Superwoman doesn’t exist- qualities of a successful woman in science (and why they help with success).

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Superwoman woke up at 5am. She’d been up most of the night feeding and settling her three-month old baby, but she didn’t really need much sleep, did she? She jumped out of bed and got ready for her gym session (despite being Superwoman, those last few pounds post-baby were proving difficult to get rid of after having her fourth child). After the gym, she returned home to get the older children fed and ready for school. Her husband, Superman, was heading off to save the world again, so she took care of most things on the home front. After seeing the three oldest safely to school and taking the youngest to childcare, she made her way to the lab to start her work day. Another busy day-- It was grant season, and she was putting two in this round. She also had a manuscript to submit, two manuscripts to review and a draft of a PhD student’s thesis to finish reviewing- they were going to discuss it this afternoon. In between, she needed to pump milk for her baby every three hours, catch up on some of the lab’s recent data in lab meeting later in the morning and attend a number of different meetings associated with her various leadership roles at the University. Then she had to prepare her seminar for next week. She read her e-mail while drinking her coffee. Two more manuscript review invitations had arrived since she first glanced at her e-mail from home this morning- she couldn’t really say no, she knew how hard it was to get good reviewers to accept these invitations. There was also an invitation to present at an international conference (I will have to either take the baby with me or wean her prior to attending, she thought). She also had to complete her COIs for the grants allocated to her study section (only 150 grants this time…not too bad). Not long into her e-mails a call came from childcare. Her baby was very unsettled and it might be easier if she took her home. No problem, she just Skyped in for her meetings and juggled her work from home, all while settling the baby at regular intervals. She managed to get everything done in time to pick the children up from school, help them with homework, settle some sibling disputes, and play with the baby for a while. She even had enough time afterwards to cook a gourmet three-course dinner to share with Superman after his very busy day (the children were still fussy with food, so she cooked them separate meals). After bathing and putting the kids to bed for the night, she snuggled up to Superman on the couch, listening intently as he told her all about his day saving the world. After relaying his latest achievements in keeping the world a safer place, he asked her, “And how was your day, dear?” “Oh, it looks like we found a cure for cancer today” she murmured satisfactorily. “Excellent, dear, excellent...” replied Superman “and what are your plans for tomorrow?”. If only we could all be Superwomen but the reality of it is that Superwoman doesn’t exist (nor does Superman for that matter!). Household equality is improving and women are gaining traction in professional settings. Although this old-fashioned view of the woman who does it all is evolving, there are common

qualities that do significantly help to make a woman super successful in her career (regardless of whether or not she has children). Much can be learned from those ladies that pushed their way to the top of their scientific fields and refused to take “no” for an answer. They don’t possess superpowers, but do share common attributes of successful men and women. Recently, Stephen Sykes (Assistant Professor, Fox Chase Cancer Center) along with other members of the New Investigator’s committee, wrote a great piece for the January/February ISEH Connections entitled “Combating Gender Disparity in Academic Science.” It is a great scholarly piece providing a broad perspective on the current state of gender equality across the world and what scientists are proposing to do to make a change. Here, we will discuss some of the characteristics that help women (and men) succeed in their scientific career. **Ambition**

Ambition is the desire to accomplish something requiring determination and hard work. Graduate and medical schools are filled with determined and hard working individuals who strive to push the envelope and make a difference. Ambition is a feature shared by most scientists, male and female, junior and established. However, ambition alone is not enough - the keys to successfully achieving your ambitions and reaching your goals resides in the characteristics listed below. Furthermore, if your ambition outweighs your willingness to work hard and achieve excellence then desire alone will not be enough to achieve your goals.

Vision/Goals

From childhood, people talk about what they want to be, and what they want to have when they grow up. This announcement marks the beginnings of desire, a stepping stone to ambition, but success only comes when you have a true vision for what you want to accomplish. Connie Eaves, Distinguished Scientist, Terry Fox Chase Laboratory, past ISEH president and the next Editor-in-Chief of Experimental Hematology (the first woman to ever hold this post) shared this hint: “be realistic about your goals, recognise and accommodate your constraints. Aim to achieve what you need to feel successful (fulfilled/happy) on all fronts.” (Note that if your goal is to be awarded a Nobel prize, you will likely never be happy with your career achievements!)”. Pamela Stanley, Professor and Horace W. Goldsmith Chair, Albert Einstein College of Medicine, also shared her perspective, “Successful women take the long view, pick their battles, speak up so their presence is felt, and persevere in the face of difficulties. In addition, successful women are very flexible, patient and manage their time well. Being flexible and resolute in the face of mini-catastrophes are key qualities for long-term success.” Being highly organized is one way to keep your sanity and achieve your goals. Try not to leave things to the last minute to complete as often something unexpected will come up and disrupt your schedule! **Passion**

Hopefully passion is one thing that everyone has for her/his chosen career. Yet many people do not openly share their passion for what they do with others, potentially in part due to other issues such as confidence (discussed further below). Don’t be ashamed to show your passion for what you do- it will often get you noticed by your peers and by those in more senior positions to you. It could lead to career opportunities that might not otherwise be as forthcoming, especially in the junior stages of your career. A scientific career is like a rollercoaster- full of ups and downs, and while it is also a rollercoaster for men, the downs

can be steeper for women (see section on confidence below). Passion also contributes significantly to your inner strength, and can be a major force in helping you to survive those tough times, when the rollercoaster is in a sharp decline. **Persistence**

Nothing worth having comes easy. Ambitions can only be achieved with persistence and a strong work ethic. Scientists are trained to deal with failures -- like when your single-cell RNA-seq library prep fails the first (or twentieth) time or your long-term cultures become contaminated just days before your final analysis. We are taught how to troubleshoot these technical things from the time we learn how to pipette, but knowing how to respond when your paper is not accepted or your grant is not funded, takes a bit longer to learn. Self-confidence and persistence are just as important to overcome these career hurdles. Margaret “Peggy” Goodell, Professor and Director of the Stem Cell and Regenerative Medicine Center, Baylor College of Medicine and past president of ISEH, shared a story to illustrate this point: “For example, an editor of a well-respected journal in the field once told me that according to her statistics, women senior authors were less likely to rebut a “reject” decision than their male counterparts. I realized hearing this that perhaps I should also be more assertive in defending my work from negative reviewers. This did embolden me to, on occasion, argue an editorial decision. From my experience as both an editor and an author, I can say this rarely works, but it does on occasion. So, the lesson is “know thyself” and try to counteract your own weaknesses. In this case, I learned to do a better job in defending my lab's work.” Dr. Stanley also commented that, “As a woman trying to juggle a lab of graduate students and postdocs, teaching and administrative responsibilities, and family life, I have found that so many things do not go as planned: trainees have personal and family problems, motivation flags, people -children, babysitters and lab members- get sick, cells get contaminated; Just when a project is going well, the lead researcher decides to leave. Being calm and determined has really helped me. For example, some time ago two colleagues told me they were way ahead of us on two different projects. In each case, my lab ploughed ahead anyway and we managed to publish before each of them! That was very fortunate and satisfying of course, but also a good lesson for me, and my trainees, to keep our eyes on lab goals until they are achieved.” **Perseverance**

Life, as in science, doesn’t always go as planned. Dr. Eaves shared her story of bias and perseverance that turned into a blessing: “I was accepted as a postdoc at the Ontario Cancer Institute by Dr. E. A. McCulloch coming from a Ph.D. in Manchester on the basis of references, my academic record and publications. It did not occur to me that being pregnant might be an issue. My arrival two months before I was due, clearly elicited a huge surprise, and an immediate change in supervisor to Dr. J. E. Till. Thereafter, I worked closely with both, but my intellectual proximity to Jim was a wonderful gift and it influenced much of my approach to science thereafter.” Despite the potential for setback, Dr. Eaves embraced the change and pushed forward with her science. The takeaway message is to not let small (or large) slights knock you off course. What may initially be seen as being a negative (or less welcome) step in your career most often turns into a huge positive, especially if you embrace it and let it become one. In Dr. Eaves’ own words- “Do not take ‘no’ for an answer- turn it into a challenge or an opportunity.” **Confidence/Inner Strength**

In order to persevere, one must be confident. While self-reflection can be good from time to time for personal growth, self-deprecation is a sure path to failure. Eleanor Roosevelt said it all when she stated, “No one can make you feel inferior without your consent.” The sad truth is that when comparing women to men, one of the biggest differences is that women often lack the confidence (or will be less likely to pretend to be confident) of their peers. One example of the difference in confidence between men and women is the disparity in the number of female applicants for faculty positions. In a 2010 study by the National Research Council, they found that women make up less than 20 % of the applicant pool for faculty positions[1]. This number is in stark contrast to women receiving nearly 50% of STEMM doctorate degrees[2]. While others can boost your ego, true confidence needs to come from within. Be aware of the imposter syndrome, the fear of high-achieving individuals of being exposed as a "fraud". Believing in yourself, and not being afraid to show that you are confident in yourself and your ability will do wonders for your career. Having said that, there is a difference between confidence and arrogance- know what the difference is and aim to be the former and not the latter! Emmanuelle Passegue, Professor and Director of the newly-formed Columbia Stem Cell Initiative, Columbia University Medical Center, places ‘confidence’ as one of the top qualities of a successful woman in science. Related to confidence is the ability to handle constructive criticism. No one likes criticism, but internalization of harsh critiques can destroy your self-assurance (or what remains of it). As mentioned above, “know thyself”, don’t let others dictate who you are or where you take your science. Read grant and/or paper critiques, listen to mentors’ advice, but don’t let any of it tear you down. Take what is constructive from the comments and leave behind the parts that feel like personal attacks. Dr. Goodell noted that, “Tenacity and pride are important, and women are more likely to be self-deprecating and internalize harsh scientific criticism, rather than fighting for what they really believe. This manifests in various ways that can slow women down.” Remember the phrase “What doesn’t kill you makes you stronger” applies to your research career just as much as in life! **Ability to delegate or say “no”**

This characteristic is less often discussed, but it can slow down your career just as critically: the ability to delegate, or even saying “no” (which in turns delegates the job to someone else) is a key attribute of a successful scientist. Women have a tendency to think they can and should do it all (see superwoman story above). Successful women do not do it all themselves, they learn to delegate. Ana Maria Cuervo, Professor and Robert and Renee Belfer Chair for the Study of Neurodegenerative Diseases, Albert Einstein College of Medicine, notes, “For many women, “delegating” equals asking for help because we are not able to do something, when for most men it means a sign of leadership. Most of us, still feel this need to show that we are able to do everything ourselves to avoid being perceived as weak. Unfortunately that ends up with us doing double or triple the work, and eventually may impact on our overall productivity (there are only so many hours in a day….).” Learning to delegate and lead at work and at home will lead to a more productive and likely more fulfilling career. Sharing tasks allows you to focus on the things that you need and want to do, rather than extra work that just needs to get done (it also helps others develop their own skill set!). One final note of advice is to seek out mentorship. Having a great, supportive mentor (male

or female) is something that can assist you in your career development and achieving your goals. If you do not have a mentor or even if you do but feel you could use another perspective, reach out to someone you feel you would learn from and ask them if they would mentor you. Not everyone is the mentoring type (and no one has the time to mentor an extensive list of mentees) but there are many people around who would make excellent mentors. Mentors can help you find the tools and the path to achieve your vision and fulfil your passion. These lessons are not restricted to women. To succeed, one must be confident, ambitious, and persistent to accomplish your vision. Stay away from self-deflating habits, and learn to "lead" rather than only "do". One take away from interacting with the successful women for this piece is that we are not alone. Weaknesses are human, but recognizing, learning, and growing from life lessons helps us to counteract those weaknesses and thrive. Dr. Eaves noted one last thing to always remember, "Keep a sense of humor" – that is good advice for life and career! We would like to thank Drs. Connie Eaves, Peggy Goodell, Pamela Stanley, Emmanuelle Passegue and Ana Maria Cuervo for taking the time to share some of their opinions (and anecdotes) on qualities of successful women in science and Drs. Trista North and Eirini Trompouki for their thoughtful comments on the piece. For our next session we have the opportunity to ask Prof Connie Eaves and Prof Thalia Papayannopoulou about their journeys in research, including how to thrive in a two-scientist household. We are encouraging you to submit any questions you might wish to ask them for us to pass on to them to answer. Please submit your questions to Louise (lpurton@svi.edu.au) or Teresa (teresa.bowman@einstein.yu.edu) by the 9th of March. Be proactive- this is a great chance to learn from two of our most prominent senior female researchers in the hematology field!

1. *Council NR. Gender Differences at Critical Transitions in the Careers of Science, Engineering, and Mathematics Faculty 2010.*
2. *Shen H. Inequality quantified: Mind the gender gap. Nature. 2013;495(7439):22-24.*

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