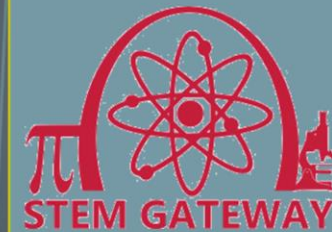


Imposter Syndrome

How to see yourself as a competent,
capable STEM person!



<http://unmstemgateway.blogspot.com/p/welcome.html>

Before we begin I want you each to take a moment to review how you are currently sitting and keep this in mind for later.

You feel like you don't belong?



This is the setting.

You are in this big room and the presenter starts mumbling about science. You feel pretty good about it because you are able to follow what they are saying. As the presenter goes on you start to hear some new words and the presenter draws something on the board that they think will help you understand the material better... it doesn't you feel lost already.

You think "what the heck am I doing here. I can't learn this. This is hard. All these people are smarter than me!"

You feel like you don't belong?



This might illustrate a bit better how you feel....

You feel like you don't belong?



Or like this?

Quiz

- Do you chalk your success up to luck, timing, or computer error?
- Do you believe "If I can do it, anybody can? "
- Do you agonize over the smallest flaws in your work?
- Are you crushed by even constructive criticism, seeing it as evidence of your ineptness?
- When you do succeed, do you secretly feel like you fooled them again?
- Do you worry that it's a matter of time before you are "found out"?

Let's take a step back and take a quick quiz.

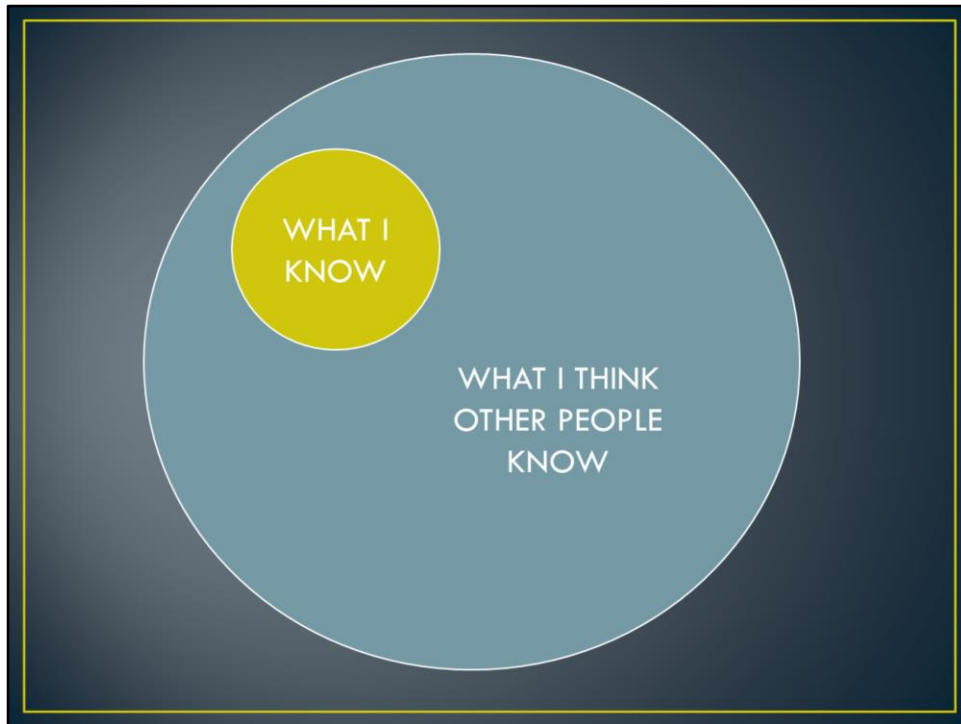
If you answered yes to any of these questions you can relate to the imposter syndrome

WHAT?

The IMPOSTER Syndrome

- Intense feeling that others have an inflated perception of your abilities.
- Convinced that you are a fraud and do not deserve the success you have achieved.
- Proof of success is dismissed as luck, timing, or as a result of deceiving others into thinking you are more intelligent and competent than you believe yourself to be.

So what is the Imposter Syndrome? It includes:
(read).



This graphic summarizes it well. We'll come back to this later.

But, don't fret. Although this is not a recognized medical/psychological condition, and I am in no way claiming to be a counselor, I want to inform you that this does exist your students or you may feel this way.

I will give you some scientific evidence to help turn these feelings around and make you believe in yourself and help you become more confident capable person in STEM.



WHO?

Who can experience the impostor syndrome? (discuss)

Anyone! And, most likely, everyone has at some point in their lives.

HAVE YOU FELT THIS WAY?

Think about an example
of when you felt this
way



It can be in any aspect of your life and does not have to be STEM related. Do any of you want to share your thoughts?

Even if you didn't share, keep your own experience in mind as you watch the rest of this presentation.

Story of Dr. James *Miranda* Barry



Dr. James Barry, His Servant and Dog, Psyche

Med Career
1815 - 1864

- Pioneering British Military Surgeon
- Stationed all over world
- Fought for better food, sanitation and proper medical care

Died
1865

Let's use an example.

Dr. James Barry, has most people knew him had a medical career from 1815 until 1864. He was a pioneering British Military Surgeon stationed all over the world and fought for better food, sanitation and proper medical care for prisoners and lepers, as well as soldiers and their families until his death in 1865 as a result of a dysentery infection.

Knowing that he was dying he gave strict instructions that no post mortem exam was to be carried out. But when he died, his body had to be laid out for burial and Sophia, the woman who washed the body, soon realized things were 'not as they should be' – the corpse was in fact 'a whole woman' and one whose stretch marks suggested had actually had a child.

Sophia kept quiet until after the funeral, and then her comments were hushed up, since the army wanted to avoid a scandal, and the true story remained hidden from view for a century.

(*) This is an image of Dr James MIRANDA Barry and John the faithful manservant in 1862.

It is incredible to think of someone spending her entire adult life in deception; she was the first woman in this country to qualify and practice as a medical doctor, and

she 'pulled the wool over the eyes of the Army authorities' for nearly half a century. I admire for her sheer guts and determination, and respect for the loyalty of her devoted servant John. He returned to Jamaica after Barry died, and apparently never uttered a word about what had happened. You don't get that sort of loyalty from staff nowadays...

WHY?

No one reason why

- Every individual is different
 - Different family structure
 - Cultural beliefs
 - Maybe education not focus at all?

Why Women and minorities?



- You are a stranger in a strange land
- Underrepresented groups do not have a long history of belonging
 - Especially at the high levels of achievement
- The more education and professional skills acquired, the less confident we seem to feel

You probably hear a lot of attention paid to women and minorities. Why is this?

(*) If impostor syndrome were merely a matter of confidence or upbringing we would feel fraudulent in all aspects of our lives. For example I am guessing women never feel like a fraud when they are sorting laundry or think it's a fluke that their pet adores them.

(*) Although underrepresented classes have come a long way, they only recently have played a part in highest levels of achievement in science, politics, medicine, law etc.

(*) But something that seems to be applicable to everyone is that...

How to overcome the Impostor syndrome

STEM fields are challenging!!

Temporal acuity and the rate and dynamics of mass extinctions

Douglas H. Erwin¹

Department of Paleobiology, National Museum of Natural History, Washington, DC 20013-7012

many envisioned a general theory of mass extinctions driven by impacts (2). Others favored an endogenous process, identifying con-

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Site-Specific Fluorescence Dynamics of α -Synuclein Fibrils Using Time-Resolved Fluorescence Studies: Effect of Familial Parkinson's Disease-Associated Mutations

Shruti Sahay,¹ A. Anoop,¹ G. Krishnamoorthy,^{1,2} and Samir K. Maji^{1,2}

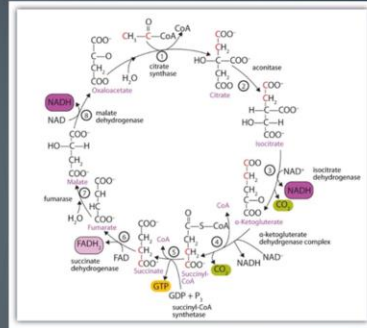
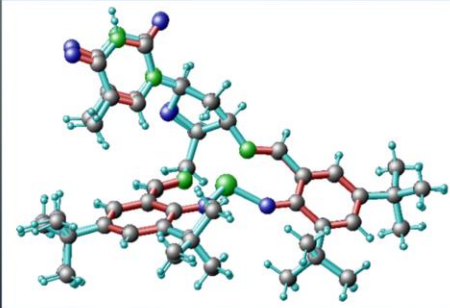
¹Department of Biosciences and Bioengineering, IIT Bombay, Powai, Mumbai 400076, India

²Department of Chemical Sciences, Tata Institute of Fundamental Research, Mumbai 400080, India

First you have to accept that STEM fields are challenging and complex. Take these paper titles, for example.

STEM fields are challenging!!

$$(x + a)^n = \sum_{k=0}^n \binom{n}{k} x^k a^{n-k}$$



Underlying these titles are complex topics, like the structure of complex molecules

- (*) Intricate cellular processes
- (*) or challenging mathematical equations

Don't let this scare you away. You need to get your mind in gear, believe in yourself and don't be shy. Ask questions in class and in life. If you don't understand something, seek examples and explanations to get those theories and concepts crystal clear. Don't be afraid to expose your ignorance. The only way to [learn](#) is to first recognize that you don't know it!

It's the truth for all students, and even professionals, as hard as it is to accept.

GUESS WHAT ----



Guess what though, I am going to share a bit of a secret with you... ready for it?
YOU ARE A STUDENT in life's challenges, even once you move into the professional setting. **YOU ARE NOT SUPPOSED TO KNOW EVERYTHING!** This is why we collaborate with others and STEM fields progresses as they do.

Ok so you feel like this... Now WHAT ?!?



Even knowing this, though, we can't help how we feel. You may still feel like this while sitting in class!? So, what can we do with it?

Non-verbal communication

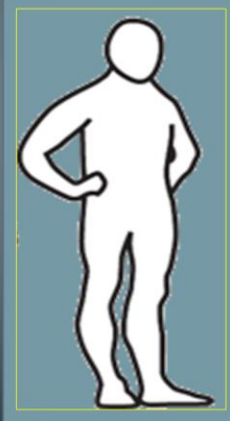


At this time, I want you to think back to your observation on how you were sitting at the start of this presentation.

I have a few images here of a few mammals exhibiting non verbal communication.

(*) What messages do you think these “poses” convey? (discuss)

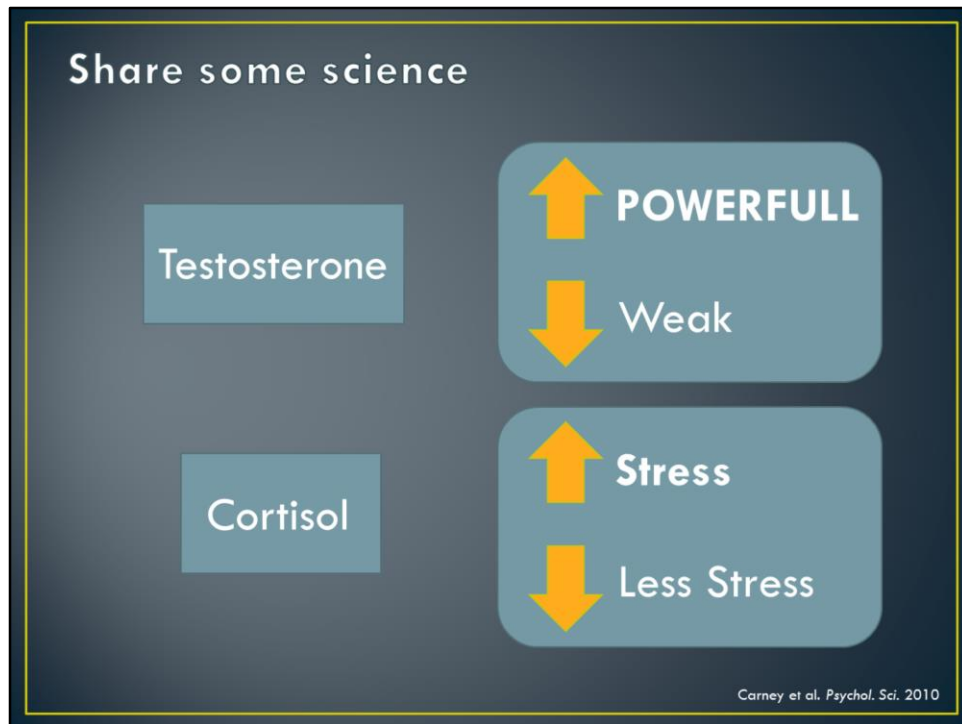
**POWER,
STRENGTH,
CONFIDENCE**



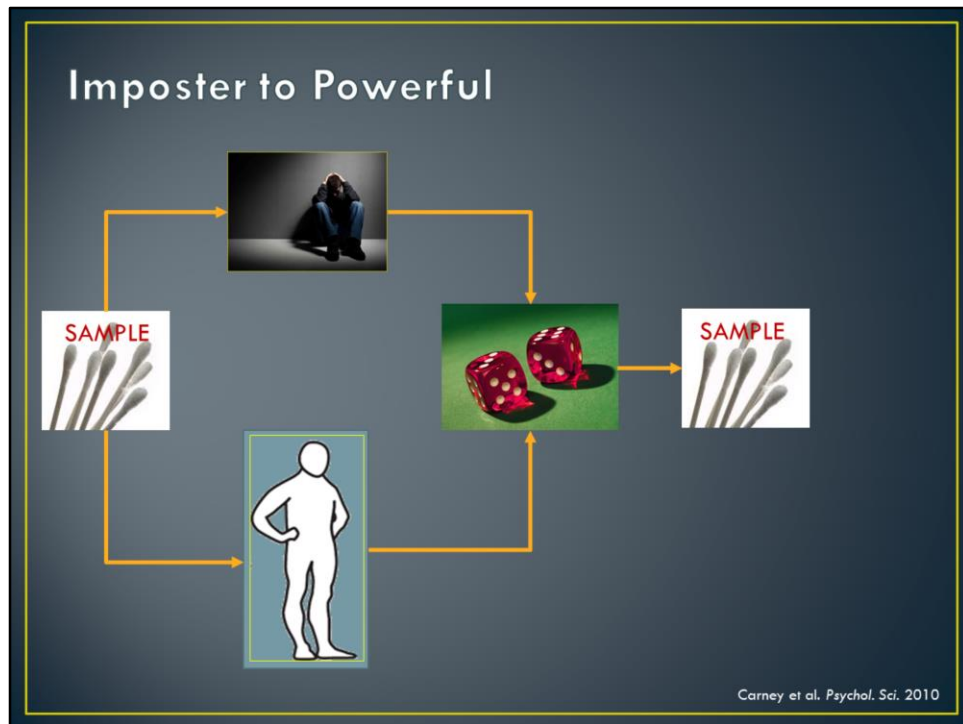
So what about these poses? (Discuss)

(*) Power, strength, confidence. Non-verbal cues help others get an idea of how you feel.

Now let's bring this back to what you observed about how you were sitting and how much you feel you've related to the impostor syndrome to this point. Would anyone like to share their thoughts?

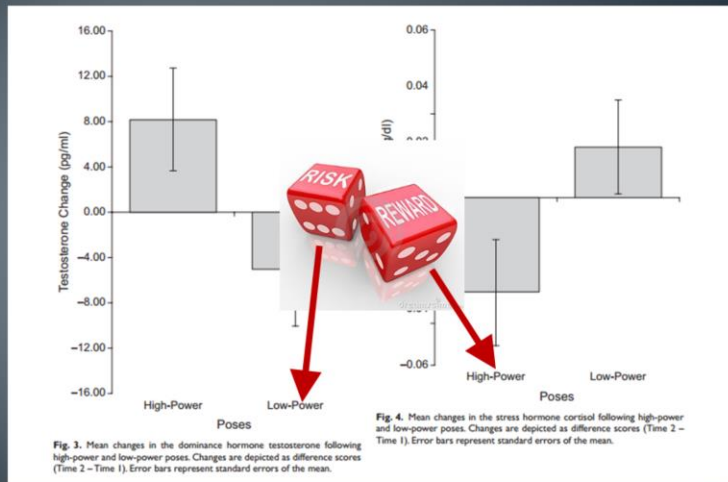


Now, being the STEM nerd that I am, I am going to share some science with you. Testosterone and cortisol are two hormones that we all have, Men and women both produce these and they can be measured simply through a saliva sample. (*) Measuring levels of these hormones tells us a bit about what is going on with us Physiologically. The optimal combination would be low cortisol and high testosterone, to a point.



There was a study done that used experimental methods to investigate how people feel about themselves. In this study, she took a random sample of men and women and took saliva swabs. She then assigned them to low or high power poses and made them hold the pose for 1 minute. Afterwards, she had them make a gambling risk and re-swabbed their saliva. Testosterone and cortisol were then analyzed before and after holding each pose.

Science of Non-verbal Communication



Carney et al. *Psychol. Sci.* 2010

Here is a graphic of the results. For those assigned to high-power poses, testosterone levels went up and cortisol down, while low-power poses were the opposite. Also, high-power posers were more likely to focus on the reward of a risk.

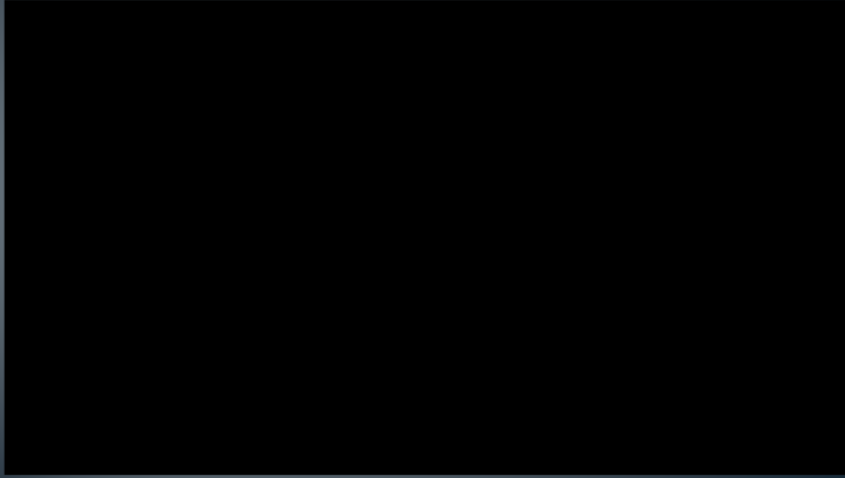
Science of Non-verbal Communication

Even when held for a **short** duration ----
Power poses cause **SIGNIFICANT**
physiological changes which in turn effect
behavioral responses.

Carney et al. Psychol. Sci. 2010

In short, even when the pose was held for only 1 minute, there were significant physiological changes that affected behavioral responses.

AMY CUDDY - TED Talk



Here's a short TED Talk on Amy's life experience that lead to this research.

The Power of Voice – More Science

Non verbal characteristics

- Emphasize words
- Hold attention
- Express confidence
- Subtly communicate feelings



Stel et al. *Psych. & Pers. Sci.* 2012

Along these same lines, Dr. Stel et al tested whether lowering pitch lead people to feel more powerful and think more abstractly. Obviously, when a speaker emphasizes words, holds the audiences attention, expresses confidence and can subtly communicate feelings it helps the audience watch the presentation. Included in this is tone. But, how does that affect the speaker?

Will tone of voice affect the speaker?

Participants told to read passage in different tones

1. Rank themselves on a scale
 - to measure POWER
2. Recognition test of words
 - to measure ABSTRACT THINKING

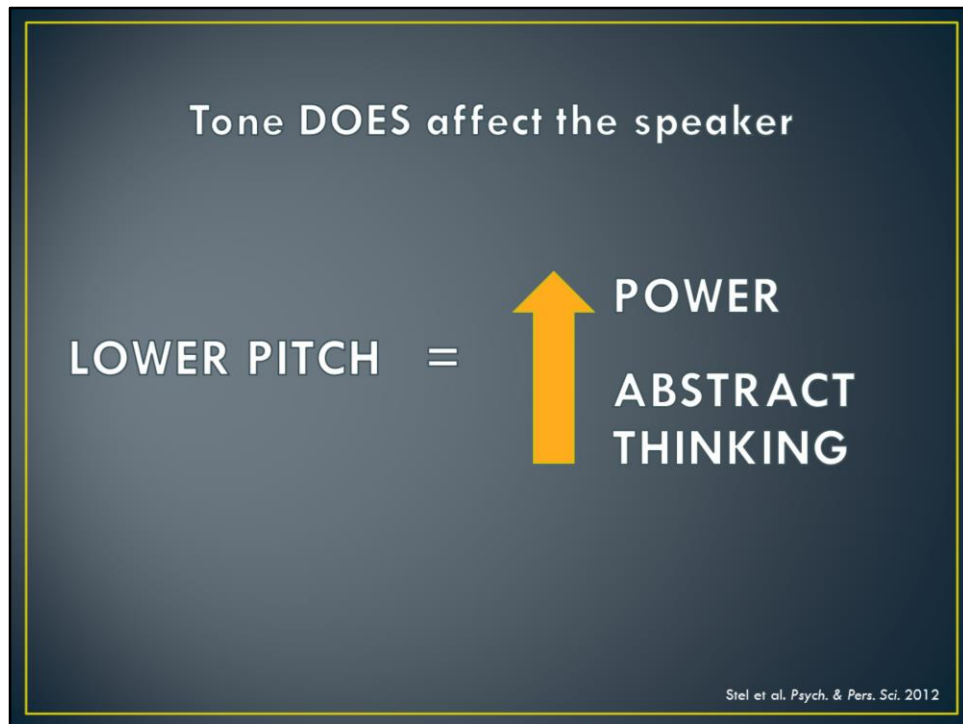
Stel et al. Psych. & Pers. Sci. 2012

Stel et al tested whether lowering pitch lead people to feel more powerful and think more abstractly.

(*) Participants were told to read a passage in different tones.

(*) After each read, they were asked to 1) rank how powerful they felt. To test for power, they were asked to rank themselves on 7 different trait pairs, for example, to what extent would you say you are boring vs. fun.

And, 2) They were asked to recognize new words to test for their ability to think abstractly.



They found that tone does affect the speaker. Speaking in lower pitches lead to an increase feeling of power and ability to think abstractly.

A Sense of Belonging

- Once the percentage of female students in a department rose above about 15... women's academic performance improved
- Girls who attend single-sex schools have higher career aspirations than both boys and girls at coed schools

Waston et al. Sex Roles 2002

In addition to making yourself feel more confident, it's important to have a sense of belonging.

(*) Here's an example. STEM fields are traditionally dominated by men. One study found that in an academic setting, there were two things that helped women academic performance and career aspirations.

Once a threshold value for the presence of woman was reached, academic performance to improve.

The other was when girls were surrounded by fellow females, their career aspirations were higher.

This isn't saying you shouldn't interact with people outside of those who fit the same demographic bubble as you do, but emphasizes the need to feel like you belong, like you can contribute, like you are valued. If you do not have these feelings, it does not mean it is not true, but rather, you are interacting with the wrong people.



Regardless of your reason of why you decided to pursue a STEM degree, it is important to stay connected to that end goal!

Its really important to stay connected to WHY you got yourself into this in the first place! **STAY CONNECTED!** To yourself, and to your community.

Status of STEM at UNM

1503 First time full-time freshman from the fall of 2005, 2006, and 2007 were tracked in this study.

Students initially stated that they were interested in STEM degrees



29.6%



42.5%



22.2%

5.7% Still enrolled



Let's put this into perspective for students at UNM. STEM Gateway has been looking at the Data - Research into STEM persistence at UNM.

(Read slide).

So, which of these options do you think had the greatest percentage?

(*) So, the majority of students are switching out of STEM, with those in underrepresented demographics having the lowest graduation rate within STEM fields.



That's where I come in. What can I do to help you?

(*) I can help you find the right connections. UNM has resources. First and foremost, getting involved with a student organization is a great way to connect with other STEM students. Other options are tutoring at CAPS, taking courses with Peer Learning Facilitators sponsored by STEM Gateway. Attending the AEON workshop series. Or joining other student organizations.

Remember

We all need People



- You could all potentially be someone's person.
- Make fast friends with those sitting around you!
- EVEN if it is for the semester!

Regardless of your background, regardless of your reason for sometimes feeling like an imposter. ----

You could have had the most supportive family in the world, the best friends etc. But if you have people in your life that understand the academic challenges you are going through specifically in relation to STEM it will make a world of difference to how you see your self and you can in turn really BELIEVE that you CAN do this.

(*) So I want to encourage you all to make connections, each day, each semester, each year to those around you with similar interests and goals in STEM, not only will it help you remember that impostor feelings are normal but it will help you realize your full potential

Its important to remember these feelings are normal and that everyone has probably has had them at some point.

we need support to overcome those feelings in order to reach our full potential.

WHY you continue on this difficult path will continue to evolve as your progress through your careers and meet different people.

Summary

Impostor feelings are normal



"I always feel so out of place in one of my engineering classes when I am the only girl and all the guys are talking about cars... I think what am I doing here?"

"I am afraid to ask my classmates for help because I just assume they know more and will not want to include me"

"I feel like I got into UNM as a fluke and that I never will feel like I belong"

In summary, it is normal to feel like you are in impostor. Some classic feelings are:

(*) (read quote)

(*) (read quote)

(*) (read quote)

Summary

- You can do small things to overcome impostor feelings
- STEM fields are challenging and you need to put in the hard work, but you shouldn't know it all right away
- **YOU ARE A STUDENT**
 - Do not be frightened by the unknown --- **BE CHALLENGED BY IT**
- **MAKE CONNECTIONS!**
 - resources
 - people
 - **Stay connected to your end goal**

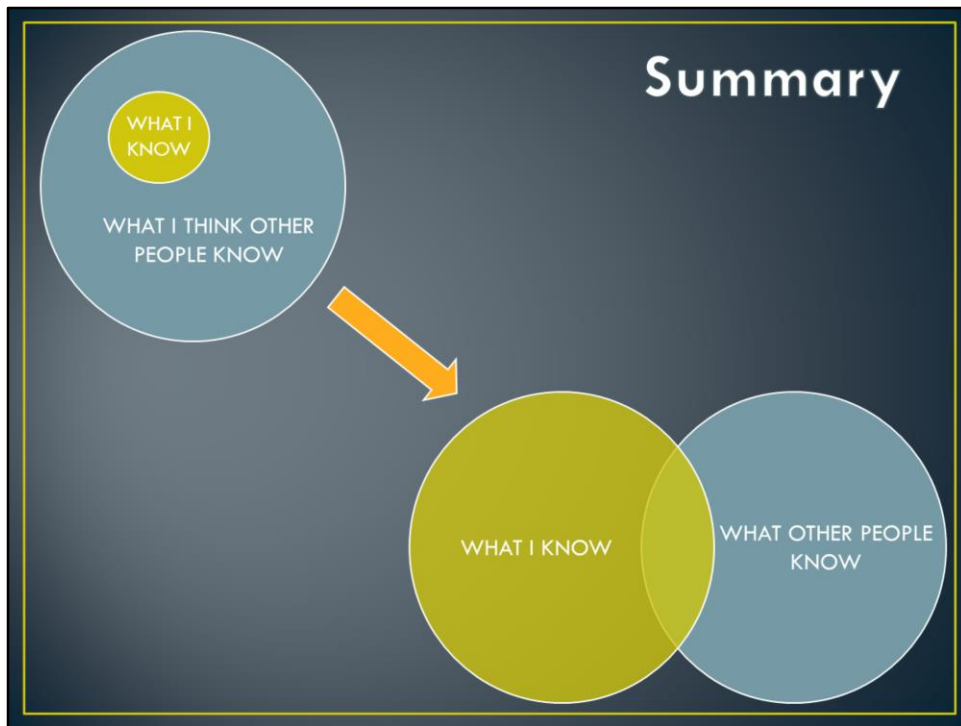


The important thing to remember is that you can get through it. Even small changes can help overcome these impostor feelings. STEM fields are not easy, but that doesn't mean you can't do it or shouldn't try.

We are all students, whether formally or not, learning is part of being human. I remember sitting in lab meeting while I got my PhD and thinking, "how do my fellow lab mates know so much?! I'll never compare". But, that gave me motivation to learn, and before I knew it, I was right there with them.

Making connections are also important. Seek out and utilize your resources, people, and connections.

(*) And, most importantly, **YOU ARE GOOD ENOUGH.**



Even if you think you know very little compared to other people
(*) You are probably being too hard on yourself, because the reality is most likely something like this.

BEFORE YOUR NEXT STRESSFUL LIFE EVENT



PRACTICE YOUR POSING

AND

YOUR BEST BARRY WHITE IMPRESSION



Before your next stressful life event, like a big test or an important job interview, a conference talk, or even just before you head into your next class, practice your posing and your best Barry White impression (play clip). You're finally prepared to make connections with those around you.....

Questions?



<http://unmstemgateway.blogspot.com/p/welcome.html>

Any Questions?