhD's awarding. The criteria provide that "[t]he effective elapsed time since the award of the first PhD taken... can be reduced in certain properly documented circumstances," "such as for maternity and paternity leave, clinical training, long-term illness or national service."¹⁷ Yet Mothers-to-Be remain excluded from this list of envisioned examples and must thus carry the burden of naming their "problem" and making a case for a special accommodation of their circumstances.

The first step toward correcting lacunae such as these is naming the problem, as I have done here. The second step is claiming—voicing grievances and articulating the specific areas in which Mothers-to-Be require support and accommodation to pursue their careers on equal footing with their peers, and identifying models for guiding policymaking in this area.¹⁸ Academic institutions can begin by looking at the example of the Israeli Student Rights Law, which, as amended

16 National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. 2014. *The Arc of the Academic Research Career: Issues and Implications for U.S. Science and Engineering Leadership: Summary of a Workshop*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/18627>

17 See Annex 4.4, Information for Applicants to the Starting and Consolidator Grant 2019 Calls, the European Research Council: Executive Agency (emphasis added). http://ec.europa.eu/research/participants/data/ref/h2020/other/guides_for_applicants/h2020-guide19-erc-stg-cog_en.pdf.

18 By this terminology, I am referencing the classic formula offered by William L.F. Felstiner, Richard L. Abel, and Austin Sarat, *The Emergence and Transformation of Disputes: Naming, Blaming, Claiming*, 15 *Law and Society Review* 631 (1980-81).

in 2012 and again in 2018¹⁹ includes provisions that facilitate higher education and an equal starting point not only for student-mothers but also for female students undergoing fertility treatments, as well as for surrogate mothers, adoptive mothers, and foster mothers, among others. Academic institutions should follow the lead of the Israeli legislature and formulate institutional policies that acknowledge and offset the unseen hardships of the Mother-to-Be scholar. For example, section 19(b) of the Student Rights Law provides that female students may be absent from classes that conflict with their fertility treatments. Academic institutions could institute equivalent policies that adapt and/or reduce Mother-to-Be faculty members' teaching workloads and/or administrative duties.



Some institutions have already begun taking steps in the right direction. A notable example is Yale University, whose benefits policy offsets the financial burden of fertility treatments by covering the cost of IVF, Intra Uterine Insemination (IUI) and Ovulation Induction (OI) for its members.²⁰ Still, it is clear that women who simultaneously navigate the demands of the tenure-track and the vicissitudes of the pregnancy-track confront unique challenges that remain hidden under the "don't ask don't tell" policies that generally prevail in matters of infertility. By bringing these challenges to light and acknowledging them as a critical dimension

of gender inequity, academia can begin to dismantle the mechanisms of shame and denial that accompany today's problem that has no name. After all, by legitimising women's claim for inclusion as Mothers-to-Be, academia takes a further step toward its promise of substantive equal opportunity for differently-situated women.

19 The Student Rights Law (2012), Adjustments for Fertility Procedures, Pregnancy, Birth, Adoption, or Obtaining a Child for Custody or Foster Care (Amendments, 2018) (in Hebrew).

20 Yale University. "Aetna Select Clerical & Technical, Service & Maintenance and Security Employees". https://your.yale.edu/sites/default/files/aetna_choice_faculty_and_mp_benefit_plan.pdf.

Chapter 4: Motherhood and science – who knew?

Mari-Vaughn V. Johnson, Pacific Islands Climate Adaptation Science Center, mother of one child born in the U.S.

42 this year, a magical number. Hopefully less than half my life is behind me, but you never know and you cannot really measure lives by years anyway. Everyone lives multiple lives, some simultaneous and some sequential, some professional and some private, some unspoken and some lived openly. I lived a lifetime as just me, as a woman on this planet, curious, adventurous, driven to make the future better. I used this time to develop the person I am, to plumb my passions and build the connections and knowledge to meet them. Or at least to pursue them, because I am not one to dream of the easily achieved.

In this collection, you have come across a group of women invited and inspired to share stories of motherhood, especially in relation to our work as scientists. I am inspired by their stories. Perhaps I err on the side of too personal, but for me science, my world view, the person I am today, motherhood, these things are too interwoven to separate. I do not have, nor will I try to formulate the answers for how to achieve a work-life balance – everyone will have their own answers. I would like to just tell you a little bit about who I am, how my life has changed in the past few years, and what that means to my identity and my work.

I am a mother.

An Environmental Biology class derailed my college plan to study international relations. When I learned about soils and associated plant communities, something clicked and the magical wonder I held for nature morphed into intellectual pursuit. Science did not diminish the world. Instead, it functioned as a new language with a rich vocabulary, giving me voice to articulate the awesomeness of nature, of life, of this thing that we all share and hardly ever notice. I embraced the beautiful and delicate system that improbably exists on a ball of rock somewhere in the middle of somewhere spatially and temporally, with roughly 500 km of atmosphere between us and the void of space. It is invigorating, beautiful, grounding, and empowering.

As a young scientist, I had little time for the latest fashions or accessories, even when the hottest accessory became a diamond ring, even as my best friend spent graduate school mothering children. I had no interest. Marriage and parenthood are a natural progression in life for most people. For me they held no interest. I felt too young to be a parent. I criticised societal constructions and

rejected their expectations. When asked about children, I expounded upon the selfishness of parenthood. When asked how I could work towards a future in which I had no stake, I explained I chose to remain childless because I cared so much about the future. Despondent about our trajectory, I committed myself to turning around what we are doing to this planet.

I am a mother.

My soft spot is for biodiversity, for complex systems with rich plant, fungi, and animal diversity. Life on this planet makes my heart sing, to think of the intricacies that interplay from the subcellular level all the way through to tectonic shifts. I accept that most people do not care about endangered epiphytic plants lost to timber operations, but humanity's responses to the plights of charismatic species confound me. How do people ignore the species that speak to our imaginations, the species whose voices we learned as children? The animals whose voices we teach to our children. What does the monkey say? What does the elephant say?

Biodiversity is under assault. Malthus and Hardin resonate with me. How could I add another mouth to a planet already overrun with humans? How could I bring a child into a world where whales, elephants, and rhinos were the stuff of fairy tales? How could I explain to this child that we killed the megafauna and we could have prevented it? There are mega-rich among us who could provide financial incentives to make it stop. There are governments that could enforce regulations to make it stop. There are regular people who could stop demanding products derived from these species to make it stop. We are selfish. It is happening right now, even as you read this. We kill the elephants for trinkets made from their tusks. We kill the rhinos for fake medicines made from their keratin horns. We kill the whales through negligence in our greed for immediate shipping and disposable plastics. Moreover, we kill the pangolins, the river dolphins, the polar bears, the great apes. You may read this and conclude, "This woman is so extreme", but can you deny that we are doing this? Endemic orchids just went extinct for the palm oil in your store-bought biscuits. We are all part of this problem and we need to all be part of the solution. We will not stop. These animals will be fairy tales.

I am a mother.

What does this have to do with parenthood amongst scientists? When you are someone who worries that the recently imposed agricultural tariffs between the U.S. and China may shift soy futures markets to South America; where more

rain forest will be cut down to grow soybeans, more native peoples and biodiversity will be destroyed, weather patterns will be disrupted over the loss of forest, more erosion will occur, destroying coastal reefs, and North American rainfall patterns that respond to South American evapotranspiration may be altered so much that the fields previously growing soy in the U.S. will no longer support the same crops as once they did; then you are the sort of woman who worries about whether or not she should bring a child into this world.

I am a mother.

My curiosity blossomed through a natural progression, with me becoming a scientist by training. As I learned more about the inner workings of the organisms and systems that I loved, I also grew to appreciate that mine was not the dominant worldview. A good friend said, “I am just not really into that nature stuff.” My naïve self-railed: you cannot divorce yourself from nature by spending your days inside! Nature is not optional “stuff”. How could she not see the beauty of life’s varied forms and expressions, how intricate its chemistry, how deftly it handles physics? She was the first person to show me that smart people can be ignorant.

Years later I find her attitude has formed my career at least as much as has my own. My resumé shows a woman trained in plant biology, wildlife sciences, and agronomy. I lived in a variety of U.S. states (and ecosystems) and studied in a smattering of countries (and ecosystems) across Asia and Central America. I launched my career as a research scientist. Frustrated at the pace of research’s impacts and determined to champion scientifically sound decision-making, I took a Science and Technology Policy Fellowship from the American Association for the Advancement of Science (AAAS) at the U.S. Department of State. Atlantik-Brücke and the Global Young Academy (GYA) continue to afford me an unparalleled opportunity to build lasting friendships and professional relationships with young leaders around the world, all committed to leaving this planet a better place than it was when they were born into it.

In my mid-30s, I took the job I still hold, wherein I strive to amplify the voices of scientists to decision-makers, enabling science-based policy development. This domestic-looking job increased my commitment to global awareness. I continued to forge connections across diverse disciplines to develop multi-stakeholder solutions. I began to be invited as a plenary speaker to international fora. I was elected to lead the Global Young Academy. I was building collaborations across academia and the interagency to move water quality forward across the United States. My scientific future was bright. My networking was bearing fruit and I

could feel the momentum building.

I was 39. My partner and I discussed children. I had devoted my life to achieving better environmental stewardship. There was this aspect of life we suddenly wondered if we would miss. And there was little time left for embarking on that trip. At 40, we decided to give it a go – if we got pregnant, it was meant to be and if we did not, we would work towards a better future for everyone, regardless.

I am a mother.

In the United States, we do not have paid leave for mothers or fathers. Luckily, I had worked for my employer for long enough to have accrued leave time. U.S. parents are expected to take 8 weeks for a vaginal birth or 12 weeks for a C-section birth. I did not take any time off before my baby was born; working until the day I went into labour. After our baby was born, his father had to go back to work immediately. After my 12 weeks, he took his 12 unpaid weeks. Before having a baby, I did not realise how vulnerable a 6-month-old would be. I had set him up with day-care, paid my deposits, met his teachers, toured the building, but when the time came, we could not do it. His father quit his job and I went back to work. Why? Because my salary was higher and my insurance options were better. It made financial sense. He is a wonderful father and still takes care of our 16-month-old every day, a full-time job to be sure, but one that I envy as I draft white papers for policy-makers on nitrogen losses in distant watersheds. My work seems less immediate.

Older women telling me that I have it so much better than they did does not make how the U.S. treats new parents any more palatable. I once scoffed at European nations providing mothers and fathers with years of leave to raise a child. Now I find myself jealous. I resent my professional life’s interruption of my private life. I long for time to spend with my child.

Before I had a baby, I routinely worked late, putting in an extra 10-20 hours a week, checking emails at night and in the morning before work. Now I leave work at work and I work a 40-hour week. Before I had a baby, I resented the mothers who seemed to shirk responsibilities. I felt that my private time was just as important as theirs was; I was able to make sacrifices to get the work done – why couldn’t they? I see it differently now. Having a baby changed my priorities. It did not change who I am. I am the same. But, I have a new friend. It is like a love affair. My family is in focus in a way that I did not understand it would be. I feel a connection to mothers around the world and even across

species. Just after I had my son, I watched a mother cat nursing kittens and felt a pang of empathy.

Having this baby somehow grounded me back into being a part of this planet. It is something I cannot articulate very well, but having a baby is another connection to being alive. Whether you are religious or not, whether you believe in Gaia or DNA, whether you believe in biological imperative, volition, or fate, the unspoken arrangement between mother and child is something that makes you both whole and less defined. My baby is central to my world right now in a way that I would never tolerate any other human being. I treasure him in a way that I can only explain as biological, core to core. I love him. Protecting him protects the genetics that code the life that runs through my body and my parents' bodies before me. I am a dork, for sure, but genetics is exhilarating.

I love this ball of rock spinning in space on which diversity has flourished. I revel in the neat and serendipitous balance where life has exploded into its myriad forms and expressions. Moreover, I wonder at the joy that is consciousness, not just being here, but also knowing that I am here. I marvel at my opportunity to share this with a little creature who speaks to my heart. To you, my reader, and to myself and to little Francis, I make the solemn promise to continue to devote my life to increasing the sustainability of human endeavours so that we can all cherish and protect the beauty that is this planet.

Section 2: Balancing science and motherhood

Chapter 5: Motherhood: a journey of surprises

Camila Ortolan Cervone, Science-policy interface and Sustainability researcher, mother of two boys and a girl born in Brazil

I always knew that I wanted to be a mom someday, but I never planned it. I was too busy working. On the other hand, I planned every step of my career. I was always a workaholic multitasking woman, doing a PhD while working as a technical advisor for a development cooperation agency. I used to travel a lot and I loved it. I used to sleep 4-5 hours a day to be able to accomplish all my tasks and that was more than enough. That was my dream job and I was finally doing a PhD. I was truly happy.

I was engaged at that time and at the end of my first year of work, I got married. My job was in Brasilia and my husband was living in our hometown, Campinas. Coming back from our honeymoon, I had to say goodbye to my new husband at the airport because I had a work trip. That was our first sad goodbye and I did not see it coming. I was gone for only one week and I suppose that was the start of a new me.

After a month or so, I decided to quit my dream job to move back to my hometown. My husband is a family man and he wanted to have children as soon as possible. I was afraid to lose my career. I was afraid of what I would become. I did not know how to live without having a job, many projects, a PhD and constant travels. My job defined me. I used to love to be alone, to have time (although I was constantly working). To feel free. And most of all, I had never carried a baby in my arms before. It was almost time for that and the idea was terrifying. However, to persuade me, one day, my husband said to me: "Do you think you will get pregnant as soon as you decide that you are ready? This is the one thing you cannot control". I am a very anxious person and that convinced me that it was time to stop avoiding babies.

One month later, I was pregnant and I had a miscarriage. I never felt so sad in my whole life. I was devastated. It seemed I was dying and part of me really died with my baby. I finally understood what is important in life and I lost it. One week later, I received the news that I was accepted to do a PhD internship at the United Nations. I had applied when I quit my job and that came as a salvation. I left my husband for three months and I found comfort in working

with something that I loved again. My second dream job saved me. It took me three months abroad in my favourite place, lots of work, many inspiring people and incredible work to make me heal and to make me feel like I was ready again. One month later, I was pregnant with my first love, Lucca, the light of my life.

He changed everything. For the first time in my life, I could not control anything, not even his birth. I was determined to have a natural birth and I prepared myself for it. However, he was bottom-down and I had to have a C-section. In Brazil, it is very common to have nannies when you have a baby, but I never wanted one, because I thought, I could do all alone. But I could not. Sleep deprivation was the worst. He was almost two years old when he slept through the night for the first time.

I devoted myself to Lucca completely. Motherhood was nothing like I was expecting. It was more difficult and more challenging than I thought. And definitely much more difficult than working. However, I did not want to miss anything. I wanted to be there with him every step of the way. I was deeply in love with him, I became a better version of myself just to be the mom he deserved and not the insecure, not prepared, and workaholic person I was.

I kept doing my PhD and my passion for my work could not stop me from accepting a few invitations to write parts of relevant reports. Deep inside I thought I was still a little bit of a super woman and I would be able to do it all. And I did. It was not easy to write the documents. I had to work at night and I was constantly interrupted by my sleepless son and many times I got frustrated and anxious because of the deadlines and because the other researchers were relying on me and I could not concentrate properly. But I did it anyway.

I manage to finish the reports, to take care of Lucca and take care of the house and my husband. Sooner than I thought, even without knowing what sleep was anymore, my heart was ready for our family to grow. The reasonable thing would be to focus on the PhD and finally finish it. But I knew by then that my mission in life goes beyond my work and the longer I waited for my second child, the longer it would be before I could devote myself to work again (and we wanted at least 3 kids). This time it was not that fast and not as easy but 6 months later, I was pregnant again. To our surprise, we were blessed with twins. It was like a dream come true to me: our family was complete. Apart from that happiness, I was afraid of telling my supervisors the news: I was not only pregnant, I was expecting twins and my PhD was still unfinished. My pregnancy was risky and I could not work most of the time. I spent almost 3 months on bedrest and I could only think about my babies. After 38 intense weeks, Pedro

and Isabella came into this world to turn my world upside down. My heart overflowed with joy and love.



My twins are only 10 months old, so I am slowly starting to work again. My husband is present and he supports and encourages me to work. He knows that I am passionate about my research and that our children will grow and then the scarce time that I have now will turn into plenty of time in the future. My parents and my mother-in-law also help a lot and I will never be able to explain how grateful I am for everything they do. When they are around, I know that I can focus on my research because they are amazing with my children. This does not mean that I do not feel guilty that I am not with them, because I do. But who doesn't?

My PhD is still developing slowly and I finally became a scientist. Before, I was doing a PhD as a plus for my work as a technical advisor. It was never my intention to be a scientist and as a biologist, that was the most obvious choice. Instead, I worked for the private sector, non-government organisations and international organisations. Motherhood made me see what was in front of me from the beginning: that science is perfect for the new me. I conduct research on international topics, I collaborate with people from all over the world, I have flexible working hours, I can choose the topics I want to concentrate on and I do not even need to be away from my children in order to do so.

Being a mom to these three amazing kids makes me a better person. It makes me want to work even more, because what I do is trying to save our planet for future generations. Now that means to save our planet for them - they are my everything.

My children turned my world upside down. Then I realised that this is definitely the perfect version of my world, of my life and that I am a better version of myself.

Chapter 6: Following a schedule

Mary Donnabelle Balela, Mining, Metallurgical and Materials Engineer, Philippines, mother of two girls born in the Philippines

After one year of post-doctoral studies in Japan, I decided to return to my university in the Philippines. The decision to go home was easy. I had been out of the country for the last 6 years to complete my graduate degrees. I had been away from my husband and family. I knew it would be more difficult financially to give up my postdoctoral position and return to my low salary as a lecturer. But I felt I was ready to take on new challenges.

The expectations for a faculty member with a PhD in my university were tremendous. I was expected to teach well, perform research exceptionally, and contribute to administrative and extension works at the same time. But there was a lack of mentoring and support for young faculty members. At times, I felt frustrated as I had to learn the bureaucracy inside the university. I was frustrated that I couldn't start any research work because I didn't have any laboratory supplies nor a workspace to perform experiments. I did not have any students because I had no research money to support them.

Then I found out I was pregnant.

My first reaction after finding out about my pregnancy was disbelief, which then quickly became anxiety. Pregnant!!! How was I supposed to build my research? How was I supposed to manage all the responsibilities of a tenure-track faculty and take care of a baby? My husband was working outside Manila and I was renting a room near the university. I knew that with a baby coming, I would need my own apartment. I also knew that I had to take care of the baby by myself as we both needed to work because of the additional expenses.

After the initial shock wore off, I allowed myself to be happy. I welcomed how my body changed with the pregnancy and I cherished those special moments of feeling my daughter move inside my tummy. But I did not slow down with my work. I continued pursuing research grants. I kept on working until the day I gave birth to my eldest daughter Aya.

We only have two months of paid maternity leave in the Philippines, so I had to go back to work immediately after. I could not find a day-care facility that could take care of a two-month old baby, but I was fortunate that my neighbour agreed to look after her while I was away at work. So every morning, I would

bring Aya to her house. After work, I would pick her up. It seemed so simple. We just had to follow a schedule.

But a baby does not care about time management and schedules.

Most nights Aya would not sleep and just cry for no reason at all. I danced her for hours to put her to sleep, only for her to wake up the moment I lay her down on the bed. I could not eat. I could not sleep. I was alone. When I could not bear it anymore, some nights I just cried with her.

I was just so tired.



My daughters Freya (left) and Aya (right).

My productivity as a researcher suffered, as well as my teaching performance. I could not teach well because of the lack of sleep. I could not prepare for my lectures. I was always late for my classes because I had to squeeze in preparation in-between lectures. The comments I received from students after the teachers' evaluation were brutal. Students would write that I should have better time management and that I should not take on a lot of responsibilities. I was hurt and sad. I was alienated from co-workers because I could not socialise. Whatever time I had at work, I spent catching up with my lectures or working on my research.

Aya was one and a half years old when I found out, I was pregnant again. To say we were shocked was an understatement. We were just starting to enjoy having Aya in our lives. We were just starting to follow the schedule. We did not expect to have another baby so soon. I was supposed to give a presentation in a symposium on the afternoon of 13 November 2015. I decided to finish some household chores first before going to work. Aya was already with my neighbour. I started feeling some labour pain around lunchtime. But the progression of the labour was so fast that I could not move anymore. I knew the baby was coming. I called my husband, but we knew he would not be able to reach me in time. Through some sheer willpower, I managed to bring myself to a hospital.

Taking care of a toddler by myself was hard enough. But taking care of a

toddler and a new-born baby took a toll on me physically and emotionally. My husband and I had to make a hard decision and giving up Freya for a year to my mother in the province was the most sensible action at that time. But that decision remains the greatest regret of my life.



Making it work. Our family celebrated Aya's 6th birthday together with my students

Freya is now 4 years old and Aya is now 7. My husband, having found a new job in the city, is now around. But our life is still chaotic. We still cannot follow a schedule. I am still late to classes, especially on those days when I was in charge of bringing and picking up the kids from school. I still get harsh comments from students from time to time. I still do not have the time to socialise. But I would not change anything. I love being a mother. I love being a wife. I love being a woman scientist.

Chapter 7: Motivation, persistence and harmony

Milica Pešić, Molecular biologist, Serbia, mother of four boys and one girl born in Serbia

Motherhood is the best experience of my life. Actually, I think that my life began three times: first when I was born, second when I was baptised as a grown person at the age of 27, and when I became a mother. My life before motherhood seems to me as a period of exploring possibilities, and after my first son was born I set my priorities looking forward with more confidence and without wandering.

Since I can remember, I was a very curious child. I was thinking about the origin of life, parallel levels of existence and I used to imagine a lot. I was almost convinced that I can fly but I practiced flying only in my mind and dreams. My first love was mathematics. I was happy to obtain new mathematical tasks that needed to be resolved in a creative way. At the same time, I was dancing, playing piano in a rock band, acting on the stage etc., never knowing which gift would outweigh. At the age of 16, I had the opportunity to work in the Laboratory for Molecular Biology at the Institute for Marine Biology in Kotor, Montenegro. From that time, my life is connected with experimental work and new compounds testing in biological systems. The experience of experimentation was the biggest quest and challenge for me and still is.

However, I always wanted to have a big family. The idea of many kids playing around me had the same power upon me as the love for science. I was blessed to fulfil both dreams. I finished my PhD when I was pregnant with my fifth child. I never thought how demanding it is to have five children and be a researcher. I did and I do all the obligations simultaneously, i.e., thinking about new experimental designs and troubleshooting while cooking dinner, writing scientific papers after saying goodnight to my children, talking with my mentees on the phone while preparing the kids for school. I learned how to concentrate even with so many noisy kids at home.

My first maternity leave (one year is the standard maternity leave in Serbia that is fully paid from the Social Funds) was the most challenging for me. I was concentrated on my baby son, his little accomplishments and housekeeping obligations. After several months, I was anxious and I really wanted to come back to my laboratory and experimental work on my PhD thesis. Finally, when I started to work again, I felt more confident but at the same time, I worried a lot about my baby son left at kindergarten. Therefore, my husband and I engaged a nanny to take care of our son at home. After two years, I was pregnant again with my

second son and at that time, I was sure that my career would be significantly postponed due to long maternity leaves. Namely, science could not wait for me, each time I come back to work, new ideas and new perspectives were opened in my field of research, and I was trying to be up to date. Therefore, I was working on my PhD thesis for almost ten years (from 1998 to 2008), while my



My kids and me in front of the Bell Tower of the Monastery "Sopoćani" in Serbia; My kids from the oldest to the youngest: Dimitrije, Vasilije, Grigori-je, Kosana and Atanasije

It is hard to prioritise when you have five children because each day brings a different challenge and one can never know what will happen next. Several times, I had to cancel my participation at conferences/meetings because one of my kids became ill.

I must admit that I was lucky having a supervisor who was full of understanding for my mother/researcher vocation. I was free to organise my working hours. For my supervisor, the results were the only thing that mattered. Now, I have a

kids were born in January 2000, in April 2003, in January 2005, in June 2007, and in July 2009. I must mention that I had two years maternity leave for the third, fourth and fifth child (fully paid). Yes, I defended my PhD thesis while I was pregnant with my fifth child (and my fourth son). And of course, my true career began after I was awarded my PhD. I even refused to use the benefit of a long maternity leave with my fifth child. I came back to work when my baby was 6 months old. At that period, I had considerable help at home because my mother and father-in-law came to live with my family.

I am not sure if I can advise women in science how to achieve a work-life balance. Perhaps my experience is not a typical one, but I think that motivation is the driving force. In everyday life, I always apply a systematic approach and never abandon my obligations. It

research team of independent scientists who are again full of understanding for my mother/researcher vocation. We complement each other and have achieved a lot during the past five years working together.

Raised in a typical Serbian family with a stereotype that woman should do housework and raise children, I adopted those traditional values and I behave



At the Special Nature Reserve "Uvac", in Serbia

in the same manner like my mother and her mother. I am the one who cooks for the family, cleans the house, cares for the children, their homework, health etc. Now that my youngest one is 11, my kids help me a lot. Occasionally, I am not pleased with their behaviour, success at school or tidiness but I appreciate their wish to help. Of course, my husband who has a strong personality helps me in different ways. His presence at home is enough to harmonise our children and me. Although being traditional, he has never complained about my absence when I had demanding experiments, when I had to meet deadlines or when I travelled



In front of the Mehmed-paša Sokolović Bridge (Old Bridge in Višegrad), located near the border between Bosnia and Herzegovina and Serbia

to a conference. During my absence, he was more than capable to replace me. In general, my children brought a new dimension in my life and career. I became a true leader of my research team with a capacity to organise work and to see

ahead better than ever. At home, I have to admit that I am a demanding mum. It is not easy for my children to fulfil my expectations in respect to their school and home obligations. We are a big family and we need to function almost perfectly. If one of us is not sufficiently committed to help other members of the family, we all suffer. If someone is ill, we all redirect our activities to help more.

I am fortunate that all the people around me support me in doing science. I am sure that I also support them in following their own dreams. The positive interaction among us helps each one to develop personally. Therefore, in my experience, the main driving forces for achieving a work-home balance are motivation, persistence and harmonic relation among closest collaborators and among family members.

Chapter 8: Ball juggling between being a great mom and an excellent scientist

Mimi Haryani Hassim, Chemical and Process Engineer, Malaysia, mother of two boys born in Malaysia

Motherhood has taught me to be a much more patient person than before I had my children. I have always been very active: I know what I am aiming for e.g. in work-related matters and I will try my best to accomplish it within the time-frame given. This was easily achievable, before I had my own family since I am dealing with nobody else but myself alone. I can control my own pace and plan my own way to get it done. But I find myself a poor leader. I do not know how to lead people very well in a team and I can tell that this is because I am used to working at my own pace and I feel restless whenever I cannot get things done as planned, especially when it is involving others (beyond my control).



Our family during Eid celebration last year at my sister-in-law's house in Malacca

Being a mother has taught me that this world consists of different types of people. We cannot always get things done in our way. There are unpredictable things when we work with others and it is OK! Celebrate the differences as this makes people unique and wonderful. Accept them as how you wish they would also accept you. We can always discuss things together, how to get things done wonderfully with all the differences encountered. And I learn all this from my own kids, when dealing with them.

Another point worth sharing is – children have changed my life a lot in a way that now I know life is not all about myself and my career. Life is so much more beyond that. There are other much more precious things and one of them is our kids. I feel so much happier now simply because I know no matter how tiring or stressful the day is, I will come back to my beautiful and fun kids. Even though sometimes it is tiring to take care of the kids after a long day at work, the reward is worth it. Thinking about them alone is enough to make me smile at work. And I become more careful in my actions as I want to set a good example as a person to my kids. Kids have changed me to be a better person than before.



Women are unique and powerful and different from men from the aspect that women are so much more multi-taskers. They can get different things done excellently if they really put themselves into it. Being a women scientist means we should not only be great in our own field of research, but also are concerned with other science-related matters, including Science, Technology, Engineering and Maths (STEM) and humanities. Having kids, for example, has made me become so much more empathic on the needs of an excellent STEM learning infrastructure for the

kids. I am one of the very active ones voicing my opinions when talking about education (especially STEM) in the country (even though informally) as this is also something that will affect the future of my kids. Having kids has helped me a lot in digging into this matter deeper and try my best to always share whatever knowledge I gained upon attending any related seminars or conferences.



Umayr (on the left) and Adam (on the right)

I am fortunate that I did not experience a dramatic fall in productivity after childbirth at all. I believe I owe this a lot to my supportive husband. There is one period, which really affected my career a bit after I got back to work, following my confinement period. That is when I lost my house cleaner and my husband, at that time, just got a new job so he could not take leave at all. It was a mad time for us as I could not even go to work with the baby and cried a little at that time, as we did not know what was to be done. We were lucky to find a very reliable and good nursery after a week to take care of our baby.

For me, my biggest support system comes from my husband. We have been married since 2003. He is the best support system for me as he always takes care of the kids every time I am out on station for works, etc. Our parents live far from us; therefore, we do not have other family to help us, but each other. I will always be grateful that my husband is wonderful in supporting me in my career, by helping me with the kids and house chores.

As for maternity leave, for the first baby, my maternity leave was two months. For the second one, the government had increased it to three months and I as well as other mummies out there are so grateful for this.

There is also a personal aspect that somehow affects my work schedule while trying my best to be the best mom. For instance, due to our religious believes, we are highly recommended to breastfeed for a minimum of two years. This is actually what is also encouraged in many countries. To be honest, exclusive breastfeeding while working fulltime is very tiring and demanding (to pump out milk also as stock when we go to work or need to travel) but it is OK. This is something that is very precious and we should treasure this experience while we can and just enjoy the journey.

On the other note, I personally find quite unfair that when it comes to promotion, female scientists or employees are evaluated by exactly the same performance requirements for men. Considering maternity leave, etc., I think it is not a fair practice. Also, it would be the best if ASEAN countries would implement a longer-term maternity leave, taking Scandinavia as example (one year with salary): our kids need us when they are in their first year of life for bonding, etc. It would be wonderful if husbands also were given paternity leave to cover for the spouse/mother in cases where the mother needs to go to work with nobody else to take care of the baby.



Another very important aspect for moms is complimentary work leave if the kids are sick, such as the Finnish system (I need to refer to Finland, as this is the only place I know exactly how it works as I lived there for five years). When the kids are sick and cannot go to school or day-care, mom or daddy can have an automatic work leave to take care of the sick kids at home. However, it is very frustrating that in Malaysia, we need to use our personal annual leave for this matter. Some workplaces only provide 15 days of annual leaves to their staff. Imagine if the kids need to be cared for for several days or weeks, it is devastating that parents need to use their

annual leave, when it is supposed to be spent on vacations or holidays. It seems like a penalty for the parents of the sick kids. Even worse is if employers do not allow the parents to be off-work (my husband suffered it in his previous company, when our kids were hospitalised due to Kawasaki fever, which is very stressful to us as parents); what choice do the parents have – to take care of the kids and lose our job? This is something worth looking into, especially for women in science in which kids are those who are very dear to our hearts; hence, for us both career and family come first.

In terms of life and work balance, to be honest, as aging, I found myself becoming more laid-back in life. I start to appreciate life even more – that is, life is not all about career development and excellence, but happiness and satisfaction of having a wonderful and healthy family. I make a habit nowadays not to bring work home, unless it is urgent. For me, home is a place for family – kids, spouse and our own activities. Work never ends and work can wait. Surprisingly, by practicing this habit, I become a happier person now and MORE PRODUCTIVE! I cannot explain, but maybe I become indirectly better in time management as I know I have only that time in the office for getting my work done, hence I am really focussed on work when I am at the office. Sometimes I also prefer to do home-office, as I can save up to two hours simply from commuting and I can arrange my work beautifully around my house chores.

Chapter 9: Guilt and self-improvement through my role as a mother

Roula Inglesi-Lotz, Energy Economist, South Africa, mother of two boys born in South Africa

My journey in motherhood while being an academic working-woman is not full of obstacles, personal difficulties, or societal pressures. It is that of an academic mother that goes through everyday life trying to do her best – she is not alone, but at times she is overwhelmed and questions herself.

I have always wanted to be a mother, before I even knew whom I was or what I wanted to do with myself. I was lucky to meet and marry a man that could not imagine himself in a future without kids. Therefore, in a sense, academia came into my life later than my dream of motherhood. During my last year of PhD studies, the time had come and we were trying to get pregnant. In between the stress and hard work to finalise my thesis, the disappointment of not becoming pregnant was making me emotional at times. Back then, I could not even realise the big responsibility of being a mother, even more a working mother.

I found out I was pregnant with my first one exactly a month after my graduation and my employment at the University. Most employed women face then the first big wave of guilt and stress with having to announce it to their employers – in my case, during probation and only a couple of months after the job offer. The reaction from the Head of the Department was more positive than I would have expected. His only request was to plan accordingly and fortunately, for me, both my boys were born at the end of the first semester so I took maternity leave without having to leave a course in the middle.



The superhero boys with their wonder woman mum (birthdays June 2018)

The institutional assistance and positivity at the workplace grew my sense of responsibility and my desire not to disappoint them. During both my pregnancies, I had the same expectation from myself: work so hard during the months before the births so that no one will say anything about my absence during maternity leave (three months as per my contract – with one extra from my own leave,

although I had the option to take the fourth one with lower salary). That was in a sense the second wave of guilt that hit me: my male colleagues will never have

an absence of work in their career, while I will. This emotion combined with comments from past colleagues – that employing women is not beneficial to the institution since they will have kids and hence, they will have lower productivity - did not allow me to fully enjoy my pregnancies. I was working more than I should have during both. I still remember myself three weeks before giving birth presenting lectures to first-year students, when even a marker falling on the floor was a disaster!

As with every person before they have kids, I thought I would have everything under control and in order. The plan was that my first baby would go to day-care when he was six months old. And that is what happened. Unfortunately, until he was 13 months old, he was hospitalised three times with serious lung problems and as per the doctor's suggestion, we had to keep him out of school for a few months or years. It was a difficult period for our lives as such decisions usually are better taken in leisure but there was no time. We were lucky to find excellent au pairs to assist and grandparents that were supportive and hands-on, but the guilt has managed to stay with me: my baby was sick and needed me but I chose a grandparent or a stranger to take care of him.

When my second baby arrived, two years later, the conditions were smoother. Not only was I more confident to announce it to my employer, but I also felt more confident in responding to negative comments about “using or abusing the system for making babies and staying at home”. I had proven myself (mostly to myself) the first time round. During maternity leave, I had both my kids with me at home and that is where a small journey of finding myself started. I was missing the excitement of work and at the same time, I loved every minute with my babies. Towards the end of the maternity leave, I knew that to offer them the luxury of a happy balanced mother, I had to go back to work - I craved the intellectual stimulation and the sense of accomplishment, and the feeling of being among students. It was then that I had started accepting that feeling guilty at times will accompany me in this journey, but I needed to live with it and use it to my advantage towards self-improvement.

Fast forward seven years since I became a mum for the first time, with two boys now in pre-school and primary age, things have changed since the first months but the waves of guilt still hit me... and they come and go both ways. Not only working-women and mothers in science, but in all fields, struggle to find balance. When I focus on work and travel, I feel guilty that my boys do not have their mum with them the whole time – and vice versa, when I spend time with them, I feel guilty for all the work that is left behind. However, those motivate me in being more productive at work and improving my time management skills

and at the same time, to become a more devoted mother – when it is their time, it is their time.

To aim at finding equilibrium, I feel I am not alone in the journey and that helps immensely. Firstly, my husband is my biggest supporter – sometimes, I call him my personal manager, and recently a life coach. He believes in me and respects



They were waiting for me to return from a Faculty Awards function where I got the Senior Researcher of the Year award (June 2018)

my work. The only way that can work in positive ways is if it is mutual. There are times in our family that we know the focus is on his career, others on mine, and others on the boys exclusively. We remind each other that life is not only about work but also, that we are not who we are because we became parents. Also, my friends – especially those that face the same problems – are the greatest support. Sometimes it is enough to hear that someone else has the same challenges as yourself – it makes the burden lighter.

Most of the times when someone asks me how I manage to balance everything, I jokingly say “I don't value sleep that much”.

When the difficult deadlines approach or the boys are sick, I do not have an option but to sacrifice sleeping hours to anything else. This coping mechanism, of course, is not sustainable but rather a short-term solution to the fact that a day only has 24 hours.

That is exactly when the next wave of guilt usually hits me. Am I a good mother? Do I do everything in my capability for them? Alternatively, do I sacrifice time and things from them for my career development? Then I hit rock bottom, the lowest point in a trampoline and to that, there is only one-way of thinking. The higher it goes, the lower it will end up; and the lower it will end up, the higher it will fly again. If I do not go low, how will I fly higher? If I do not question myself, how will I ever improve myself? If I am not always uncertain if what I give is enough, how will I ever encourage myself to be better? As the cutest koala in the world in the movie “Sing”, said: “When you've reached bottom, there's only one way to go, and that's up”!

I had many discussions through the years with mothers that love their kids but they are the first ones to agree that motherhood has kept them behind



from making more ambitious career choices. Everything in life is opportunity cost. We can do anything we want to, but we cannot do everything we want to. However, what we can do surely is to offer our kids the blessing to have happy parents that are content individuals and not self-defining themselves as parents.

Society suggest that parents of girls are the only ones responsible for changing their behaviour and provision of opportunities towards a gender-neutral reality. I feel the responsibility to “teach” my boys how to respect women not only by being gentle but also by allowing and

promoting women’s strengths and right to pursue their dreams. And that cannot be “taught” by long speeches and discussions; active examples within their family environment can show them the way. Having a mother that travels a lot, that achieves whatever she aims at or at least tries and having a father that does not only “allow” her to flourish but truly supports her are the foundations for well-rounded individuals. My engagement through my work with various organisations and the discussions with students make me re-evaluate my role and responsibility as a mother continuously.



Identifying and reminding myself the ultimate reason why I am a woman in science has assisted me in coping with many of the guilt waves. As a researcher, I look constantly for solutions, for answers, and for suggestions that will improve society and the world we live in. Being a mother has given a new meaning to this internal quest. My purpose now has a face (rather two) and (two pairs of beautiful) eyes – the future that I want to leave behind me as a legacy has a name. My boys have given

a new meaning to why I am a researcher and why I am a woman in science – to see them happy with less of today’s problems surrounding them.

Chapter 10: My husband, son and I: The Three Musketeers

Sandeep Kaur-Ghumaan, Assistant Professor in Chemistry, India, mother of a boy born in India

As a young girl going through school, college and university I had never imagined that one day I would get married, have children and, at the same time, be working towards building a successful academic career. The only clarity in my mind was the keen interest I had in Chemistry and the goal of completing my education in the subject with good degrees from reputed institutes and then, to look for a job. After finishing my MSc in Chemistry in 2002, I earned a PhD in Inorganic Chemistry. However, even while I was finishing my PhD, I was still unsure about whether or not I wanted a career in research and teaching. After earning the PhD degree in 2007, I went to the U.S. for postdoctoral research for a year. It was during this year that I got married.

Before that, I always had the support of my parents in whatever I wanted to do in my life. My father always made me feel special and inspired and encouraged me to keep giving my best in all aspects of life. He always told me to keep working hard, with no expectations on results. Though he is not present to see what I have achieved in life today, I always try to follow his footsteps. My husband, Harmeeek, was the one with whom, for the first time, I discussed the pros and cons of a career in industry or academia. It was during this time that I realised that I would always have his support in my independent decisions and in whatever I do in the future. I continued my job in the U.S. even after getting married, and came back to India in 2008 after I got pregnant. My pregnancy was not planned, but I thoroughly enjoyed this time relaxing, reading and managing my home. This was a welcome change for me and one of the best phases of my life. The birth of my son in June 2008 and holding him in my hands was the most wonderful feeling, which I cannot express in words. I knew then that nothing would ever come between the times I wanted to spend with him. Together with my husband, I decided to look for work only once our son was a few months old. I went for my second postdoc to Sweden in 2009, when my son was 10 months old. My family accompanied me during the time I stayed in Sweden. In Sweden, my husband took the responsibility of taking care of our son, while I was working towards setting up my career in research. It was not easy, but it was during this occasion of juggling my time as a mother and researcher that things became clearer as to what and how I wanted my career to take shape. I knew that I wanted to spend quality time with my son along with dedicating my time to teaching and research. During the time I was in Sweden I managed to get an Assistant Professor position in the Department of Chemistry, University

of Delhi. This was again a turning point in my personal and professional life. In my point of view, the very purpose of life is to fulfil your dreams and, in the process, leave a trail of happiness and joy for the people around you. As a woman, I feel the journey of following one's dreams is a combination of problems and opportunities, and is layered, in a far more pronounced manner than the one faced by a man. I believe that women in science have overcome numerous situations that could, on the face of it, look daunting.



The very first day: Aurum's birth, New Delhi, June 2008

Having been trained as a scientist in India and overseas, I have had the privilege of working with some of the best names in my field of study. These individuals have been supportive of my work. Equally supportive have been my parents and the family I married into. In Asian societies, the partner and his family play an important role in determining how well your career develops.

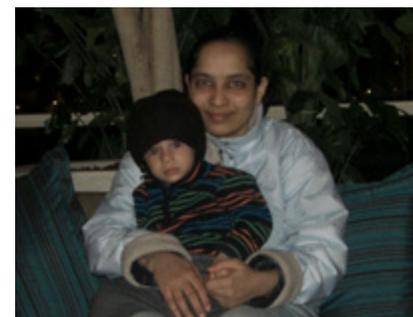
This happens through the support that they provide by being sensitive to your professional space. What policies the workplace has adopted for women is another important factor. In India, more and more workplaces are realising the importance of addressing the distinct needs of women with families. So, you see childcare facilities being set up in offices, flexible working hours, and other initiatives that can make such a huge difference.

In my career as a scientist in the Department of Chemistry at Delhi University, I got good support in the form of day-care facility for my child. My university also offers childcare leave (a total of two years paid leave) – given to working mothers to look after one's children until they attain the age of 18. There are also various funding schemes for women scientists in India. So, I would say that in India, the ecosystem is there for women scientists to succeed in the workplace.

The system (comprising the family and society) provides the “external” support to a working woman. What is equally important is the “internal” factor – the woman herself – her perseverance to carry on with her work. But howsoever may a woman want to be successful at work; she is also sensitive to the other “big responsibility” – her children. It is far more “natural” for a woman to “think and act” like a mother than for a man to do so as a father. Raising a child gives each mother a distinct characteristic of becoming “infinitely patient” with

her child. Over the years, as the child grows, this “patience” continues to stay with the mother. I have been through this myself. As a researcher before the birth of my son, I was not a very patient person. Now, as I look back over the last decade, I am more evolved as a person, and as a result, I am a better and more patient researcher. Being a mother has also sharpened my communication and organisational skills and helped me to juggle manifold high-stress priorities. Nothing that I have previously done has taught me so much about these skills as raising my son has.

Based on my experiences, I can say that attaining the right balance between professional and personal life is a challenge, especially for working women. Motherhood is a blessing, and with it comes the responsibility of raising children with the best of one's abilities. Though there have been sleepless nights, difficult days, and thoughts of negativity and guilt, taking care of my son and seeing him grow has complemented my life in different ways.



A memorable trip, Copenhagen, April 2010

When I became an Assistant Professor at the University of Delhi in 2010, my son was only 2 years old and was still breastfeeding. It was not easy leaving him behind at home and going to work, considering the fact that this was the time when I had to put extra effort into establishing my research group and climb up the academic ladder. Until I joined Delhi University, I had always been

highly successful as a student and then as a researcher. Now was the time when I wanted to be successful as an independent researcher and a teacher. The expectations I placed on myself were huge. I had not realised that there are always two sides to a coin. I started feeling guilty about leaving my son at home and going to work, and failed to understand that it was completely my decision to work. This situation went on for the next two years and I was unable to work as much as I wanted to. My son started going to school at the age of four, so he had to be dropped and picked up from school. But the good part now was that I could spend time on my work. This was the time when I learnt how to execute a task efficiently. That is perhaps the reason why the joy of giving birth is bestowed on women.

When my son was born, I wanted to be the best mom along with having a “great career”. However, the cultural frame of our society does not allow wom-

en who are mothers and are working at the same time to be over-ambitious and successful. But, do we equate a great career with being a great dad? I guess not. Men can have great careers and still be seen as the best dads. I am not saying this to batter men, because I have seen friends who are dads, struggling to find a footing, too. For me, though, eventually there came a stage when I questioned myself as to what a “great career” meant to me. I realised that if it meant working round the clock then I would not be able to maintain that and have a great family life. So, I decided to have my own definition of a “great career” in which I tried to work on projects that mattered, concentrated on outcomes, and enjoyed myself both at work and with my family. Though I did not always succeed in all that I wanted from my career, neither was I deprived. I managed to get good fellowships, projects, publications, books and here I am writing a chapter on “motherhood in science” for the GYA. Recently, in 2018, I went for a one-year sabbatical to Rostock, Germany, with my family to work at a very prestigious institute in my field of study. My son has mostly accompanied me to the work-related trips that I have undertaken. This has given us ample family time and fond memories.



The Three Musketeers - Aurum's 10th birthday, Rostock 2018

three of us. This fit very well with the goals that we set together at the personal and professional level. By making choices of how I wanted my life to be, I could also let go of the minor guilt that I had at times. In the end it is the quality time spent in each and every aspect of life that matters most because I personally feel that raising happy and smart kids is not dependent on the amount of time that one devotes to them.

At my university, as I prepare students for a career in science, I am able to use many characteristics developed as a mother (patience, for example), to try to bring the best out of the students. Work-life balance is another area in which I

have gained good experience. As would be the case with many of my contemporary women scientists, my typical day comprises not only dealing with work at the professional front, but also taking care of my family. My husband has been supportive of my work and so have been my in-laws. If I try to rewind the years gone by, with their support, striking a balance between the two has become easier by the day. I do not deny that there are odd days on both the fronts where it does not quite work out, but the patience acquired over the years has come to my rescue on most occasions. Work stress, family pressures, childcare dilemmas and time management issues do take a fair amount of mindshare but at the end of the day, the experiences have always been enriching.

My husband, son and I have been comrades like “The Three Musketeers”, always fighting and being there for each other in all kinds of situations. And in the end, I have realised that perseverance and confidence in ourselves is the key to success. Most of all, I have tried and suppressed the inherent desire to be ‘Supermom’ all the time. Because I know that a mother is always special for the child even if she is not perfect and what matters the most is that you love your kids and always be there for them. And YES, I believe having a great career and an awesome family without feeling guilty is accomplishable. I could and I promise you will be able to, too.

Chapter 11: Trying to balance life to have everything I love

Sandra López-Vergès, Virologist and Immunologist, Panama, mother of two girls born in the U.S. and Panama respectively

Since I was little, I was always curious, wondering about everything around me. I was the typical child that began her questions with “why”. My parents are medical doctors and artists, doctors and scientists from many different fields always surrounded me. My mother was interested in medicine as well as in social sciences, gender issues and bioethics, giving me a wider view of everything around me. From a young age, I knew I wanted to be a scientist, I dreamed about a lab in the roof of my house, about life at a university and about traveling around the world. I was raised as an only child (my half-sister is 10 years older than I am and lived in another country with her mother), therefore I spend a lot of time with adults and I did not dream about having a big family but I knew I wanted to have kids one day. I always thought that kids will come once I finished my studies, so even if my sixteen-year-old sweetheart became my husband, we married only in 2008 in Panama, after I obtained my PhD in 2007 in France.

We planned almost everything with my first child and I did not have a fall in professional productivity after childbirth. I had my first daughter in the middle of my post-doc, in 2010, once my research was already advanced and I had interesting results. In California, the postdoctoral insurance paid everything during my maternity and delivery, but the maternity leave was only 6 weeks, so I worked until one week prior to my due date so I could stay longer with my baby. Luckily, I had my own fellowship and my mentor was really understanding of the importance for his mentees, independently of their gender, of balancing personal life and science, so he will always support his PhD students and post-docs during parenthood. Thus, I could stay with my baby for three months and work from home the last month. When I came back to the lab, it was easy to organise experimental work and breastmilk pumping time (I breastfed until my daughter was 11 months old), as there were many nice pumping rooms in our building at the University of California, San Francisco. I was writing mainly at home to be with my family. This was after the 2009 real estate crisis in the U.S., so my husband, who worked as an architect, lost his job and could help me by staying at home taking care of baby Camila. We had no family around, but many post-doc friends had babies at the same time, so the transition to parenthood was smooth. I really enjoyed the happiness that motherhood brought to me. Being a mother allowed me to learn how to be more efficient using each experimental waiting time to do other things and be able multitask without feeling

overwhelmed. Also, I became more focused when I was doing something specific, enjoying my time at the lab and at the same time, I knew I would be able to enjoy family time.

In 2012, I came back to Panama and even if we knew we wanted a second child at one point, we didn’t expect that two months after accepting a position as a researcher I would have an unplanned pregnancy. Coming back home after



With my two daughters during the March for Science in Panama, 2018

15 years outside my country was not easy; we had to adapt again to our culture, my husband had to find a job, I changed research projects, and as an independent researcher I learned administrative work in conditions where research was not as developed and supported as in California. Moreover, as I was back in the country for only a few months, I had no right for a public or private

health insurance during my pregnancy, so we had to pay all the medical check-ups and the delivery ourselves. We had to stay at the hospital for four days as they suspected that the baby might have a bacterial infection, this stressed my family and me, luckily, at the end, our baby girl was totally fine. Similarly, because I had short contracts that were constantly renewed, I had no right to a paid maternity leave, so I worked until two weeks before my due date. At least, my boss was understanding, so I had the freedom to work from home and stay with my baby for 3 months. However, in general, other women are not as lucky, and motherhood policies should be strengthened so all women should have the right to the same maternity leave. When Anaís, my second child was born, my husband and close family were at work while I stayed home taking care of my baby. I often felt lonely during the day as I missed the companionship of the friends that I had had in San Francisco, as most post-docs lived around the university campus, it helped to have a community life. I started to feel sad without any apparent reason, and only after 2-3 years later, I was aware that I probably had post-partum depression. What gave me the energy to go out of my sadness was the look of my baby’s blue eyes and smile, and the loving kisses of my toddler coming back from day care and the continuous love and presence of my family that was not aware of the difficulty of the transition I was experiencing.

When I went back to work, breastmilk pumping was not as easy as the first time. There was no designated room and I had to ask permission to use other people's offices for 20 minutes, under stressful situations in which people almost entered the office I was using. Other times, I would have to stand up pumping in the bathroom. However, for me, breastfeeding was important, I know it has many benefits for the baby and, for me; it was a way to stay in contact with my baby, even if I was at work and to give her the best of myself. Once I stopped breastfeeding, I donated my hospital grade pump to the institute and now, there is a very small room where moms can pump.

After pregnancy, I had a fall in professional productivity, but I never thought that this was due to my second child. I thought that it was due to all the different changes I had to go through. Furthermore, when spending funds for public



With people from the lab in Panama

research, I had many administrative issues in Panama (longer time to get reagents and equipment) that I still face today. However, now, this does not put me down, as I know how things work here and how to get things done. I am lucky to be surrounded by great people at work and this makes the difficulties that we all experience as researchers in our “scientifically developing” countries easier to overcome. I want to do so many things and continue to produce quality research, but it is not always easy to balance everything in life. As many parents, I am working on it, and sometimes I feel totally overwhelmed. However, I have discovered that I can have an interesting life as a researcher, mother, wife, daughter, and friend and participate in the many changes in sciences happening in my country. That is how motherhood changed my life: my children gave me the strength to overcome any situation, any issue, they made me stronger showing me the beauty of total unconditional love, the importance of small things in life and that I can have many ambitions, personal as well as professional and fulfil them both. However we need to find the balance to handle both worlds; for that, sometimes we need to organise time to meet a specific goal, however as soon as a due date is reached for that goal; it helps to compensate with more family time than usual. However, it is not always easy and the feeling of guilt is quickly there, especially when you miss an important activity of your child. I am lucky to have the help of a housekeeper that can welcome the girls from school, as well as the help of my parents that are always there for their granddaughter's ex-

tracurricular activities and of my husband that is a real companion as we share all the chores at home and we take care of the kids together.

My ethnicity and gender were not an issue in France, in the U.S. nor in Panama. In Panama, there are many professional women; however, it is still more traditional in the fact that it is expected for women, even if they work outside



In the lab

home, to be responsible for the home chores and the children. I have never felt pressure from my family, as they have always been supportive and helpful, however, sometimes, I have felt that other people judge me if I am working late or have many international meetings to attend. As my children get older, it is easier for me.

They understand and I have learned to listen to them when I am overworking, because I know they are right, as I also feel very tired. Finally, they are my best personal counsellor as they have helped me to be more aware of my own body and the importance of resting, working out, enjoying family time and friends, in order to be more productive, more creative and a better researcher. Also, raising my children which both have different personalities, has made me a better boss, a better mentor, and more empathetic. At the same, I am able to show the importance of effort and responsibility at my work.

Now, I am happy to be back in Panama, the scientific community has increased exponentially during the past five years; scientists from all fields are also more involved with society. It is thrilling to be living all these changes and to participate to help science in my country and at an international level. We are facing a big challenge as humans and thinking of my children's future gives me energy to continue believing that we can make a better world for them through our passion for science. My father taught me to always have a social perspective of our own work and try to have a positive impact around us. Also, my two girls make me be a better person each day, as I would like to be a role model to them as a professional and scientific woman, teach them the importance of family, perseverance, hard work and to follow their dreams independently of their gender. We are in a crucial moment where society needs scientists with a social and ethical responsibility, and children will be always there reminding us what is important in life.

Chapter 12: Eda and Seda (my daughter and me)

Seda Keskin, Chemical Engineer, Turkey, mother of a girl born in Turkey

When I think about how motherhood affected my life, I take a deep breath. My story may be a little bit different in terms of timing, because I became a mother not during my PhD but after becoming a professor, almost at the peak of my academic career (of course only according to me). Going back to the beginning, when Ahmet (my husband) accepted to work as an assistant professor at one of the top universities of Turkey, I was on a plane moving to the United States for my PhD degree. We spent three years apart and as in all long-distance relationships, it was difficult, especially due to the huge time difference allowing us to talk only during brief time windows. Before finishing my PhD, I was extremely lucky to find a position in my home country and I started to work as an assistant professor in the university that I always dreamed to work for. While we were both trying to grow our careers, we postponed growing a child. Both of us were working in universities that are very much demanding in both research and teaching objectives. So, time flew by when we were submitting papers, writing proposals, going to conferences. I wanted to wait until I established my research group and became an associate professor, assuming that being a mother with an established career would be easy (of course, then I learnt that being a mother is not easy under any circumstances).

Our daughter, Eda, was born in April 2014 and dynamics at home and work completely changed. I used my official maternity leave (16 weeks) after giving birth. I can easily say that the time I spent with my new-born during these 4 months is the best time of my entire life. It is simply fascinating to witness how she grows every day. My mother was also with us for a month, and it was perfect to share these times with her. I was not teaching during this time and since my research was computational, I was able to work from home when it was necessary. We live on campus, and my office is just 5 minutes' drive away, so I was able to go to university for short meetings when my daughter was with her grandmother. I asked my graduate students to visit me at home to work together when they had any difficulty to solve a problem. Things, in summary, worked quite well when I was at home with my daughter in the first four months. Meanwhile, there is no paternity leave for fathers in Turkey, so my husband returned to his work just the next day after our daughter was born. In September of that year, I had to go back to my full-time job at the university and I had to teach two classes. We found a baby-sitter and things become physically and emotionally challenging. I was not able to leave my daughter with a stranger, this was too hard. Because of breastfeeding, I had to come back home at least twice in a giv-

en day and it was a huge rushing between home and school. The words which best express my feelings at that time, are "guilty conscience". I was feeling guilty when I was going to university, because I was leaving my dearest and the most valuable one at home with someone that I did not know very well. I was feeling guilty when I was at home because there was too much to do at work, I was responsible for my graduate students whose careers somehow depended on me, for many projects that I led and papers that I promised to write. At that point, I would like to note that this guilty feeling is valid for all working mothers who struggle to find a balance between their children and work. I was feeling insufficient and being very harsh on myself to control and micromanage everything at home and at school. This is still ongoing while I am writing these sentences; my eyes are checking my cell phone to ensure that my daughter is safely back from kindergarten to home.



Eda having fun at a birthday party (left), Eda, Seda and Ahmet at Eda's first birthday party (top), and my research group aka my kids at university (bottom).

During the first two years, I clearly observed how much being a working mother or working father differs even in academia. Since I was feeding our daughter, I was not able to attend conferences abroad for the first two years of mother-

hood whereas my husband continued to work late hours and attended international conferences. Our daughter started to go to kindergarten when she was two and I had to leave the office early to pick her up, since I am the one close to the home and kindergarten. I felt guilty when I was leaving the faculty meetings early due to my motherhood responsibilities. There were difficult times in the first three years, she was not eating enough and I was struggling to find a solution, crazily fitting models to her weight-length charts in Excel with tears in my eyes. I tried to manage these hard times with the support of my husband and my parents. Our daughter is currently six years old and I am still trying to attend conferences only in Europe so that we are not going to be very apart from each other-so some feelings do not change with time.

I can say that being a working mom motivated me to become more productive and practical at work. As all working moms, I need to set my schedule in the beginning of the week and use time management skills to balance my daily life and working life. There are times that I have to skip lunch (almost all week) or force myself to finish the work because I know that working at home is not any more an option because everything is prioritised all around my daughter. I also learn that grading the exam papers at home is not a good idea if I do not want to show colouring skills of our daughter to my students. After my daughter, my productivity at work in terms of papers and awards significantly improved-something that I was not expecting at all. In addition, I guess the reason is not the time management. I think the reason is that I am now more ambitious because I want to be an example of a successful and inspiring woman to my daughter and in fact, to all little young women in the world. My daughter changed the meaning of my life and my view of the world as a woman scientist. Most importantly she showed me that being a mom is never-ending love and sacrifice, and it is not only challenging but also priceless.

Section 3: Finding the rainbow after the storm

Chapter 13: Motherhood: the most beautiful ecstasy of my life

Shalini S. Arya, Food Scientist and Technologist, India, mother of two girls born in India

Becoming a mother, a journey of struggles

Motherhood has taught me how to be perfect, how to ask questions, how to manage time, emotions, and how to manage myself. Motherhood taught me to live every second of life!

Well, with so many positive things about it, regrettably it is the most challenging, too. Due to more demanding careers, stress, life that is more ambitious, change in lifestyle and other things; the fertility rate is going down. According to a recent report by Times of India News, 27.5 million couples in India are suffering from infertility. In India, especially and unfortunately, infertility is considered a female problem. The people here are not ready to accept that two are required to make a baby. Within a year of marriage, if a woman has not given good news (conceived); it is said that there is a problem within the female. People forget that a man can equally suffer from infertility. Whatever the case might be, first thing that happens is a female undergoes a myriad of tests to understand the problem behind unsuccessful attempts at conceiving. This is mind-set that infertility is a problem of women and a man cannot equally be responsible for this.

Therefore, married women, immediately after a year of marriage, are under tremendous pressure. Pressure for conceiving! Ours was a long-distance marriage, where my husband worked in another university and we used to struggle to meet during vacations, common conferences, trainings and workshops. This was possible because we shared a common platform of academics. The struggle to fall pregnant is a vicious circle, there is disappointment of not falling pregnant and stress increases and because there is stress you don't fall pregnant. I was no exception to this. Many times, I was becoming emotional and depressed. Obviously, this was affecting my professional career. Therefore, I had no grants, no research projects, therefore no research publications. I was going through depression and anxiety.

Finally, after many efforts, medications, help and support from family, friends and doctors I was able to conceive. And aha! Here I was on cloud seven; I was

the happiest woman on this planet and entire universe. But at the same time, I did not know the challenges coming along with it.

Since my childhood, my grandparents and parents told me real stories of their lives, their struggle as freedom fighters, their struggle against many odds. As a child I, grew up listening to those inspiring real-life stories that motivated and helped me to face and overcome the hurdles that came into my ways. I was ready for everything.



My lovely family: myself, Soumya (standing), Swara, and my husband Subhash

Before the arrival of my daughter, the life was miserable, lonely. The arrival of my first daughter, Swara, gave me another life, a life with meaning and vision. People report that they had lot of pain and difficulties during their entire trimesters. However, I was so happy and excited and because I had found this jewel after so many efforts, I never realised the pain of vomiting, nor the anaemia, nor did I feel exhausted. I was so excited to go on maternity leave; I choose to spend maximum days with my child. Therefore, until the day before my delivery, I was working in the office. I wanted to be more responsible. I became more conscious and more productive. Swara was born on 3 December 2012 and brought me lots and lots of joy, wisdom, life learning lessons.

During maternity leave (180 days), I was changing, my thoughts were modified. One day, I was happy and the other day, I was crying. I was emotional. Hormones were playing their role and there was no one to help me including myself. I stopped going out, I was always worried about my baby, if she will get infection, if she will get cold and the first thought for any action that came into my mind was for my baby. I started living only for her. I started buying things only for her and my entire world revolved around her and I lost myself.

I did not realise how and when the 180 leave days were over and the time of joining back on duties arrived. I became very emotional; it was unimaginable for me to leave my daughter at home. I joined back to the office; however, I was struggling with managing time for lectures, laboratory, teaching and research and science outreach was far away from my reach. Who will look after the baby? Where to keep her when I am at work? Is a hired caregiver trustworthy with

so many child kidnappings happening around? Is she safe? This and so many other questions always hampered me. Managing household chore, baby care and office shore was becoming challenging. I was not able to decide what to do, with every day's struggle many times the thought of quitting was making me stronger. I was almost there with this decision.



Enjoying time together: Soumya, Shalini and Swara

Initially my family and everyone around supported me but later on it was becoming more difficult to manage between childcare and office work. I struggled to appoint a caretaker, support from relatives and many other tricks to provide best care to my baby and simultaneously perform the office duties. Initially I was so obsessed with the various things like cleanliness, super conscious on baby food, nutrition, hygiene, clothes, sanitation, baby health and what not. I was not ready to accept and compromise on the standards laid by me. Somehow, nothing was working out and many times even, I decided to leave my job.

This had a very bad effect on my career. I was not able to give more time for lecture preparation; somehow, I was managing to deliver lectures and practicals. Off course, there was an experience of four years; however, I was not satisfied with the quality of my delivery. In the past, I was able to give more time for my students and research discussions, outreach activities and many other career-related travels. However, I became less motile. There was a guilt in the unconscious mind.

While I was busy in taking care of the first one, I did not know that I was already carrying another life. I was shocked and disappointed with this news. This was because for the past three years I had not taken any rest, not enough sleep, not given time for myself, neither was I happy with my research performance. I had guilt. Being very ambitious, my thinking was strong that children affect your career adversely and it is very difficult to give time for your career. Therefore, after one child and the experiences involved during her upbringing, I decided to abort the second child.

However, the mother in the back of my mind and heart did not allow me to go for that painful act and I gave birth to my second beautiful angel Soumya. This time everything was so perfect, no worries, no pain, nothing as I was more experienced for handling babies. However, the challenges of being a mother remained constant! Managing one was so difficult now how to manage two? However, a bag full of experiences and confidence helped me in the upbringing of two!

Likewise, I was not even obsessed with childcare. I learned many things while raising the two children. Raising kids brought many obstacles, challenges, depression, anxiety but it is also true that it made me a wise, kind, smart individual and a successful women scientist. It taught me how to live life in tolerance, how to be patience and how to handle situation and most of all the lessons learnt. Change is the only permanent. Today difficulties are mellowed, a little milder than before and I am very positive that the future is brighter and happier!

Chapter 14: A family of three: my two girls and me

Flavia Ferreira Pires, Social Anthropologist, Brazil, mother of two girls born in Brazil

Motherhood changed my life dramatically. The person I was had to give place to another person as if once giving birth to a child I gave birth to myself.

I am a mother of two lovely young children. Serena is now 5 years old and Olívia is 3 years old. In 2004, when doing part of my PhD studies in London, I came to know the father of my girls. He was a charming French-Tunisian student at that time. In 2005, we started a loving relationship. In 2008, I was appointed a full-time tenure track lecturer and researcher at Federal University of Paraíba in João Pessoa, a sunny and lovely coastal city in the Northeast of Brazil. He promised to move to Brazil, but he never fulfilled his promise. Therefore, we were in a long-distance relationship until 2012 when I managed to go to London to do a second post-doc. My real intention was to get pregnant. And I did. I have never dreamt of getting married, but I knew I would become a mother of a girl. In fact, my pregnancy was full of idealisation. I was far from having contact with babies. I guess I thought I would be able to deal well with motherhood because everybody does (or it seemed they did at that time). Unfortunately, I did not. I had post-natal depression. If one person had told me, while pregnant, that I would live what I in fact lived through, I would never have believed it. Sleep deprivation was the worst thing that ever happened to my body and mind.

In 2014, I decided to return to Brazil in order to return to work. My parents were crucial in that decision, since they moved to live with me in João Pessoa; they left their hometown, more than a 3-hours flight away, to be there with me. I would never be able to do what I do without them. I will never be able to thank them enough. Serena was 1 year and 3 months old, a delightful child who brought so much happiness to her grandmother's and grandfather's lives. However, she was a burden to me. I could not understand why mothers were so happy with their children. I was sure they were all miserable like me deep inside, and were pretending to be happy to meet social expectations. Lack of sleep was still a problem, tiredness, lack of memory, bad humour; negative thoughts, these were some of the signs which now I recognise as symptoms of depression, but at that time, I thought it was only tiredness. My marriage was not going well since Serena was born. In the beginning, I tried to keep my roles of woman and wife but soon enough I realised it was too much to ask. I could not reconcile being a mother, a wife, and a professional. I failed. It was an unknown experience, since before that I had always been successful. Serena did not go to nursery. I

could not stand the idea of being far from her, I could not let anyone take care of her, I could not take my eyes from her, neither to sleep. And I went without sleeping for months and months. I stayed with her at home and the kind of work I was able to do was minimal, like replying to emails. Now I believe that it was a mistake, she should have gone to nursery and I should have been taken care of seriously by a psychiatrist.

On my birthday in 2015, I was in London where my husband (we officially got married in 2010) at that time was living and I got pregnant again. It was not planned and it was not expected at all. I was in panic because I had a difficult delivery with my first child and her first year was simply chaos. I thought I was not able to have another child both physically and emotionally. However, things got much worse when their father asked for a divorce on the very same day I told him about the new baby that was coming. This pregnancy was very challenging. At the beginning, I tried to convince him that it was not the right time to divorce, to give us a second chance. As he was resolute, I gave up trying. During my pregnancy, I was sad and speechless all the time: “how could this be happening to me?” At times, I felt so angry with him. One day I was driving to the University and a relieving idea came to my mind: “it is so easy to just finish this suffering”, starting at the car in front of me and accelerating my own vehicle. I thought about committing suicide. It was because of Serena, my child that I did not. For a moment I had thought it was better to have a dead mother than a mother like me.



During my pregnancy, I was sad and speechless all the time: “how could this be happening to me?” At times, I felt so angry with him. One day I was driving to the University and a relieving idea came to my mind: “it is so easy to just finish this suffering”, starting at the car in front of me and accelerating my own vehicle. I thought about committing suicide. It was because of Serena, my child that I did not. For a moment I had thought it was better to have a dead mother than a mother like me.

Despite difficulties, Olívia’s birth was truly special. A home delivery brought the empowerment I was longing for. I managed to have Olívia naturally after having an emergency C-section for my first baby in London. For some time that energy fed me and I was able to go on with my life. Until I got a serious crisis of sinusitis and needed hospitalisation, which I refused because “I could not be sick, I was a mother of two girls, and the youngest was breastfeeding, I needed to go to work”, I told the doctor. I cried and cried at the doctor’s office explaining why I could not be at the hospital for more than a couple of hours

and refusing any medication that could go through the milk. This was when I realised I needed medical treatment and I looked for a good psychiatrist. On the day Olívia turned one year old, I stopped refusing the treatment and took my first medicine (antidepressant and mood stabiliser). I am still under treatment.

My children changed my life completely. Before then I was truly workaholic but



I used to work as a way to fill some emptiness in my life. I could work non-stop because I had no good reason to stop. I had a friend that passed away with breast cancer and before becoming ill, she told me that her two children never prevented her from doing anything, quite the opposite. They brought luck into her career. She was an artist and her husband was always present. Something similar happened to me, but I do not know how I can explain it. I had them when I was already employed and somewhat prestigious in my field. I had accomplished a lot before the children.

During the past six years, from 2012 until 2018, I did not face any external pressure from outside myself to perform. I continue to be one of the most prestigious researchers in my field of research, Social Anthropology. However, I am always pushing myself to do more and better, and my students have been sources of support and direct incentive as well. During Serena’s first year, I could only do the minimum at work, but I had done so much before to guarantee some time off during her first months. During Olívia’s first year, I accomplished more, including supervising and lecturing, but it was never easy. Sometimes I had to ask the help of dear colleagues to substitute me in lectures simply because I was too exhausted to do it.

I have to confess that I missed work when I was with Serena alone in London and at times I would prefer to be at work than at home with her. To take care of children is a serious, exhausting job that is not valued and appreciated in most societies. It is not considered real work; it is not well paid, consistent with the lack of prestige and status given to “women’s work” in patriarchal societies. For their father, life continued quite the same. He lives abroad and comes to see the children every 4 months, he does not take any responsibility over everyday care and neither can he make decisions.



Today Olívia is 3 years old and I have been under treatment for two years. I realised the most important thing is to be the best mother I can be, not the perfect mother. If medicine is necessary to keep my stability, I will take it. This is the first time I write about my post-natal depression. I feel guilty sometimes, as if it was my fault for not being strong enough. Sometimes I take them to school in the afternoon and the only thing I can do is lay in bed and sleep. Sometimes I buy ready-made food be-

cause I am so tired and I do not bother to cook. I wish we had relatives around, more friends and a support network. I wish politicians and society took children seriously in general and the burden of taking care of them was shared.

I am a mother. I aged. I lost part of my memory and ability to handle academic work due to depression, which I hope I will regain with effort. I have no free time for myself. But I am a mother and I am a divorced woman. Please do not call me a single mother, as they used to say. I am a mother always accompanied by two delightful small girls. We try to live our lives, laugh and love ourselves the best we can. We are a family of three.

Chapter 15: The challenge of balancing motherhood and career

Meron Zeleke Eresso, Social Anthropologist, mother of two boys and a girl born in Europe and North America

The intricate challenges pertaining to balancing family and career has for long been a subject of discussion across the globe. A more focused discussion about motherhood and science in different sociocultural settings lets us gain more insights into the commonalities of the challenges faced and the various coping mechanisms adopted by millions of “mother scientists” around the globe. As a social anthropologist, I strongly argue that while making such attempts to understand the commonalities, we simultaneously need to pay attention to understanding how much the diversity of cultural values and norms that embed motherhood in different sociocultural contexts come into play. Drawing on my own experience of being raised in a strong patriarchal society, I believe the diverse stories we bring to light helps us to understand the subjective nature of the issue, which might not necessarily point to commonalities of challenges and coping strategies.

I was born and raised in Ethiopia in a socio-cultural background where from early age I witnessed a visible gender disparity generated by the strong patricidal culture that defines the gendered socialisations, division of labour and power dynamics ingraining inequalities in different domains of life including education. In this cultural context, there is a strong societal expectation, of which looking after children is defined as “a rightful duty of women”. Such expectations put academic women under societal pressure and women like myself who are often juggling between family and their career are considered as “unfit” to the dignified societal position of the “martyr/ sacrificial mother”. When I had my first son, Naol, at a young age, I found myself in a situation where I had to make the important decision of pursuing my PhD and taking care of my newborn. I got the rare opportunity of a PhD scholarship that would allow me to do my study overseas in Germany. That was a challenging moment as it was difficult to find a day-care for a one-year-old infant as an international student. That was the time when I had to make the toughest decision of leaving my son behind with my mother, Mrs Roman Tefera, who has been a strong support base for my success in my career since childhood. As a single mother who raised me to be the person I am today, she valued education so much that she sent me to a private school from the meagre saving she raised while forgoing her basic needs. Her encouragement, sacrifice and lived experience as a working single mother made me realise the value of education at such a young age.

At this time when I had to make a crucial decision regarding my scientific career and study, she once again stepped in and offered to take care of my son. Although I very much welcomed the offer, this also put me into an emotional torment, as I would be separated from my son during my doctoral study. As a Social Anthropologist,



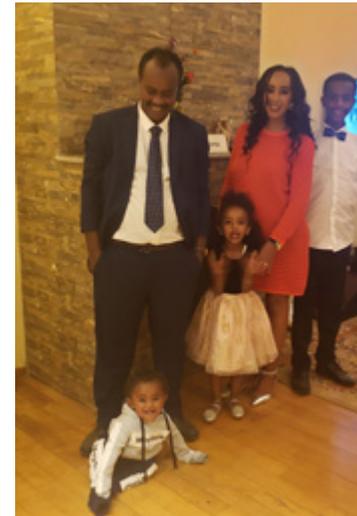
Meron Zeleke, Ketim Dereje, Naol Dereje and Dereje Feyissa

I spent about 14 months of my study on ethnographic fieldwork back home, which gave me the opportunity for family reunion. I decided to have my 2-year-old son travel with me to the remote field sites for the first few months of the field-

work, only to realise that he was not in condition to stand some of the challenges involved. As my research area is one of malaria-infected areas, I had to reconsider the plan to have my baby with me during the time of the fieldwork, which, of course, has caused so much psychological pressure on me for being away from him while being in Ethiopia. The sense of guilt of being “away” was something that I had to struggle with on a daily basis.

Furthermore, the understanding and support I have received from my husband Dereje Feyissa, who is also a professor of Social Anthropology is immense. Dereje’s support, unlike many other men raised in strong patriarchal environment, is phenomenal. It ranges from the basic support that comes naturally within an established relationship that is filled with love and care. To name some of his supports, he was often the one to drop the kids off at school while I am away for fieldwork and conferences, helping the kids with their assignments and school, taking care of the household duties, etc. My husband’s position as an Anthropologist and working in a related job has put me in a privileged position, as we tend to understand the working conditions, the stresses involved and the personal commitment required. Dereje is a supportive husband who better understands the pressures we both face as a scientist. His extraordinary support and understanding is one of the reasons I proudly call him *siltun bal* in my local language, which literally translates to “the modern husband”. Supported by my mother and husband, I successfully completed my doctoral study with distinction and published a book based on my PhD study.

After finishing my PhD in 2012, I had to find a job in Ethiopia and integrate myself into the country’s academic structure. In a very competitive job market, I was successful to be employed as an assistant professor at the department of Social Anthropology in Addis Ababa University, where I served in the position



until I won a renowned postdoctoral fellowship from the Volkswagen Foundation, which enabled me the flexibility to combine research and motherhood. The three years fellowship (2013-2016) offered me a very flexible working environment, allowing me to strike a balance between career and family. It has also enabled me to work part time as an adjunct professor, while continue to do research. My success was rewarded by the Volkswagen Foundation, which offered me a senior postdoctoral fellowship for additional three years (2017-2020). I led a project on gender and migration, which involves a group of five researchers conducting their MA (Masters of Arts) research adding a greater comparative lens to my research project.

Furthermore, I am also part of an interdisciplinary research project on women empowerment involving international researchers from different disciplinary backgrounds.

The postdoctoral fellowship involved several fieldworks, library researches at different North American and European universities, summer schools and attending international conferences. It is not the teaching and supervision works that are difficult as such, but all else that goes along with it like conducting fieldworks, attending conferences and workshops, etc. That has become hard to accommodate. As much as the situation allowed, I tried to have my son and husband travel with me as a way of balancing my role as a mother and my academic career. It was during this fellowship period that I had my second child, my daughter Ketim, in 2014, while I was on a study visit at California State University, and my son Raji in Canada while I was on a research stay at York University. Being on a fellowship has allowed me to benefit from the support system put in place by the Volkswagen Foundation, which was quite accommodative to awardees with young children. This has helped me to realise for the first time how much the autonomy and flexibility in academic sciences help to be productive.

The other challenge for scientist-mothers in my part of the world, which I

believe, speaks to the relativity of other contexts as it relates to academic promotions. The gendered landscape in academic careers in Ethiopia is evident in the underrepresentation of women in the sector that increases at upper career levels. The demanding promotion criteria put in place relating to publication, public engagement, taking up administrative posts at the University and teaching loads are some of the issues that make the academic promotion of women quite challenging. Women tend to shun aggressive academic competition. Accordingly, there are gendered perceptions, which often discourage female scientists from applying for the next promotion or high profile positions. Notwithstanding these constraints, I courageously applied for promotion in September 2017. As I have fulfilled the criteria stated in the University's legislation, I convinced myself that I was the best candidate for the position of Associate Professorship. I was successfully promoted to the position in April 2018. I was also appointed as an Editor-in-Chief of the Ethiopian Journal of Human Rights and have joined the editorial board of a Brill publication, *Islamic Africa Journal*. Drawing on my lived experience, I strongly believe that a belief in one's own capabilities and confidence is a major factor in women's academic success, as doubt, disillusionment, and discouragement will only lead to giving up and inadvertently buying into societal biases. While maintaining academic excellence I have also continued expanding and nurturing my family.

To sum up, I strongly believe that my lived experience goes contrary to the conventional wisdom, i.e., that it is impossible for young women scientists to combine a career in academic science with motherhood. Furthermore, I argue that the challenges and strategies used are so subjective and context-specific that there are no strict rules about how to do it. We all need to navigate through varied cultural landscapes leveraging support systems from within while negotiating a working environment that combines family and career in a balanced manner. The way the concept of work-life balance is used has been quite problematic sending out the message that the two are competing elements in one's life generating divided loyalties. I demonstrated that my work is an integral part of my life that complements and not competes to being a mother. I end my contribution with a strong argument that there is a possibility for female academics to juggle both work and family life if there is one of three factors in place. First, a socio-cultural context where there is a strong social support system by close family members and the existence of child-care institutions, particularly at the early stage of child growth. Second, understanding partners, as parents should share commitments equally. Third, an institutional support base like the Volkswagen Foundation grant offering flexible work environment for female scientists like research funding institutions, which are considerate of the reproductive roles of women.

Chapter 16: My girls, my world

Nova Ahmed, Computer scientist, Bangladesh, mother of two girls born in the U.S.

I am thankful for having the opportunity to share my journey about how becoming a mother has affected my career. This text is a tribute to my mother and my two daughters who have been my greatest inspiration over the years.

I had my daughters during a period of difficulties in my personal life. My parents were in the process of divorce, which turned out to be of public interest. I was a full-time graduate student, dealing with my own academic pressure. My little family, with two baby daughters, was my refuge in difficult times: on a stressful day, I was able to embrace the simplicity and joy with the little ones.

I was a student-parent! I joined the PhD programme when my daughter was eight months old. It was my dream school – Georgia Institute of Technology, in the U.S., and there was nothing more to ask for. I had my second daughter as a second-year PhD student. It was challenging to stay in the competitive graduate programme. I was the only female PhD student of my advisor (who had been there for more than 20 years); I worked with hardware and systems where female representation was traditionally low. I had more to prove – to myself, to others, to set an example.

The path was not smooth as I faced a personal difficult time. It was the time when my parents got divorced in Bangladesh. The event was made worse as many people got involved in conversations around it. I was feeling guilty not being able to support my mother and siblings who had to make drastic changes in their lives. My father left us, refused to support us (as we refused to call the movie star he then married “mother”) and most importantly left us with public humiliation. It directly affected my younger siblings. In a conservative culture this public event created wounds that were hurt by close ones, in-laws and many other unknown people. I was emotionally dependent on my father and this event entirely disconnected me from him. I only saw him twice before he passed away with cancer.

It was a time when I was extremely stressed. It was right after I had my second daughter. There was no maternity leave. There was no family member to support me. I was not far enough in my research to work from home, I needed more time for laboratory experiments, since some of my experiments were not showing expected outcomes. Nothing was working properly. As a solution, I decided to quit the PhD programme. I was ready to give up my position that I

had longed for for years. At that time, my husband gave me great support. We chalked down all the alternatives. We went through major changes over the next few weeks. We moved to graduate housing on campus, reducing our commute time to labs. I enrolled my baby girls to Day Care of Georgia Tech (I spent my entire Research Assistantship money on them, 1,700 US dollars per month). We prioritised all around our girls and studies. We worked out our finances – we were actually living dollar by dollar.



I decided to ask for help when I was struggling with time management. On one such difficult day, I went to the office of Dr Maureen Biggers, a faculty member of Georgia Institute of Technology, and burst into tears. I could not say much, I just said it was extremely difficult. She shared her journey of patience and perseverance and supported me by arranging two wonderful opportunities for me – one was a SAIC- (a technology company) sponsored mentoring programme, where I would mentor two undergraduates every semester and another was sending me to a leadership conference named Grace Hopper Conference for Women in Computing. These two outlets changed my outlook, confidence level and gave me more than I expected. In this opportunity, I would like to thank Dr Bigger for being there for me.

Initial discussion about the mentoring programme was tough. My advisor was clearly unhappy about adding more work when there was enough load for my research and family time balance. On the other hand, it was something new to me. Having two undergraduate students who would learn from me – having students to spend time together to perform research works was a fascinating and empowering idea for me, which I needed at that time. I took the entire project positively and seriously. Working with the undergraduates gave me new perspective. We explored crazy ideas that I would not have had time to try out, otherwise. I learned a lot working with them. Eventually, the area around my desk was full of laughter, work and inspiration. My advisor introduced me to many other young students during summertime, who worked with me in my PhD study. He later mentioned me as an example. One of the undergraduates who worked close to me received the best undergraduate research award.

I attended the leadership conference, which inspired me a lot (1, 2, 3). Dur-

I attended the leadership conference, which inspired me a lot (1, 2, 3). Dur-

ing my very first visit, I joined a session of non-traditional students. I considered myself non-traditional as a student-parent. I met a woman who was



a mother of five, one of whom had bone marrow cancer. She shared how she switched her role to be a mother when she needed to do so. She taught me about not giving up during difficult times. I then realised the blessings of having a healthy, supporting family. I was so motivated attending the session that I remained awake all night and wrote

my first research paper after I returned from the conference. I was ready to fight. I visited every single event of Grace Hopper Conference during my graduate years. I still volunteer for various activities for this conference in the hope of supporting dreams of many others.

My journey as a student-parent was harder as there were personal and society-imposed pressures. There were reservations against my decision to place my children in day-care when I was doing nothing (full-time graduate student!). There were family members and friends who would always find my girls thin, weak and neglected. I would feel guilty from time to time; since one of my daughters was small, (she was born with small frame and lightweight). My mother would assure me by telling me how we were in our childhood. It was mostly a mental battle that I fought against my own feelings. My mental image of a good mother was portrayed by our society, enforced by close ones. It was a patriarchal environment, where every single blame goes to the mother and credit goes to the father. I joined a group called student-parents at Georgia Tech, where I found many other students like me. I wanted to make changes where student-parents need help. I took concerns regarding maternity leave to the graduate student council. The rules were not changed but we expected sympathy, empathy and awareness about the challenges.

On a bright spring morning, I defended my PhD. My youngest daughter shouted loud “My mom’s name is now dooooooctor Nova!” Right at that moment, I knew this path was worth travelling.

These little girls were running around with me. I would never be the same

researcher without them. My daughters were 5 years and 3 years old when I received my PhD.



It was a straightforward decision about what to do after finishing. We came back to Bangladesh in 2011. It was my turn to give back hope, strength and love I got on my journey. We started teaching programming to underprivileged children. We travelled to various regions across the country with the National Mathematics Olympiad Team (4). It is a team of me and my girls and my husband: we make a great team. But, my team is more than my two girls are, I have an entire research team, which is close to my heart, part of my family and life.

My children have changed my work schedule, family dynamics and maturity level. I was blessed to have my family's support. I could navigate through challenging situations with my family. I forgot about difficult problems of professional life when I was laughing aloud with my little girls. My mother wanted to be a medical doctor, she could not pursue her dreams because she gave birth to me, my siblings and because of her family responsibilities. I wanted to tell my daughters a different story – “I did it all because I had you around me”.

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Chapter 17: Being a mother in a precarious academic world

Özge Yaka, sociologist by training – geographer at heart, Germany, mother of one girl born in Germany

The day I learned that I was pregnant with Rosa Mavi, my beautiful daughter who is now 2 years old, I was truly shocked. Yes, I wanted to be pregnant, at least I thought so. It was actually a struggle to convince my partner as he already had two kids and was not looking forward to going through it all over again. I, however, was sure that I wanted to give it a try. “Give it a try” means this: I got ovarian cancer when I was 29. I was writing up my PhD at that time in the UK, but I was diagnosed in Turkey, during a short break. I stayed in Turkey with my parents, got an operation, and then the chemo. To cut it short, I recovered, sacrificing one of my ovaries on the way. My oncologist gave me a shot to put me in an artificial menopause, which would, in theory, protect my remaining ovary from destructive effects of the chemo. But, to be honest, he did not seem to believe that I would be able to have children.

Seven years later, when I was ready to try it, I thought my chances of getting pregnant were low. I was already 36, and had one chemoed ovary. “I might have maximum 30% chance,” I thought. And I was sure that even if I eventually managed to get pregnant, it would take a long time. And there I was, with a positive pregnancy test at hand, after the very first time we “tried”. I did not expect that. One side of me was panicking while the other side was really happy. I was unprepared. These complicated and contrasting feelings of panic and happiness, fear and excitement were there all through my pregnancy. After the birth of Rosa Mavi, the intensity of those feelings increased. I felt grounded and lost, blessed and ruined all at the same time. Raising a baby was the most difficult thing I did in life. My daughter's endless crying made me feel incompetent and inadequate. I blamed myself even though everything I read said otherwise. Guilt and self-doubt was all-encompassing, overwhelming. I was lucky that I had a therapist and a partner with whom I could share not only the work of childcare but also my sorrows.

I was not that lucky career-wise, though. I did not have a permanent position when I got pregnant. I was finishing a fellowship in Paris and returning back to Berlin to live with my partner. I applied to one long-term position, hiding my pregnancy, and I did not get it. After a few months, it did not make sense to apply to new jobs as I thought nobody would hire a pregnant woman. Therefore, I was unemployed for the most part of my pregnancy and after giving birth. My only income was 300 euros that the German government pays to unemployed

mothers for a year after giving birth. I was financially dependent on my partner and I did not know for how long. It occurred to me that doing the same things over and over again, non-stop for 24 hours (breast-feed, change the diaper, soothe-console-rock, put to sleep, and start again) was wiping out my intellectual capacity. I felt that my brain was empty. I was reduced to my physical functions, tuned to my daughter's needs. I was a shell of what I was.

For one-and-a-half years, until Rosa started kindergarten, I stayed at home with



Rosa Mavi and I, summer of 2017 – Fethiye/Turkey

her. I felt progressively better about myself, especially after the first months. After the first year, as I stopped breastfeeding, I was able to be away from Rosa for more than a few hours, which was a completely new thing to me. I started a new project not for advancing my academic career (the project did not make much sense for that)

but to re-connect with my intellectual being. I managed to arrange yet another postdoc, for two to three years, to start when Rosa Mavi was 18 months old. I was lucky that she liked the kindergarten. Otherwise, I decided, I would postpone the fellowship if I could, or drop it altogether. This is the hard thing about it: trying to balance your new position/identity of being a mother and your old self, who was once free to read, write, socialise, explore... You obviously need to discover a new way of being, as a mother and as a scholar and it is not easy.

My therapist once said that the first year of motherhood is also a period of mourning, as you lose your old life and your old self for good. This kind of loss, though, and all the confusion it brings to independent, intellectual women, is not recognised. Instead, motherhood is represented as the perfect bliss by our mainstream culture. Women are born to be mothers anyway, and there must be something wrong with them if they are not satisfied in that role. This unrealistic and patriarchal myth of motherhood is the reason why many mothers suffer alone, afraid of talking about their feelings. Strong taboos on motherhood also deepen the effects of post-natal mental illnesses as they feed them with isolation, guilt and self-loathing. I discovered this all by reading the feminist literature on motherhood. Thank God for Adrienne Rich! Since then, I grew more confident in my new role as a mother. And I realised that academia is not the best place for a new confident mother, who enjoys spending time with her

child and wants to be there for her. We are trying to survive in an increasingly competitive and precarious academic world. As a scholar who finished her PhD a while ago, and who is still on short contracts, I am expected to work incredibly hard to secure a permanent, or at least a longer-term, position. I actually enjoy working. I love developing ideas, conducting research, and employing empirical data for conceptual thinking. And despite frequent feelings of inadequacy, I know that I am good at it. But I did not want to give in to the unrealistic expectations of constant performance. I am a mother with a small child. And I am not a robot. Nor is my daughter. She gets ill all the time, she gets whiny, and she wants my constant attention. And I ended up deciding in favour of spending time with her, instead of working, on many different occasions in the first two years of her life. I committed the deadly sin of slowing down.

In most cultures, women are expected to have children between 25 and 40, the most demanding years of an academic career. We spend these years pursuing our PhDs and postdocs, under constant pressure to establish ourselves in our fields. As the academic world is becoming more and more competitive, especially in the countries of the West/North but also globally, the list of things you should accomplish as a young scholar gets longer and longer. Publications, for sure, but also getting external funding, leading research projects, networking, being visible in meetings and conferences, getting cited, you name it. And you need to do all this on short contracts, while constantly looking for another job, writing various different proposals for different positions. Young scientists and scholars are expected to work incredibly hard while facing constant threat of insecurity. It is a rat race to secure a permanent position, and you might not succeed even when you play by the rules.

How could any young woman scholar, someone already disadvantaged due to her gender, dare to have children under such hostile conditions? How could you spend your precious time on raising a child when the clock is ticking to secure a tenure track position? These are the questions we face and these are the risks we take as young academic mothers. And it is not fair. It is not fair that two ticking clocks pressure academic women: our biologic clock of fertility and the career clock of securing a permanent position. It is not fair that we have to risk our careers, something that we invested so much time and energy in, to be a mother.

It is well established that having a child negatively affects women's academic careers, not men's. As if we were the only parent – sometimes we are, but mostly we are not. Mary Ann Mason, who is the faculty co-director of the Earl Warren Institute for Law and Social Policy at the University of California, Berkeley, draws on census data to argue that academia is even more punishing for moth-

ers than other demanding professions. Academic women, more often, give up on having children to advance in their academic careers. Of course, every woman has the right to decide if she wants to be a mother or not. But if it is imposed on them to give up on or to postpone motherhood (to post-tenure) by the inhumane structures of the academic world, it is simply unacceptable.

Change requires radical transformation of both academic structures and motherhood as an institution. Paid leave both for mothers and fathers, and for the



Rosa Mavi and I just after we ate our ice creams on a lakeside beach in Berlin, summer of 2019

first months for both at the same time, is a basic requirement. Mothers and fathers should also be granted with unpaid leave and a right to return to the same position, at least up to three years. Young scholars on short contracts should be supported with re-entry opportunities when they are ready to return to work. Beyond all those policies, attitudes and expectations should change. Even granted with long paid maternity leaves, academic mothers are anxious about “the gap” that would appear on their CV, if they do not keep publishing, presenting, etc. It needs to be accepted that we are not robots and we need those gaps

to have meaningful lives as healthy human beings. I was also anxious about “the gap” that would appear on my CV unless I keep publishing, presenting, etc. Then I decided to own my gaps and carry them proudly. I needed those gaps to recover from cancer and to create a human being. And they are no less important than advancing academic careers. I ended up putting motherhood, as I did with cancer, on my CV (I only got one positive reaction about that so far, surprisingly from a man, thank you Arturo Escobar!).

The organisation of motherhood should also be transformed. Babies and toddlers require lots and lots of care, love and attention both for their physical and psychological well-being. But it doesn’t necessarily mean that one single person,

the mother, should be giving all that care, love and attention. Partners should take equal roles in raising children, and extended families should support the parents if possible. Kindergartens should be widely available and free. But beyond all that, we need to develop collective ways of raising our children, sharing the burden not only within but also outside the nucleus family.

My partner and I did not have much support raising our daughter. Our extended families live in a different country and our friends are juggling with their own lives. I wish we were living in a more collectivised society, in which we could raise our children together, with friends and neighbours. But we do not. So, unfortunately, there are only two people on this world, who feel responsible for Rosa Mavi’s physical and emotional well-being and we try to behave accordingly putting her needs before the increasing heavy requirements of academic life. This decision takes a toll on our academic careers. I have no idea if I will be able to find a permanent or at least longer-term job after I finish my (third!) post-doc. I am anxious and stressed about my future. But it does not mean that I regret my decision to prioritise my relationship with my daughter. I do not. I do not want to have another child and this might be my only chance to establish a close bond with a human child, one that happens to come out of my belly (C-section!). I want to use that chance. I have academic friends who do not even remember the first years of their children, as they had to work hard. I want to make the most of it and remember the time we spend together. But it does not mean that I stopped being a scholar. Intellectual women are expected to be childless to be free to think, write, and create (think about Simone de Beauvoir, Rosa Luxemburg, Jane Austen, Emily Dickenson and Virginia Woolf to name a few). My dearest Ursula K. Le Guin, on the other hand, once said that she had three kids and wrote more than thirty books and she enjoyed both immensely. I also want to enjoy being a mother and being a scholar, if the academic world ever lets me.

Chapter 18: Being a mother in science: it is hard but possible!

Rym Kefi-Ben Atig, Genetic Anthropologist, Biomedical genomics, Tunisia, mother of two boys born in Tunisia

Children are the sunbeam in a couple's life but their presence requires a great organisation, sometimes difficult to achieve by women with a professional commitment. In this context, I share with you my experience as a young scientist, mother of two boys, Khalil and Mohamed Aziz, aged 13 and 8, respectively.

When I was a student, I decided not to get married until I got my PhD degree. Fortunately, I climbed the university degree with success and I obtained my PhD in January 2005 in France at the age of 27. I chose to return to my native country, Tunisia, and get married to my fiancé (known since three years before). In Tunisia, it was necessary to be affiliated to a research laboratory and to pass the national competitions in order to obtain a permanent position. I became pregnant with my first boy, Khalil,



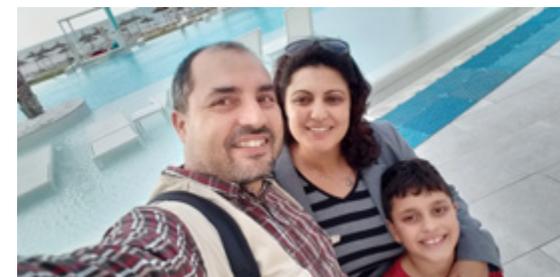
From left to right: Mohamed Aziz, Khalil, Rym and Kais

in September 2005. The pregnancy was difficult, especially the first months. It was especially difficult because of the 124 km that separated my home, in Bizerte, from my work at the Institut Pasteur in Tunis (IPT). A few weeks after giving birth to Khalil, in July 2006, I had taken part in a national competition to obtain the position of Assistant Professor. I had the opportunity to get a position in one university in Southern Tunisia located more than 500 km from home. Thinking about my little baby Khalil, I could not leave him in Bizerte and I was not able to take him with me to the South, consequently, I had to refuse the job offer. I remained as postdoctoral researcher at IPT.

After my 2-month maternity leave, I went back to work. I worked every day from Monday to Friday from 8:30 am to 5 pm. For Khalil's care, the whole family was organised to help my husband and me. I stayed the first three days of the week at my parents' home, where my father, who had just retired, could take care of Khalil during my absence. The rest of the week, I spent at home and it was my husband and my mother-in-law who were taking care of Khalil when I was at work. My husband is a part-time teacher and my mother-in-law is

a part-time nurse. Both had to get their schedules organised to ensure Khalil's care. My mother-in-law often was on call on weekends and holidays to have recovery days that she uses during the week to keep Khalil. Sometimes my husband's grandmother also helps us when my husband and my mother-in-law have professional commitments.

On my side, I did my best to ensure my role as a mother and continued to work hard for a permanent position. It was very tiring and I was not sleeping enough!



Kais, Rym and Mohamed Aziz

I breastfed Khalil for nine months. In the evening or very early in the morning, while Khalil slept, I pumped the milk from my breasts so the person who kept Khalil during my absence could give him his milk bottle. This was very

painful! At work, during my lunch break, I also drew my milk, if not, my breasts swelled a lot. When I am at home and as long as Khalil is awake I take care of him; any other tasks are scheduled while he is sleeping. We made many sacrifices. My husband was preparing his thesis in mechanics at that time and he was forced to limit his visits to his research laboratory that slowed the progress of his thesis. As for me, I declined several invitations to congresses, internships and trainings in order not to be far from Khalil. I remember that I was selected to attend the meeting with the Nobel laureates in medicine and I had to decline this invitation!

Our daily life became easier around 2009 when Khalil went to kindergarten, moreover I had passed the competition and I obtained a permanent position. After that, I doubled my efforts at work. I was involved in many research projects and I supervised several undergraduate and graduate students. I also attended several international scientific events.

In May 2010, my husband and I decided to have a second child, Mohamed Aziz, who was born in February 2011. For him, our organisation was easier because we were more experienced and because my mother-in-law was by then retired. However, my husband decided to give up his thesis in order to spend more time with our children. I took a maternity leave of two months, followed by four months on half salary. During my maternity leave, I took care of Mohamed

Aziz and I worked at home, when it was possible. My professional activities were focused on writing scientific papers, projects and correcting students' theses. Mohamed Aziz was breastfeeding for nine months and I was able to resume participation in international congresses and meetings only two years later.

When my children became more independent, I started preparing my career advancement. My family continues to support me. For example, when I left on a professional trip, my parents took care of Khalil because his school is near my parents' house. My husband and my mother-in-law looked after Mohamed Aziz. In order to be present with my children, I limited the duration of my trips to five days maximum and the number of trips to five per year. I obtained the university degree "qualification to supervise research" in 2014.



My son Mohamed Aziz, myself, and my eldest son Khalil

At home, my children are my priority. I do not watch TV at night to take care of my children's school day-to-day. If I have to finalise my work, I plan it after 10 pm when the children are already in bed. If I have to be abroad, I try to organise international meetings for only a few days during the school holidays. If, on the other hand, I happen to have a meeting on a different occasion, I arrange to have a video communication with my children, according to the schedule that suits them to follow up on their homework. Sometimes, depending on the time difference, I have to wake up very early in the morning or stay up late to get in touch with them. I renounce any invitation to international scientific events when it coincides with my children's exam period. Since 2016, my professional career has regained momentum. I became team leader, I coordinated several national and international projects and I gave more courses at the university. My efforts are rewarded both professionally and personally. In 2017, I was Laureate of the Next Einstein Forum and I was selected by the World Economic Forum as one of the top 50 scientists in the world under 40 years old. I was also selected by the Science and Technology in Society forum (STS) as a "Future Leader" and participated in the meeting with the Nobel laureates in Kyoto, Japan. Recently,

I obtained the national women excellence award "Arvea Women Award" in the category of scientific research.

At the familial level, my children are good pupils. They participate in many extracurricular activities. They are very fulfilling children. Certainly, we provide a great effort, my husband and I, and we are very tired by our familial and professional commitments, but that does not prevent us from being very happy. I think that the secret of our success lies in love, family support and self-confidence. We dream big and we work hard to achieve our goals that is how our family and our religion educated us.

Chapter 19: Motherhood: never giving up

Vanny Narita, Biologist, Indonesia, mother of two boys and a girl born in Indonesia

I am a mother of three beautiful children. They are the love of my life. I cherish every second of my motherhood. As a biologist, I would say my children are my mitochondria. They provide energy for me to keep moving.

I got married right after I got my undergraduate degree in the U.S. Instead of going to an Ivy League university, which had already accepted me, I decided to pursue my PhD at the same university, so I could stay with my husband. People questioned my decision, but there were millions of reasons why I did this. I would say being married is the time when you started to have infinite variables to consider what to do next in life. Being single was simpler.

Apparently, I spoke too soon. Being married was much simpler than being married AND having children. After I obtained my PhD, we returned back home to Indonesia. A year later our son was born. My daughter was born four years after that. I had several health problems after that, and my youngest child was born about nine years later. My husband fully supports me being a mother and pursuing my career. However, having children and working as a scientist are far more than simple. Sometimes, I feel overwhelmed trying to balance my life.

Do not get me wrong. Motherhood fills me up with joy, peace, and reflection of what is important in life. I did my best to be a good mother, and I am still doing my best to be one. That includes two years of breastfeeding and holding myself not to be apart physically too often, especially during the first years of their lives. This meant no scientific meetings/fellowship and lowering my goals during this period. Certainly, I faced a dramatic fall in productivity after childbirth and at least the following 4-5 years after each childbirth. And this put tremendous pressure of being a good mother and a young scientist. Many times, I felt so exhausted and having that guilty and hopeless feeling at the same time. Guilty feeling because I felt I abandoned my children. Hopeless feeling because I felt I did not perform at work as I should have.

Most of the guilt resulted from having to leave my children when they were babies to go to work. My office is far from my home and not conveniently reachable by affordable transportation. There are office busses, which pick you up at certain points. However, you have to catch the bus at 5:30am, meaning that I had to leave home to go to this point at the latest at 5am. The time it took to reach my lab is about 2 hours. The return journey is about similar, and

I got home usually around 6pm. Adding it up, that means I was away from my children for about 13 hours each day. I tried to bring my babies to my workplace (along with a nanny). However, it was more chaotic for everybody. My workplace does not have childcare facilities. It does not even have a place to pump your milk although some of us have requested this facility. As an alternative, we usually pump our milk in the praying area, which unfortunately is a public space. My workplace is also a laboratory, so it is considered unsafe to have children, especially babies, around. Not to mention the financial issues if you have to bring a nanny with you.

I felt hopeless because I felt I did not perform at work, as I should have. Being a PhD from abroad and at a relatively young age put a tremendous pressure,



Illustration by Vanny's husband, Amri Putradjaja

not only from your boss, but also from your peers. Scientific field expectations were so high and sometimes unrealistic when you still have babies and/or toddlers. At the same time, you have a lot of pressure from your family and friends as well to have children as soon as possible; my age was considered quite old in our society (and actually, it is true for women's biological clocks as well). In addition, I had problems during my pregnancies that required me to have bedrest. To deal with this dramatic fall of productivity, I switched my research from wet lab to dry lab, more towards bioinformatics where I could work at home. My friends and staff supported me by doing the wet lab work, while I designed and supervised the research. That way I could counterbalance my productivity. For a time, it worked well, but the problems arose when my office started to expect everybody to be present in the office. They would finger print attendance twice a day (and even three times) and if you did not meet a certain amount of attendance, your salary and benefits would be cut.

These changes made it very hard for me, especially when our second baby was diagnosed with heart and kidney problems when she was eight months old. In Indonesia, we have three months of maternity leave, and no paternity leave. However, we do not have any leave for this kind of cases. I applied for three

months office leave, but because of my daughter's condition, I often could not come to the office. I tried my best to do bioinformatics work and supervise my research during this time. However, it seemed almost impossible to reach the targets.



Illustration by Vanny's husband, Amri Putradjaja

of my children, work on policy recommendations, teach and do research. My research during this time even resulted in two patents.

After serving the presidential administration for four years, I came back to my previous agency for a short period. I was pregnant again and having some complications, so I decided to resign. My baby is still having some developmental issues that require my full attention. I took two years off my work. During these two years, I have been working on some science policy and communication consultancy, which I could do at home. Recently, I just took a part-time lecturer position that allows me to work flexible hours.

I would say that being a young woman scientist is quite challenging. Usually the problem comes because your productivity as a scientist and as a woman come at about the same time. From my experience, I believe we can balance our work and family life just fine when the right ecosystem is present. Flexible hours and understanding from our workplace play a key and important role. Support from my family and friends are invaluable. And of course, my children are my infinite source of energy that keep me moving.

Chapter 20: Mother and daughters or sisters

Amal Amin, Professor of polymer chemistry and nanotechnology, Egypt, mother of two girls born in Egypt

Principally, we think that we make life for our children but actually it is them who provide us with life full of excitement, always learning, warmth, love and many more meanings beyond what we may imagine.

Personally, I have two girls who I consider as sisters more than mother and daughters. Of course, sometimes we disagree in our points of view because of age and generational gaps but similarities in thoughts and preferences are more evident than differences. I got my first girl (Salma) during my Master's directly before the defense of my thesis. Afterward, I got a scholarship to pursue my PhD in Germany via a joint grant between Germany (German Academic Exchange Service - DAAD) and Egypt where I was forced to leave my daughter behind in Egypt with my family alone during language courses in Germany. However, I did not accept that and tried to change that situation by writing to the German authorities (DAAD) and Egyptian ones clarifying how hard it was to leave a toddler away from her mother, and in the end they approved her coming along with me. Fortunately, my husband decided to temporarily leave his work to maintain and preserve our family together against stereotypes which discourage men to follow their wives leaving their jobs but he decided to start with us our new life and continuing his post-doctoral studies.

We spent years working very hard and struggling to attain our aims. Afterward, me and my daughter returned back to Egypt for me to start my new job as a researcher leaving my husband to continue his work. Unfortunately, I had lost my mother earlier in the beginning of my career when my little child (Mariam) was only 2 years old and the older one (Salma) was 7 with no near relatives who could take care of my children and no near-suitable child day care services as I am a chemist needing to stay longer times at the lab. It was the same situation which happened when I was in Germany doing my PhD with my oldest one, so, it happened again but with much responsibilities and more tasks and plans to advance my career. However, at that point, I decided to have more of a friends kind of relationship instead of a mother-daughter relationship with my daughters, where I used to work sitting among them with my computer talking with them or directing them or helping with homework or so. We made our shared life out of mixed moments of work and fun, probably I was a little late than what I expected in my career but I enjoyed this relationship a lot. Therefore, we travelled together during my scientific visits to several countries with much fun,

enthusiasm and hard work learning from different cultures how to be stronger and compatible to whatever happened. Their father as well became very supportive of this type of relationship. However, it was not that easy but I suffered a lot to keep personal life-work balance. Also, as a mother, I had to make some additional control where mothers usually would like children to become much better than them which took much effort and time to establish their life principles and to motivate them to live up to their dreams and to have their own personalities not just to accept what they already have. Fortunately, they became stronger, funny and positive chasing their dreams. However, they are completely diverse in their preferences where the older one chose medical school to be a researcher and physician to satisfy her dreams to serve humanity!!! The little one, although being excellent in biology as well, would like to be a musician but I convinced her just to consider music as a hobby at the moment and try to continue her regular education where in our country planning for regular career is much easier and safer than to be just a musician or writer with no expected salary especially for girls where jobs are considered as secure source of regular income. Accordingly, they both began their piano lessons along with Taekwondo and swimming training. There were always ups and downs for us but we tried always to work and move as a family to be effective and not to feel lonely. I have to confess that their presence in my life is an advantage as a woman and as a human being. As a woman and especially as a scientist, they taught me how to challenge life itself with much perseverance and determination to do what I want and I shouldn't wait for change but be the change-maker myself, which benefits me as a human being where for my children and the others worldwide, I believe in working as a global citizen to change the world into a better place for them and the next generations.



Amal with Salma and Mariam

That was the main driving force behind my enthusiasm to work for several ideas-based projects or organizations as in the case of cofounding the Global Young Academy, the Egyptian Young Academy and other prominent scientific communities and achievements including my new initiative of women in science without borders to change the world with science. From my life trip, I could say it was hard to convince others that I will succeed in both roles as mother and scientist, although I received great help from my husband and several colleagues but it was very hard to accomplish significant progress in academic career and it would not have happened except with dedication and extra effort. However,

sometimes I blame myself for not taking care of my daughters more but I think our life together will enrich and widen their experience.



Amal with Salma and Mariam

Moreover, I think being Muslim with a conservative background was an advantage and extra motivation for me to prove myself and to challenge society and all stereotypes to prove that we all as humans are equal and we should have aims for our lives. I think the presence of a family in my life pushed me to overcome all difficulties including severe health problems which I faced in 2013. For all of that, I owe to my family with all what I did and I dedicate my sincere love to my lovely family.

In conclusion, I could say “Being a mother is learning about strengths you didn’t know you had and dealing with fears you didn’t know existed” (Linda Wooter).

Section 4: Concluding thoughts

Chapter 21: Lessons learned – experiences shared

Shalini S. Arya, Food Scientist and Technologist, India, mother of two girls born in India

All the stories narrated in this book indeed show that mothers face a very exceptional set of obstacles, challenges at all stages of motherhood including from falling pregnant, to during pregnancy, to taking care of children until children grow independent and may be even in later stages of upbringing. However, while all working mothers face challenges, those with strong family support and surroundings tend to come out of these obstacles more easily. The stories also bring some of the interesting words of wisdom, learning lessons and messages for other mother scientists overcoming these challenges through their own strategies and learnings. Therefore, I would like to share a few learnings here from my own experiences, which may vary from person to person and situations.

1. Let it go

The most important of all learnings was “let go” behaviour. I learned no matter whatever happening against my wish, I would not react. I kept telling my mind that it would change. I practiced meditation and other mind trainings. I accepted the reality; I faced the difficulties and believed that this will change. For me the pain was lesser with this feeling. I did not bother about “my recipes”, my food, my hygiene etc. Earlier, I wanted to do everything for my baby, I let it go, I decided to others to get involved and I let it go. It was initially difficult to accept but later helped me a lot.

2. Plan, plan and only plan

To bring everything the way I like it to be, I decided to plan the activities, task and manage time. Therefore, before the next morning, in the night I planned, planed and planed. Deciding the breakfast menu, arranging the clothes, workbag to be arranged and kept ready near the door etc. Again, I always looked for the next day’s to-do list and scheduled the most important task. At home, I had an office, so, while I was with my kids, I could accomplish deadlines. I carried a “home to-do list” in the office, while in the office I was very much focused on all my tasks, once I had in mind that there were other tasks waiting for me at home, so I should be most productive. Many times, after working hours, I com-

pleted the home to-do list, for e.g. bringing diapers, baby medicines or school stationary etc. I used a lot of post-its for planning; the white boards were full of timetables and other lists. It helped me a lot.

Nowadays, I find it easier with technology. I can answer an e-mail while with my kids at home. My cheerful, positive, problem-solving nature has helped me to balance motherhood with a more ambitious career. Over the period, I have developed so much of confidence in myself to get through things, even when they are impossible. I think this is only because I am a mother.

3. Do not judge others

We tend often to look over at the next person judging their action and results. I decided not to judge others, not to compare and just be yourself. This has made me happier. I stopped comparing, competing with others. It is human nature, when you live in a society, you tend to judge due to whatever reasons. But, I put a big full stop on it.

4. Enjoy family time

Now, when both my daughters, Swara (6.5) and Soumya (3.5), become a little bigger, ahh, it is full of fun and enjoyment together. I have best friends waiting for me, to do joyful things together, to fight together, and to do unlimited things together. We have learnt how to support each other. While both of them go to one of the best schools, my every day is learning from them and giving lessons of a better life to them. Both these things are full of enjoyment.

It is like a beautiful world. They speak the best language; they have the best behaviour of politeness and respect. They understand the emotions and feelings of others. I feel proud of being their mum. This resulted from all the hard work and efforts I have put in. By being a mother, I have learnt when to say yes or no to children and set limits. I use these skills in my office, too. We cherish every moment together, even the daily activities have become fun activities together! I always ask myself what kind of mother I want/wish to be. I want to be the best mother in the whole world full with empathy, kindness and love for my daughters, I will be their first teacher. They are going to learn the fundamentals of life from me. They will experience what love is. Because they will experience it the same with me. I know I am their role model and they will behave the way I behave.

5. Enjoy the work

It is my choice to take this job; no one has forced me to do it. All of us work for different reasons. Some work for money, some for deriving job satisfaction and I discovered the reasons for my work and I fully own the decision and my choice.

I enjoy my job very much; I always see many positive things in it. While working with this attitude, I have realised the success, awards and accolades are by-products. You enjoy the work, give your best and success will follow you. After I became a mother I found myself more focused, more productive, with more research output, more grants, more awards, more recognition, more travel, and everything was more including the joy.

6. Accept help

I do not know what stops us from taking help from others. We are always ashamed to approach others for help. Take help from others and help others. This was the biggest life lesson for me. Initially, it was difficult and challenging, but later I found it works. I took help from my mother, sister, sister's daughters, and my father and sometimes even from the housekeeping staff and building guard. You might think this is too much. But situations arise that you are helpless and you have no option. At that time, I realised if you help others, they would help you in your worst situation. I have beautiful relations with close and extended relatives. Their support was very important to me. Additionally, I developed beautiful relationships with the extended office workers, their families as many times they helped me for my daughters' upbringing. I am very grateful to each one of them. Motherhood made me a more humble human being, an indebted person for life. I experienced the pain, difficulties and I went through or am still going through that, therefore I want others to learn from my experiences, I never leave an opportunity to share. I have learnt how to sail the boat of motherhood while enjoying the beautiful sea surfing (life)!

Therefore, I feel that having children was most advantageous to me being a women in science. I have realised the potential in me. Motherhood has built up confidence in myself. I can raise my voice and keep my point of opinion in the meetings and gatherings. Particularly, in the system where there is lot of male domination, I have proved that a woman can take care of children and simultaneously they can perform their duties with best outcomes. Women are multitasking and better managers. I have found that one should not be afraid to

ask for a support, if required. There are women who can support you as they have similar feelings of motherhood. Therefore, having children has changed my perspective towards life. I have become more empathetic towards working mothers especially PhD students and if they are to be mothers; I offer my full support to them in whatever capacity I am able to contribute.

I conclude, based on my own experiences and I can say that it is very challenging for young women scientists to manage ambitious career and motherhood. It is beyond imagination, if she comes from some specific community with no social support system and poor financial background. Furthermore, to overcome these substantial challenges, we need communities that can support our women, through education, culture, and society. I would like to add that the challenges are entirely depend on which community you belong to, whether you have a well-educated and supportive family, varied culture, an available support system during your motherhood and working environment. In this chapter, I have shared a few tips and they are purely based on my own struggle and not the hard and fast rule of motherhood. For me work is my life, children are my heart, and both in fact complemented each other and do not compete. Rather motherhood has changed my life positively. Nevertheless, during this journey and beyond I strongly feel that strong support from close family members, existence of strong and maybe free childcare support in the work area predominantly during early child age, supportive, sympathising partners (both share parenting equally), and flexible working hours for female scientist can make a big difference.

Chapter 22: Motherhood and science: important messages for us all

Anina Rich, Professor of Cognitive Science, Macquarie University, Sydney, Australia

Nova Ahmed, Associate Professor, Electrical and Computer Engineering, North South University, Dhaka, Bangladesh

Ghada Bassioni, Professor and Head of Chemistry Division, Faculty of Engineering, Ain Shams University, Cairo, Egypt

Sandra López-Vergès, Senior Health Researcher, Gorgas Memorial Institute of Health Studies, Panama, Panama

This book brings together the experiences of 18 very different and highly successful women, 18 very different scientists, 18 very different mothers. Some of the challenges they describe will bring you to tears, but throughout their stories shines a common thread: the determination to succeed in a scientific career, while also having a family. These women have shared their stories, sometimes with brutal honesty, to show you just some of the different ways one can combine motherhood and science. Motherhood has been identified as a major reason for women not reaching the peak of possible scientific careers (Wolfinger, Goulden, & Mason, 2010; Goulden, Mason & Frasch, 2011). These women show through their stories, within different cultures, that combining career and family is possible – but it is definitely not easy - and that there are things we can all do to make it better.

The increasingly competitive environment for pursuing scientific careers makes support for women as mothers crucial in order for them not to fall behind their male peers (Adamo, 2013). The stories included here highlight the need for all of us to consider how we can change the environment in which mothers work to enable them to succeed – to reduce great struggle and sacrifice many of our stories illustrate. There are clear actions that societies, institutions, and families can take to make it easier for women to succeed in what is still a male-dominated arena. It is time for these actions to become the norm.

In addition to practical changes to the environment and support systems, we need to address the systematic inequities that create many additional barriers for women, particularly mothers, to progress in research-based careers. Women tend to be less visible; they have to overcome bias about their capabilities during selection and promotion; their papers stay longer under review and get cited less. For example, Hengle (2017) reports that female-authored papers

spend ~6 months longer in review than male-authored papers – and end up better written, suggesting women are held to a higher standard than men. In addition, women who are mothers take an additional career hit in terms of perceived commitment to work and competency, known as the “motherhood penalty” (e.g., Correll, Bernard, & Paik, 2007; Cuddy, Fiske, & Glick, 2004; Fuegen, Biernat, Haines, & Deaux, 2004). The combination of these biases with the challenges of actually caring for children and other family members lead to the situations highlighted in these stories: stories of success but often requiring sacrifice and significant hardship. As long as we continue to allow systems to perpetuate in which decisions are made without accounting for societal biases, mothers will experience additional barriers.

Although awareness of gender statistics and the general barriers experienced by women scientists around the world is growing, often the impact of these barriers is not taken seriously or is not fully understood. The personal stories in this book bring a human and personal perspective to the effects of gender inequity and motherhood in science, and provide a call for action to all of us to challenge social biases and work towards changing the systems that allow these biases to have such a significant impact. Changing bias is hard, but there are clear demonstrations that we can fix the systems – for example, by designing fairer processes so that bias has less impact (Fox, 2017).



Ghada's daughters

The stories clearly highlight the positive impact of simple practical steps like providing private appropriate facilities for pumping breastmilk, affordable local childcare, flexible working hours, and decently paid parental leave for both parents. Identifying these factors is not new (e.g., breastfeeding support in the workplace has clearly demonstrated benefits in return to

work (Rollins et al., 2016; Anderson et al. 2015; Weber et al. 2011)), but these stories also illustrate the extent to which a lack of these measures can greatly impact the ability of mothers to return to research successfully. These measures are even more crucial when young women scientists are not in their home countries, as is common during PhD and postdoctoral training, especially for scientists from developing countries. These periods are scientifically demanding

and often researchers do not have family or community help. Institutional or government measures for parental leave, breastfeeding and childcare can be the major determinant of the quality of their scientific training/motherhood experience and their future as scientists.

Our stories also have a clear thread of the importance of family and community support. When this exists, mothers have a much better chance for successfully managing both career and home life than when it is lacking. The stories of those who succeed despite a lack of support make it very clear that this success is hard-won - and brings a whole host of additional challenges to mental and physical health. Again, our stories illustrate what we know are important factors from the scholarly literature - social and professional support improves the experience of mothers (Logsdon & Davis, 2003) and increases the likelihood of women to remain in scientific fields (Adamo, 2013).

Finally, these stories illustrate the benefits that motherhood can bring to our science. Perhaps the most challenging and important job in the world is being a parent – and working out what being a good parent actually means. To each of us, our careers as scientists have been enriched by the challenges of becoming parents. Our contributors highlight the development of patience, of a greater sense of perspective, of inspiration, of tenacity, of better time management and efficiency, greater empathy, and energy for making impactful discoveries. Greater diversity of experience and skills developed through motherhood allow asking different questions with new perspectives, and thus bringing a larger diversity, quality and excellence in science.

We call on institutions and governments all over the world to implement the simple practical changes that can make the difference between a woman having a career during motherhood or giving up.

We call on fathers and partners to take up the challenge of sharing childcare and family responsibilities equally with us, and appreciate those who already do, so that we can both develop flourishing careers and happy families.

We call on our societies to recognise that women can contribute in many ways, not just as mothers.

We thank our extended families who pick up the extra load when we are unable to manage.

We call on all mothers in science to be strong in their ethical values, in their beliefs, and their desires and have strength to overcome the challenges in their paths for themselves and their offspring.

And most of all, we look towards a world that recognises the additional benefits motherhood brings to science - so that women scientists can flourish because of their commitment to being good parents, and not despite it.

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About the Global Young Academy

The vision of the GYA is science for all; science for the future, and its mission is to give a voice to young scientists and researchers around the world. The GYA, founded in 2010, is an independent science academy of 200 outstanding early- to mid-career researchers from six continents who are selected from across disciplines based on their academic excellence and commitment to engage with society. GYA members serve five-year terms, and the GYA presently counts members and alumni from 86 countries. The GYA administrative Office is publicly funded and hosted at the German National Academy of Sciences Leopoldina. The wide array of GYA activities are supported by a range of international public and private funders.

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