

## Women in Research

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From the Greek Mathematician Hypatia to Chemistry Nobel Prize winner Dr. Ada Yonath, women have made valuable contributions to Science for thousands of years. However, today some girls are held back by the gender stereotype that women are not good at science. To work to break the stereotype, we interviewed three women in research: Meagan Lyszczyk from Chemistry, Maddy Wang from Computing Science, and Yvonne Wong from Psychology. While they each come from different scientific disciplines, they are all splendid examples of women in research. We hope that these women's stories and advice can inspire and encourage more students to become involved in research, especially those young women who want to but are afraid to.

### MEAGAN LYSZCZYK UNDERGRADUATE STUDENT

**Education:** B.Sc. (University of Alberta)  
**Lab affiliation:** Dr. Alex Brown

*How did you become involved in research?*

Meagan became involved in research through her own initiative. She talked to other students about research opportunities available on the University of Alberta campus throughout the summer and made the decision to apply for the NSERC Undergraduate Student Research Awards (USRA) to find out through her own experience what the process of scientific investigation involves.

*What was your role in your lab?*

Throughout the summer of 2011, Meagan was the summer research student in Dr. Alex Brown's laboratory in the Department of Chemistry.

*What were you hoping to investigate in your research?*

The research Meagan conducted over the summer focussed on the photophysics of substituted benzofurazans. Benzofurazans are aromatic compounds whose fluorescence properties are strongly affected by substitutions at the 4, 5, and 7 positions. Substitutions are linked to changes in electron density and dipole moment and may improve fluorescence or lead to quenching. Specifically, she regarded two substituted benzofurazans: 4-azido-7-nitrobenzooxadiazole and 5-ethynylbenzooxadiazole. Her research aided in bringing about a theoretical understanding of how these fluorescent probes can efficiently be designed and in developing a unified model for the use of substituted benzofurazans in fluorescent bio-labelling strategies.

*What would you do on a typical day in the lab?*

On a typical day, Meagan would be responsible for composing scripts that were then run of specific software programs, which analyzed chemical structures. During her summer in the lab, she spent a significant amount of time regarding the excitation wavelengths of light that were given off by those compounds investigated.

*What is your favourite part of doing research? What is your least favourite part of doing research?*

Above all, Meagan enjoyed her experience in the lab. "It allowed me to learn what research truly entails". The experience allowed her to get a sense of the bigger picture in science: "as an [undergraduate science] student, it is easy to get caught up with assignments, exams, etc. and you forget that you are part of a larger community".

While Meagan enjoyed seeing what research entails, she acknowledged that regarding one narrow, specific topic is very tedious. Instead, in her future endeavours, she hopes to branch out more and "understand the bigger picture" involved in a particular area of study.

*In this area, what was most challenging for you? Have you ever had to overcome any challenges in the past related to your research career?*

"There is certainly a learning curve involved," Meagan explains. "[Learning] computer programming and script writing are all about [becoming more familiar with them] through experience". There is a specific language involved in the field of analytical chemistry, which can be quite challenging to those previously not exposed to it. She credits the help of the graduate students in Dr. Brown's lab with helping her through this learning processes and providing her any help needed in overcoming "writing glitches" and any other problems that she incurred.

*What do your future ambitions include?*

Meagan prioritizes finishing her current degree and cites that it is still too early to determine whether she would pursue graduate level work.

*What advice do you have for anyone who may be interested in pursuing similar opportunities?*

Never be fearful of new opportunities. "Go for it!" Meagan exclaims. She expresses that undergraduate research endeavours are all about the learning experiences that come along with them. "Try something even if you're not sure you never know. [Especially, use such opportunities] to learn more and find out if its what you'd like to pursue before committing to graduate studies".

*Is there anything else you believe our readers should know about becoming involved in doing research?*

"It is an amazing opportunity!" Meagan cites that most students do not know what research related opportunities are available to them and emphasizes to spend some time getting familiar with what's out there. "Many people in their undergraduate [studies] don't take advantage of such experiences and they most definitely should".

### MADDY WANG GRADUATE STUDENT

**Education:** Ph.D. (University of Alberta), M.Eng. (University of Regina)

**Lab affiliation:** Dr. Hong Zhang



*How did you become involved in research?*

Maddy has a background in Engineering; she has always been interested in machine learning. She came to Canada to pursue further in her studies first at University of Regina and then here at University of Alberta

*What was your role in your lab?*

Maddy is currently a Ph.D. candidate in the Zhang lab. She is working very hard to finish her dissertation, but she is also actively training the junior members of the lab

*What were you hoping to investigate in your research?*

Maddy's research focus on computer vision, a form of machine learning that specialized for image processing and object recognition. She pointed out that how human perform object recognition is very different from how a computer could do it. She wants to figure out a solution for computer vision to perform object recognition that is accurate and efficient.

*What would you do on a typical day in the lab?*

Maddy said a typical day of computing science Ph.D. student can be different depends on where you are in your studies. The first 2 years will have many course works where you can learn in a class setting. This sets the foundations for your research, main while you will

also read many research papers to learn the research background. The later years, which is Maddy at now, she describes that she spends majority of her time on computer alone with some interaction her colleagues.

*What is your favourite part of doing research? What is your least favourite part of doing research?*

Maddy most enjoys the exploration aspect of research, generating new ideas and finding solutions. Often a question will have multiple solutions, it is never as simple as  $1 + 1 = 2$ . Maddy finds the possibilities of various solutions very exciting. However, the uncertainty of implementing an idea can be frustration as well. Sometimes what you thought could be the solution to the problem is actually not working; it might take a month or even a year to figure out what the issue was.

*In this area, what was most challenging for you? Have you ever had to overcome any challenges in the past related to your research career?*

Finding the suitable research direction has been the biggest challenge in Maddy's research life. Maddy said Ph.D. can be a very short time where you can be lost in finding your topic. Maddy used her interests to guide her in selecting a research topic, she followed her heart and found a topic that fits her interest and skill sets.

*What do your future ambitions include?*

Since Maddy's research focus is computer vision, she really wants to apply the research to solve real life problem. For example, computer vision software can help physicians detect abnormalities in patient's brain imaging scans. She hopes she will be at a position to bridge the gap between research and industry.

*What advice do you have for anyone who may be interested in pursuing similar opportunities?*

It's all about passion. Maddy believes it is very important to find something you really like doing, once you find it you are more motivated to pursue further. Maddy also advises that research is a long process, so don't be discouraged when things don't work out, it will all be worth it in the end.

*Is there anything else you believe our readers should know about becoming involved in doing research?*

Never give up, stay focused, and be dedicated: those are the keys qualities to have when you are involved in research.

### YVONNE WONG POSTDOCTORAL RESEARCH FELLOW

**Education:** Ph.D. (University of Western Ontario), M.Sc. (University of Lethbridge)

**Lab affiliation:** Dr. Anthony Singhal

*How did you become involved in research?*

Yvonne Wong became involved in research "through chance". After completing her undergraduate degree,

she worked at a call centre where she was introduced to Dr. Ian Whishaw, a professor at the University of Lethbridge, who recruited her to complete a M.Sc. under his supervision. Upon its completion, Yvonne pursued a Ph.D. at the University of Western Ontario.

*What is your role in the lab?*

Yvonne is currently a post-doctoral associate and lab manager of the Singhal lab. As well, she manages a joint electroencephalogram (EEG) laboratory in the Department of Psychology. Her work is carried out in collaboration with both Drs. Singhal and Varnhagen.

*What are you hoping to investigate in your research?*

The main focus of Yvonne's research is to use EEG and fMRI (functional magnetic resonance imaging) methods to examine the neural correlates of human attention and actions. Through the use of simultaneously recording EEG and fMRI, the Singhal lab examines the neural circuitry of emotion-attention interactions during various tasks. The work of the lab also uses EEG to investigate the relationship between haptics, vision, and audition on attention to stimuli in peripersonal and extrapersonal space.

*What do you do on a typical day in the lab?*

On a typical day, Yvonne plays an integral role in assisting with data analysis as well as being primarily responsible for maintaining several laboratories' equipment in the Department of Psychology.

*What is your favourite part of doing research? What is your least favourite part of doing research?*

Being "Sherlock Holmes" is what Yvonne enjoys most about completing research; she finds the inquisitive process incredibly fulfilling. Particularly, Yvonne enjoys reviewing past data: "I enjoy looking at data from previous experiments and finding new methodologies to make sense of research questions that remain unanswered". She finds this to be most exciting when new results that are obtained are supported by the work of individuals who have worked on similar projects in the past.

But, Yvonne acknowledges that the "stress of publishing" is not always agreeable and that there is a significant amount of pressure: "in the scientific world, it sometimes seems that you need to continually publish in order to remain competitive".

*In this area, what is most challenging for you? Have you ever had to overcome any challenges in the past related to your research career?*

Time is always a challenge! In order to be successful in this field, Yvonne describes that you need to be efficient. Keeping up with current working being done in your area is essential but time consuming and there "is always heavy competition within the research world".

*What do your future ambitions include?*

In the future, Yvonne hopes to primarily focus on teaching while continuing to conduct research in her spare time. Through teaching, she hopes to inspire young people who are interested in science-related fields to pursue a career in research. "If we teach young people good scientific techniques early [in their careers], it is possible to leave a successful research legacy".

*What advice do you have for anyone who may be interested in pursuing similar opportunities?*

To be successful in a research career, Yvonne advises that you need to "find the question that inspires you!" She strongly emphasizes that without a passion for the subject and the task at hand, it is difficult to dedicate your time to research - something that is greatly required to pursue such endeavours. Furthermore, Yvonne suggests making sure to "find a supervisor that you are able to work well with" as this will be the principle person who will guide you along in your academic path.

*Is there anything else you believe our readers should know about becoming involved in research?*

Yvonne emphasizes that research is filled with its challenges and struggles and you truly need to love what you do if you're going to make it. Passion is essential for success in this field and over the years she's come to appreciate that "if you wouldn't be willing to do it for free then don't do it at all".

