

# TEACHING STATEMENT

Mariana Smit Vega Garcia (marianag@uw.edu)

My teaching experience includes teaching for a wide variety of students (Business, Liberal Arts, Science and Engineering majors) and a wide variety of courses (from Pre-Calculus to Multivariable Calculus). My responsibilities included making lesson plans, being the sole lecturer responsible for a class, writing and grading quizzes, creating curved exams and setting the curve after grading. Overall, I have excelled in my teaching duties, as evidenced by my positive teaching evaluations, comments from my students (some of which are included in the end of this document, along with a chart giving more details on my evaluations) and teaching awards. More specifically, the average of my teaching evaluations in each of the following categories is above 4.5 out of 5: the students' overall rating of me as an instructor, how well-prepared and organized I was in class, how clear and helpful my explanations were and how much I helped them understand the material. I have also received two teaching awards, the Excellence in Teaching Award from the Department of Mathematics, and the CETA (Committee for the Education of Teaching Assistants) Teaching Award from Purdue University. Moreover, in the fall of 2011 I was honored to accept an invitation to assist in the Orientation Week for new TAs in the Department of Mathematics, where I was a screener of new TAs and a session leader, positions given to a select group of experienced teaching assistants who have demonstrated excellence in teaching.

Much of my success in teaching comes from building a mutual trust between the students and myself. Having a relationship with them based on trust helps my students feel comfortable to make mistakes, which then allows me to see where they need extra help. For example, one of my business calculus students got so upset over a quiz score that as soon as the class was over he threw his paper away, in front of me. After I sent him an e-mail explaining his score and stressing that I was available to talk and help him, his attitude towards my class changed completely: while before he never participated in class, he subsequently started to ask questions and even volunteered to come to the blackboard. This episode illustrates two of my main beliefs about teaching: that investing time in students is necessary for many students' success and that the student-teacher relationship should be one of trust. One of the most important things that drives me as a teacher is that I truly care about my students and my commitment shows them that we have a partnership together working towards developing their full potential.

While my immediate goal in the classroom is to hone my students' understanding of the topic of the day, ultimately other nuanced skills are constantly under development, and I strive to help my students with them as well. Most notably, the ability to formulate and articulate a logical thinking process is paramount in any profession, for students of any major, and is consistently demanded in Mathematics, as is the ability to communicate one's ideas precisely, be it in an exam, while justifying computations, or in a work project where one needs to work with colleagues and explain one's point of view.

To achieve these goals I try to go the extra mile to make sure my students have every chance of growing: in my own experience as a student, if a professor is not fully committed to his class, the class also feels that they do not have to fully commit. With this in mind, I try to be very organized for every class. More specifically, my lesson plans include when and how to ask for the students' participation in such a way that they are all encouraged to participate without being singled out, and I also work in advance on time management, including extra problems in case I have more time at the end of class.

Another tool I use to plan my classes is to write not only a daily class plan, but also general goals for the material that needs to be covered during the upcoming weeks. This gives me a clearer idea of which topics might need to be reviewed prior to teaching a new topic, allowing me to plan the course better. Following the cultural and educational requirements of my courses at Purdue University, usually my classes were structured in the following way: during the first 15 minutes I helped the students with their homework - I asked which problems they had questions about and I answered them in an order determined by their popularity. Next I introduced new material while giving examples and problems for the students to work on their own. I always tried to provide as many opportunities as possible for them to participate, as their feedback not only helped me assess which topics needed to be explained in a different way, but also helped me see where each student needed more help. In the last 15 minutes of the lectures I frequently gave my students a short quiz covering the concepts taught during that lecture, which also served the purpose of giving them feedback about their understanding of that material.

Regarding students' participation and feedback, helping them feel comfortable sharing their thoughts makes class much more productive, so I am persistent in coaxing out of them any questions they might have. One technique that I often use to encourage my students to share their questions and build their confidence to participate more, which they have consistently told me they enjoy, is to let them work on problems by themselves while I walk around checking their work and helping them. This gives them a chance to try their hands on the tools I have just taught them and gives me the opportunity to see what they are doing and help them individually. This can be particularly helpful in the beginning, when they might not feel so comfortable sharing a question with the whole class. While this has to be adapted to a larger classroom, I believe it is still worth taking the time to let students work on their own and strive to give them individual feedback, even if there is no time to check each student's work. Other methods that I use are asking a question to students sitting in different areas of the classroom, for instance "Can someone from the last row tell me what is...?", which can be useful when only a few students tend to answer every question, and also taking a few seconds' pause during class to look at the students, which gives them a moment to ask questions.

Another method I use is to send the students "test yourself" e-mails with short review problems, which helps them prepare for their exams. Moreover, I find that tailoring applications of Mathematical concepts to the audience has positive effects on students, as it motivates an understanding of the underlying theory with concrete examples which illustrates to the students how that material has real applications pertinent to them.

With respect to evaluating my students, writing and grading exams has helped me see which teaching methods were effective and where I can improve. Grading an exam is, for me, not only a culmination of your work as a lecturer, but an opportunity to reflect on how you conducted class, which questions were not completely answered and if focus should have been put on different topics.

Being a latina Mathematician also helped me be aware of some of the challenges that underrepresented populations face in pursuing a career in Mathematics, and in life in general. Many of my female friends in the Mathematics Department had to overcome some form of disapproval from their family, friends or the society they lived in to become a PhD student in Mathematics. Furthermore, coming from a developing country, I lived the reality of facing everyday challenges to be able to get a good education; many of my colleagues in Brazil were the first in their families to get a college diploma,

and sometimes the first to get a high school diploma. This has helped me be more sensitive to how prior knowledge, culture and background might change a student's experience in the classroom. Balancing a lecture with different students involves being able to identify what level and pace is more appropriate for the majority of the students in that class, but also finding ways to help the students which might lack some of the background required to fully understand a certain topic, and ways to engage the students which might already have learned that material beforehand, or which need less time going over it. To achieve this I take the time providing individual feedback whenever necessary: I suggest extra problems to students who are struggling more, schedule extra hours to work with them and send solutions and help by email when they cannot meet me in person. I have also received positive feedback regarding challenging problems given as a bonus that have kept the students engaged.

All in all, I have strove to give teaching my best and show my students how invested I am in their success, as I believe showing them how committed one is to work with them in the classroom is an extremely powerful motivator to help them learn. Many of the comments my students wrote in anonymous evaluations have showed me that this approach seems to bear great results, besides fostering a pleasant work environment. Establishing learning partnerships with my students has been one of the most wonderful experiences I have had. I truly enjoy Mathematics and I see teaching it as an opportunity to make a difference in my students' learning journey and shape their perception of Mathematics as a vehicle to develop critical thinking and communication skills which can serve anyone regardless of their major, an opportunity which I relish.

### **Future development of teaching**

Starting as a teaching assistant giving recitations twice a week - only helping with homework - I went on to teach my own classes where I was the sole lecturer responsible for that class, determining the daily class plans, writing and grading exams and quizzes. Several teaching workshops offered at Purdue University were instrumental to develop my teaching skills and methods, covering a wide range of topics, from how to write exams and organize a lesson plan to dealing with problems in the classroom. During my Post-doc in Germany my position did not include teaching, which has showed me I miss the interaction with the students and the opportunity to be a part of their learning journey. While I deeply cherish the opportunity to further develop my research, teaching is a wonderful part of being a Mathematician and I will be thrilled to take a position which also involves teaching.

Regarding my future plans, I have not yet had the opportunity to teach higher level classes or advise students, working together on projects related and unrelated to my research, guiding them into the world of research. I am very much looking forward to the challenges of doing so: teaching more advanced Mathematics while making it enjoyable and challenging at the right level, lecturing with enough detail without making classes overly technical, hopefully bringing some of the love and joy we felt when we first learned Mathematics to the next generations. For this I plan to adjust my teaching to the needs of the courses I teach, while always being open to learning new methods, attending teaching courses/workshops, getting feedback from the students and being flexible to change according to it. I am also extremely passionate about participating in the development of researchers, helping them in the beginning of their careers with topics of research, giving them encouragement and guidance. I have already had some experience with this while organizing the student colloquium, which was a venue for students to improve their speaking abilities and expose others to new perspectives, and while mentoring incoming graduate students at Purdue University as part of the AWMentor program created by the Purdue student Chapter of AWM.

My experiences as both a student and an instructor have made me realize that teaching ought to be more than a one-way process where the instructor teaches and the students learn. Overall, I have been very successful, but the process of me learning from my students is far from finished and I look forward to continuing this journey.

## Teaching experience

Below is a more detailed description of my teaching experience. While being an Instructor I was the sole lecturer responsible for the class; while being a Recitation Instructor I helped the students with their homework, wrote and graded quizzes, answered questions about the content covered in the lectures, held office hours and proctored exams.

### Courses Taught

Semester	Position	Course Number	Course title	Meetings per week	Number of students
Fall 2009	Recitation Instructor	MA26100	Multivariate Calculus	1	69 (2 sections combined)
Spring 2010	Recitation Instructor	MA16200	Plane Analytic Geometry And Calculus II	2	68 (2 sections combined)
Fall 2010	Instructor	MA15300	Algebra and Trigonometry I	3	75 (2 sections combined)
Spring 2011	Instructor	MA22400	Introductory Analysis II	3	57 (2 sections combined)

In the Fall of 2013 I substituted as the recitation instructor of MA26100 - third Calculus class for engineers.

In the Spring 2013 I substituted for other TAs in the following courses:

- MA22300, instructor for a first Calculus course for management students,
- MA26600, instructor for a Differential Equations course for engineers,
- MA26200, recitation instructor for a Linear Algebra and Differential Equations course for engineers.

### Course Responsibilities

Responsibility	Course
Proctor exams	MA26100, MA16200, MA15300, MA22400
Hold 2 office hours per week	MA26100, MA16200, MA15300, MA22400
Help with homework	MA26100, MA16200, MA15300, MA22400
Write and grade quizzes	MA26100, MA16200, MA15300, MA22400
Teach new material	MA15300, MA22400
Write and grade 2 midterms	MA22400

## Teaching awards

- Committee for the Education of Teaching Assistants teaching award, 2012, Purdue University.
- Purdue University Math Department Excellence in Teaching award for 2011-12.

## Students Evaluations (from the Purdue Instructor Course Evaluation System)

All the courses I taught had two anonymous, online course evaluations which the students could fill out, one in the middle of the semester, one after the lectures were over. All grades are group medians out of 5 of each of my sections.

Course	(1)	(2)	(3a)	(3b)
MA26100	4.3, 4.5	4.4, 4.6	4.2, 4.3	N/A
MA16200	4.8, 5.0	4.8, 4.9	4.7, 4.9	N/A
MA15300	4.4, 4.8	4.8, 4.9	N/A	4.7, 4.8
MA22400	4.6, 4.7	4.9, 4.9	N/A	4.8, 4.8

- (1) Overall, I rate this instructor as:  
 (2) My instructor was well-prepared and organized in class:  
 (3a) My Recitation Instructor helped me understand the material:  
 (3b) My instructor gave clear and helpful explanations:

## Teaching aid production and development

I wrote and graded quizzes for the following courses: MA26100, MA16200, MA15300, MA22400 (all the courses I taught), and I wrote, graded and curved 2 midterm exams for the course MA22400 (Introductory Analysis II, second Calculus course for management students). Furthermore, the development of sets of practice problems for the students to study, besides a collection of short ‘test yourself’ problems which I sent by email on a weekly basis, has also helped me reflect on what difficulties the students might have, and how to further help them.

## Administration and management of education

In 2011 I was honored to accept an invitation to assist in the Orientation Week for new teaching assistants in the Department of Mathematics at Purdue University, which is a position given to a select group of experienced teaching assistants who have demonstrated excellence in teaching. After going through that orientation week myself two years before, it was extremely enriching to experience it from the other side, helping evaluate which courses the new teaching assistants were ready to teach, giving them feedback and suggestions on how to improve their teaching skills, and also sharing my experiences while leading a training session. Participating in the evaluation and training of new teaching assistants has been a very interesting experience which has also helped me improve my own teaching and learn about teaching education.

## Teaching of general skills

Learning Mathematics is a great opportunity to further develop studying techniques with the students. Practices such as sending them a short ‘test yourself’ problem every week to recall what was taught, as well as stimulating them to organize groups to work on their homework together and discuss their

difficulties, were very well received and seemed to benefit the students. Moreover, I provided several opportunities for the students to work in pairs and small groups, honing their teamwork abilities, and encouraged and helped them use Mathematical softwares such as Matlab.

Finally, learning to express one's reasoning in a Mathematically logical way, with one step after the other, is a very useful skill in life, and I tried to always give constructive comments on their quizzes and exams on how to improve this skill.

### **Education and outreach presentations**

In 2012 I was interviewed for the cover story "Many Perspectives One Vision" of the Insights magazine, published by the College of Science of Purdue University. A copy of the article, addressing how diversity can enrich the Sciences, bringing people from different backgrounds and cultures together, as well as reaching out to the general public and showing how people from all walks of life can become scientists, can be found at [http://www.science.purdue.edu/insights/docs/pdfs/cos-12-2592\\_insights-fall2012.pdf](http://www.science.purdue.edu/insights/docs/pdfs/cos-12-2592_insights-fall2012.pdf)

Furthermore, I was one of the founding members and vice-president of the Purdue Chapter of the Association for Women in Mathematics (from Fall 2011 Summer 2012). Our experience and how the Chapter positively impacted the Department was published as an article in 2012 in the AWM Newsletter and can be found at <http://www.drivehq.com/folder/p8755087/11725389501.aspx>.

### **Electronic teaching**

During my years as a graduate student I had the opportunity to participate in the development of online teaching material. In the Summer and Fall of 2013 I acted as a Blackboard facilitator at Purdue University. In this role I helped to integrate the online homework system used by the Mathematics Department (in this case, Webassign) with the online system used by Purdue University to store students' grades (Blackboard).

Furthermore, I participated in the innovative project called IMPACT, which aims at developing student-centered teaching and learning environments, when I had the opportunity to develop and work on tools used for online learning, as well as technological tools available to develop student-centered courses.

Moreover, my students at Purdue University were required to use online homework systems, which gave me the opportunity to learn about their benefits and limitations. The platforms used for the courses I taught were Webassign and Mathzone.

**Feedback from my students (from the Purdue Instructor Course Evaluation System)**

MA22400 (second Calculus class for business students, I was their instructor):

- Mariana was extremely helpful and knowledgeable in the subject area. She knows how students learn and what to do to help them understand. Her explanations are thorough and she answers questions so that they make sense.
- I liked that you go around and make sure that we know what we are doing and take the time to explain it to us individually if we need help.
- Mariana is adamant about making sure that students understand the material. She always expects questions to be asked and is open to questions and when asked, she conjures up a great and informative response. Overall, she is very involved with her students as she expects in-class participation through the forms of student response and in-class problems. Her prowess in Calculus has greatly facilitated my learning and allowed me to gain an overall better than average understanding of the subject.

MA15300 (first Algebra and Trigonometry class for liberal arts students, I was their instructor):

- She is awesome, one of the best math teachers that I have ever had. Helpful, explains things well, and has a sense of humor which brings life to class. Please keep her around!
- Mariana gives great examples in class that help us later on for the homework. She is very friendly, always available, very approachable and likeable. She strongly encourages us to go to the math help room and is always open to speak with students. She has been a great instructor and I have enjoyed having her.
- I thoroughly enjoyed my instructor. She seemed very concerned that the whole class grasped each concept thoroughly, and she encouraged the class to ask many questions. This helped make the course more manageable and beneficial. Thanks.

MA16200 (second Calculus class for engineers, I was their recitation instructor):

- Wonderful instructor. She was very helpful, always willing to answer questions, and knew the material. She was prepared and had extra questions ready if we didn't have any. She kept the class moving, was easy to understand, and explained things clearly.
- You are so helpful! It was great that you understood the material that you had to help us learn and you had more knowledge about the subject than the basics that we were learning in class. So you were able to give us well thought out explanations for why problems' solutions were what they were. You are a very good teacher. :)
- Good explanations, step by step, very helpful to students, very aware of what needs to be focused on and what needs explanations. Very good!

MA26100 (third Calculus class for engineers, I was their recitation instructor):

- Mariana was very helpful in explaining homework problems and answering questions about the class. She always knew how to work out the problem and did so in a clear manner.
- Mariana Smit Vega Garcia is easily the best teaching assistant I have had then entire time I've been at Purdue. She does a great job preparing us for exams and teaching the material.
- She's very respectful, organized and helpful. She maintains an upbeat environment in the classroom and keeps me engaged.