University of Utah Teaching Assistantship: A Critical History of Mathematics: Redefining What Is and Who Does Mathematics

January 2020

A. Summary

Department:

Mathematics

TA Assignments:

Fall 2015: Lab Assistant, Differential Equations and Linear Algebra (MATH 2250)
Spring 2016: Lab Assistant, Differential Equations and Linear Alebra (MATH 2250)
Fall 2016: Instructor, Business Calculus (MATH 1100)
Spring 2017: Instructor, Business Calculus (MATH 1100)
Summer 2017: Teaching Assistant, Mathematics Program for High School Students
Fall 2017: Instructor, Calculus II (MATH 1220)
Spring 2018: Instructor, Business Algebra (MATH 1090)
Summer 2018: Teaching Assistant, Mathematics Program for High School Students
Summer 2018: Instructor, School of Business Bridge Program
Spring 2019: Lab Assistant, Engineering Calculus I (MATH 1310)
Summer 2019: Instructor, Discrete Mathematics (MATH 2200)
Summer 2019: Teaching Assistant, Pre-REU Program
Summer 2019: Co-facilitator, Instructor Training
Fall 2019 and Spring 2020: University Teaching Assistantship: Building an Inclusive Math Learning Environment to Support Student Retention in STEM

Teaching Mentor:

Amanda Cangelosi (cangelos@math.utah.edu)

Nominee:

Allechar Serrano López (serrano@math.utah.edu, u1012921)

B. Proposal Narrative

Title: A Critical History of Mathematics: Redefining What Is and Who Does Mathematics

UTA Assignment:

There are few instances in which mathematicians encounter the humanities as part of their technical training. A typical undergraduate plan of study is filled with calculus, algebra, and differential equations. In addition to these essentials, many institutions offer a history of mathematics course. Mathematicians agree that studying the history of mathematics is something worthwhile and that it will make us better mathematicians. At the University of Utah, MATH 3010 *Topics in the History of Mathematics* is described as "a brief look at the history of mathematics, focusing on the principal ideas of importance in the development of the subject." This description provides freedom for the lecturer to decide which ideas will be studied during the semester. Yet, a course on the history of mathematics is traditionally restricted to what we consider to be classic. We tend to believe that it suffices to study proofs from Euclid's *Elements* and Gauss' *Disquisitiones Arithmeticae*. Reading these is the equivalent, for a mathematician, of reading *The Ingenious Gentleman Don Quixote of La Mancha* for a native Spanish speaker.

What we consider essential depends on our individual preference, but our perspective of the world heavily influences it. This leads inevitably to a bias of representation favoring certain cultures over others in the history of mathematics. Mathematics is presented as a European creation; its history is deeply connected to the view of mathematics as a superior intellectual activity. This idea of what is mathematics is far from "one size fits most," and it inadvertently restricts who gets to do and study mathematics. Mathematical traditions outside of Europe tend to not fit this mold and, consequently, have been largely dismissed from the history of mathematics. Our students go through a history of math class and continue to be unable to articulate the contributions of Native Americans to the field. More than thirty-five years ago, Gabriel García Márquez touched the subject of Eurocentrism in his Nobel Lecture. *The Solitude of Latin America* was not talking about mathematics, but it might as well have been:

> "And if these difficulties, whose essence we share, hinder us, it is understandable that the rational talents of this side of the world, exalted in the contemplation of their own cultures, should have found themselves without valid means to interpret us. It is only natural that they insist on measuring us with the yardstick that they use for themselves, forgetting that the ravages of life are not the same for all, and that the quest of our own identity is just as arduous and bloody for us as it was for them. The interpretation of our own reality through patterns not our own, serves only to make us ever more unknown, ever less free, ever more solitary. Venerable Europe would perhaps be more perceptive if it tried to see us in its own past. If only it recalled that London took three hundred years to build its first city wall and three hundred years more to acquire a bishop; that Rome labored in a gloom of uncertainty for twenty centuries... "

This UTA proposal builds upon my previous UTA award to work towards inclusion and diversity. It encompasses the design of MATH 3010 *Topics in History of Mathematics* as a culturally-aware course that discusses the contributions of non-European groups to mathematics. My responsibilities as UTA will consist of preparing the course content for MATH 3010 during Fall 2020 and teaching this course as the instructor of record during Spring 2021.

For Fall 2020, some of my responsibilities as UTA will be to:

- Define course goals and learning objectives that address how should taking this version of MATH

3010 will enrich students' skill set and mindset, and how the course fits in their undergraduate program of study.

- Determine course content by selecting which topics will be covered and which source materials will be used.
- Develop teaching methods and tools that are inclusive and tailor to the students' needs.
- Determine appropriate assessments to evaluate student learning by designing final projects and writing exercises.
- Define course policies, timeline, and syllabus.
- Design course and assessment feedback.

During Spring 2021, my responsibilities will correspond to all the ones that are encompassed as the instructor of record for MATH 3010 which include lecturing, holding office hours, and grading assessments.

Historically, the responsibility of teaching MATH 3010 has fallen upon tenure-track faculty members. This UTA proposal will provide a graduate student with the opportunity to teach an upper-level class with a non-traditional curriculum. This teaching assignment entails more responsibilities than the ones associated with usual teaching loads for graduate students. The UTA will be working on developing the curriculum, which requires research in ethnomathematics and the contributions of small-scale cultures. To represent non-Eurocentric cultures accurately and respectfully, the UTA will spend a semester finding primary sources and developing lesson plans since this cannot be achieved within the timeframe of a traditional teaching load.

The UTA has been successful in a previous attempt at discussing the contributions of underrepresented groups to mathematics. As part of her Discrete Mathematics course, the UTA incorporated a group project that encompassed a written report and in-class presentation regarding the contributions of a mathematician from an underrepresented group to the field. Students were also required to write a reflection after all in-class presentations; some of the students' comments were:

- I went into the paper and presentation skeptical, because such assignments are generally reserved for classes in the humanities and similar disciplines. However, I thought it ended up being quite productive, in a number of different ways:
  - connect with other classmates (students rarely interact with their peers)
  - variety of paths in mathematics and variety of subjects
  - examine conditions of underrepresented minorities in all fields, but especially in one as homogeneous as mathematics. As a discipline, math seems less self-critical than many others. So, it is up to those practicing and learning about math to be leaders in doing so.
- The presentations gave me sort of a glimpse into the greater math world and the people that make up the field. Individualizing math was useful for me because it humanizes the subject and makes it seem more approachable.

The impressions above illustrate the importance of this UTA proposal as a means of providing a much-needed venue a for a new approach to the history of mathematics.

Interaction with Undergraduates:

The course MATH 3010 *Topics in the History of Mathematics* is offered to undergraduates every semester and is currently open to forty students. The group of students historically enrolled in the course

consists mostly of mathematics undergraduates and undergraduates in math education. This UTA proposal impacts these students directly; however, the material and curriculum developed will be available for instructors in the Department of Mathematics and any student through the UTA's departmental webpage.

By redesigning MATH 3010 and including culturally-aware content, undergraduate students will explore mathematical ideas from traditionally underrepresented cultures in mathematics. This course will provide a better understanding of how the Greeks and other European groups built upon the knowledge of others to create what we call modern mathematics. The students will also draw from history to understand the current situation of mathematics in terms of underrepresentation. This will provide the students with information that will be useful in their future instruction. A critical history course will provide future benefits when the undergraduates enrolled in the course design their courses and incorporate this knowledge, which will benefit students from underrepresented groups greatly.

Mentor:

Amanda Cangelosi is a career-line faculty member of the Department of Mathematics. She earned a B.S. in Math Education and a M.S. in Statistics from Utah State University, and a post-baccalaureate in mathematics from Smith College. She taught secondary mathematics for ten years. Amanda has served as a university supervisor to math teaching majors during their student teaching assignments in local secondary schools and as the liaison between the Department of Mathematics, College of Education, Utah State Board of Education, and the Center for Science and Mathematics Education.

The mentor will oversee the development of the curriculum and assessments for MATH 3010. She will provide guidance to the UTA in what entails to set up a course for the first time since she is a more experienced instructor. She will also be asked to make teaching observations and provide feedback to the UTA throughout Spring 2021.

The UTA:

Allechar Serrano López is a fifth-year graduate student in the Department of Mathematics. She has taught several courses at the University of Utah and participated in multiple outreach projects. Allechar is committed to the promotion of underrepresented groups in mathematics and STEM. As an officer for the student chapter of the Association for Women in Mathematics (AWM), she serves as Outreach Chair, Speaker Series co-Chair, and conference co-organizer. The AWM Speaker Series brings mathematicians from underrepresented groups to the University of Utah to share their research and their path through mathematics. The conference is organized with the RTG group, and it is aimed at underrepresented groups in mathematics, all speakers are women and people of color. As SACNAS Scholar, Allechar participated in a national conference and graduate school fair to recruit future graduate students.

Allechar is also committed to the dissemination of mathematics to younger generations. She has participated as a teaching assistant in departmental programs such as the Summer Mathematics Program for High School Students for two summers, the pre-REU program for undergraduates for one summer, and the Math Circle last year. She also coordinated two math workshops for the Defining Your Path Program during Fall 2019 and co-organized visits to secondary schools in Fall 2018, reaching nearly five hundred students. Currently, she facilitates a reading group for undergraduate students interested in number theory, which meets weekly.

Allechar worked on a proposal for bilingual tutoring at the Math Center. This initiative was able to provide tutoring in Mandarin, Japanese, Russian, Spanish, and Korean to foster a sense of belonging for students of different backgrounds and countries. She has also served as a mentor for two female undergraduate students through AWM and for a first-year graduate student through GSAC. She supervised another female undergraduate student on her final graduation project.

Allechar has participated in various panel discussions regarding life as a graduate student, experiences as a woman in STEM, and teaching as an international student. She has served as Academic co-Chair for the University of Utah Chapter of Latinos in Action since Fall 2016. Allechar has also organized weekly seminars for graduate students in algebraic geometry and number theory. During Summer 2019, she was a co-facilitator for the Instructor Training for incoming graduate students and postdocs. During the academic year 2019-2020, Allechar has been working on her UTA award, *Building an Inclusive Math Learning Environment to Support Student Retention in STEM*. She has given talks and co-organized workshops for the Math Education Seminar and Instructor Training.

Prior Support: The Department of Mathematics has received UTA support during the last three years. During the academic year 2017-18, Anna Romanova received support to teach special topics course on Representation Theory course and Sean McAffee received support for the Graduate Teacher Mentor (GTM) program. Sean tracked student-instructor interactions and provided feedback to mentees. During the academic year 2018-19, Anna Nelson and Rebecca Terry were awarded UTA support to continue the GTM program. Anna and Rebecca collected information about grades and instructor feedback to measure the impact of the program. During the academic year 2019-20, Allechar Serrano López was awarded UTA support for her project *Building an Inclusive Math Learning Environment to Support Student Retention in STEM*. Allechar has collected information regarding participation in teaching workshops to measure the impact of her project.

Assessment Plan:

The success of the proposed course will be evaluated through several methods. Students enrolled in the course will provide regular feedback about the content, assessments, structure of the course, and the evolution of their mindset regarding who owns mathematics. This feedback will be collected throughout the semester to make adjustments throughout the term. The materials developed for the course will be evaluated through consultation with the Center for Teaching and Learning Excellence (CTLE).

I will design pre- and post-course surveys to determine what knowledge was gained by enrollment in the course. Throughout the term, I will request teaching observations and feedback from experienced instructors in the Department of Mathematics and through the CTLE.

Assessment of Previous UTA Award:

Last academic year, Allechar Serrano López was awarded a University Teaching Assistantship to work on her project *Building an Inclusive Math Learning Environment to Support Student Retention in STEM*. For this project, there has been a total of six workshops and seminar talks that the UTA has organized or facilitated. In August 2019, incoming graduate students and postdocs in the Department of Mathematics participated in Instructor Training, which consists of ten days. For this training, the UTA facilitated a workshop called *Social Justice in the Classroom*.

During Fall 2019, the UTA helped with the organization of four workshops for the Math Education/Teaching Seminar. After talking to some faculty members, it was mentioned multiple times that time constraints are a reason why they do not attend some of the workshops. Taking these observations into account, the UTA decided to help organize some of the workshops collaborating with Kelly MacArthur and Claudia DeGrandi with the hope that members of the Department of Mathematics would not have to choose between attending either the seminar or the UTA's workshop. For these workshops, the UTA attended organizational meetings to discuss the content and structure of each workshop. This decision was the most beneficial because the workshops were mandatory for graduate teaching assistants in the Department of Physics. During this term, there were four workshops, namely:

- *How to Connect with Your Students* on September 6th, 2019. In this workshop, the UTA provided information about the importance of building a meaningful relationship with the students and inclusive teaching practices.

- *Facilitating Effective Group Work* on September 27th, 2019. In this workshop, the students discussed different scenarios that might occur when facilitating group work.
- *Bias and Micro-Aggression Workshop* on October 25th, 2019. This workshop was facilitated by staff from the Office of Inclusive Excellence.
- *Snippets of Excellent Teaching* on November 22nd, 2019. During this workshop, the UTA discussed teaching techniques that she has employed and how they benefited her students.

The UTA has also facilitated a workshop titled *Inclusive Teaching: a Living Oxymoron Point of View* on October 18th, 2019. She discussed her experiences as a student and as an instructor. The main goal was to show participants that it is crucial to know how our identity affects how we teach but how it can also help us relate to our students. The topics discussed in the seminar included race, socioeconomic background, immigration status, educational level, and more. The UTA has planned another workshop on February 14th, 2020 in which she will discuss how to incorporate cultural aspects to the math classroom.

Another important goal of the UTA's project was increasing the visibility of underrepresented groups in mathematics. To do so, the UTA discussed with the Association for Women in Mathematics (AWM) several ideas. The result of these discussions was a shift in monthly social events. The AWM holds a monthly social for members of the Department of Mathematics in which they gathered to share snacks and solve logic puzzles. With the help of the UTA, these events have been transformed into a social and educational experience. For example, the October Social consisted of the celebration of National Hispanic Heritage Month and LGBT History Month. During the social, the UTA answered questions regarding her experience as a Latin American and the history of Latin America. The activities of the event included graduate students explaining the different meanings of the Pride flags. The UTA has also prepared a resource to showcase mathematicians from underrepresented groups and information about each celebration. The resource consists of three parts:

- Information about the specific observance month and frequently asked questions.
- Resources on campus that can help someone belonging to the underrepresented group such as scholarships, services, and student groups.
- Blurbs about mathematicians who belong to the underrepresented group or who have contributed to the advancement of such group.

It is important to remark that for each resource, the UTA contacted an office in the University that would help with reviewing the resource and make sure that the appropriate terminology was being used in each case. The November Social celebrated Native American Heritage Month, and the planned activity was to discuss the contributions of Thomas Storer to mathematics. Storer developed a mathematical theory to study string figure-making as a mathematical object. For the current academic year, the UTA will provide resources for each month that correspond to observance months, when possible. This is the plan:

- January: Celebrating Mathematicians with Disabilities
- February: Black History Month
- March: Women's History Month
- April: Mathematics Awareness Month
- May: Mental Health Awareness Month
- June: LGBT Pride Month

You can find some of the resources attached in the Appendix. The activities have received positive feedback; members of the Department of Mathematics have commented that they prefer these activities. They are learning something and they gain information about how to help members of underrepresented groups. The events are attended by faculty members, graduate students, and undergraduate students, and, since the implementation of the activities, the participants stay for longer and interact more with

each other.

The UTA has also talked to the Math Center, and information about which languages each tutor speaks is available to undergraduate students. This corresponds to the implementation of bilingual tutoring.

References:

- Ascher, M. (1991). Ethnomathematics: A Multicultural View of Mathematical Ideas.
- Ascher, M. (2005) Mathematics Elsewhere: An Exploration of Ideas Across Cultures.
- García Márquez, G. Nobel Lecture. NobelPrize.org. Nobel Media AB 2019. Retrieved on December 25, 2019.
- Joseph, G. (2010) The Crest of the Peacock: Non-European Roots of Mathematics.

C. Appendix

I have attached the slides corresponding to one of my presentations, a midcourse feedback that I developed, and the resources to increase visibility of underrepresented groups in mathematics. These have been distributed to all instructors in the Department of Mathematics and/or placed in the building so that students can see them.

Social Justice in the Classroom

Summer 2019

Overview

Panel discussion

Coming to America

Say hello to Mr. Rogers

Answers

What can you do?

What does this look like for Allechar?

Panel discussion

Questions

- What does inclusive teaching mean to you?
- What does social justice mean to you?
- Share a story about issues of equity that are relevant in your work. How did this happen? Were you able to do something about it?

Coming to America

Students struggle with some topics, for example, fractions.

$$\frac{3}{5}$$

Aren't we teaching math?

Why is the fraction $\frac{3}{5}$ important in the history of the United States of America?

Say hello to Mr. Rogers

Complete the identity wheel, and answer the following questions with the help of your neighbor.

- What does inclusive teaching mean to you?
- What does social justice mean to you?
- Why does inclusive teaching matter?
- What are the major issues preventing equity on the culture of mathematics?

You'll have 10 minutes to do this.

What does inclusive teaching mean to you?

It means that anyone can cook! Sorry... everyone can do math!

What does social justice mean to you?

Fair distribution of opportunities, privilege, ...

Why does inclusive teaching matter?

- Impact of early math skills
- Individual level
- Filter
- Why are we educating?

What are the major issues preventing equity on the culture of mathematics?

- We are not part of the conversation
- We perceive it as an add-on

Guidelines

- Establish and support a class environment that supports belonging for all students.
- Set explicit expectations.
- Select course content that recognizes diversity and acknowledges barriers to inclusion.
- Design all course elements for accessibility.
- Reflect on one's beliefs about teaching to maximize self-awareness and commitment to inclusion.

What does this look like for Allechar?

Syllabus

Class Culture

We will model our class based on the axioms proposed by Federico Ardila:

i) Mathematical talent is distributed equally among different groups, irrespective of geographic, demographic, and economic boundaries.

ii) Everyone can have joyful, meaningful, and empowering mathematical experiences.

iii) Mathematics is a powerful, malleable tool that can be shaped and used differently by various communities to serve their needs.

iv) Every student deserves to be treated with dignity and respect.

Syllabus

Project

There will be project consisting of a written 4-page report and a 10-minute oral presentation. You will research the contributions of a mathematician from an underrepresented group in mathematics. The project will comprise 10% of your overall grade. I will base your grading on the written report, oral presentation, and attendance to all presentations that we have in class.

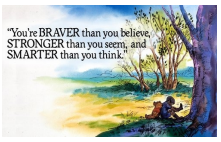
Be a gateway, not a gatekeeper

- Explain what grad school is.
- What is a postdoc?
- Tenure v. career line

Exams

Math 2200
Summer 2019
Final Exam
08/02/19
Time Limit: 120 Minutes

Name: _____
UId: _____



This exam contains 18 pages (including this cover page) and 11 problems.

You may *not* use your books or notes on this exam. The use of a scientific calculator is allowed. You are not allowed to share materials.

You are required to show your work on each problem on this exam. The following rules apply:

- **Organize your work**, in a reasonably neat and coherent way, in the space provided. Work

Test Anxiety

Do not write in the table to the right.

Problem	Points	Score
1	20	
2	10	
3	10	
4	10	
5	15	
6	15	
7	43	
8	12	
9	40	
10	25	
11	0	
Total:	200	

Positive script for test anxiety

If you are feeling anxious, reading the following might help:

Relax and take three deep breaths. Do not panic. You have studied hard to prepare for this exam and you know the material. Focus on one item at a time, not on the whole test. If you forget something, think about we discussed about the topic. What class day was it? What else did the instructor say? What examples did you learn?.
It's OK if an answer does not come to you right now, you can go on and try later.

Inclusive teaching includes you

2. (20 points) **May I have your attention, please?**

Eminem, Marshall, and Bruce are having an argument. They all claim to be the *real Slim Shady*, but you know that there is only one *real Slim Shady* and all the other Slim Shadys are just imitating.
You have deduced the following statements are true:

1. If Eminem is not the *real Slim Shady*, then Bruce is the *real Slim Shady*.
2. If Eminem is not the *real Slim Shady*, then Marshall is not the *real Slim Shady*.
3. If Bruce is the *real Slim Shady*, then Eminem is not the *real Slim Shady*.
4. If Marshall is not the *real Slim Shady*, then Bruce is not the *real Slim Shady*.
5. If Bruce is not the *real Slim Shady*, then Marshall is not the *real Slim Shady*.

You tell Eminem, Marshall, and Bruce that you have figured it out. If you ask "Will the *real Slim Shady* please stand up?", who stands up?

Use the following truth table as an aid.

E: Eminem is the *real Slim Shady*.
B: Bruce is the *real Slim Shady*.
M: Marshall is the *real Slim Shady*.

E	B	M	¬E	¬B	¬M				
T	T	T							
T	T	F							
T	F	T							
T	F	F							
F	T	T							
F	T	F							
F	F	T							
F	F	F							

1. **Guess who's back, back again...**

In 2002, *Lose Yourself* was the first rap song to win an Academy Award for Best Original Song. Eminem was not present at the award ceremony because he did not think he'd win. The song also won a Grammy Award. What makes this song so special? Well, pretty much everything rhymes. We can look at the following rhyme scheme where words in the same color rhyme:

1. If we look at the first eight lines, we can find sets of words and phrases according to color (the cardinality of each set is also listed):
   - A ={palms, arms, vomit, mom's, on, calm, bombs}; $|A| = 7$
   - B ={sweaty, heavy, sweater, already, spaghetti, ready, forgetting}; $|B| = 7$
   - C ={knees, weak, he's, he, keeps}; $|C| = 5$
   - D ={loud, mouth, out, how, now, blaow}; $|D| = 6$
   - E ={wrote, whole, goes so, opens, won't, choking, joking, over}; $|E| = 8$
   - F ={nervous, surface}; $|F| = 2$
   - G ={down, crowd}; $|G| = 2$

   Answer the following questions using this information; don't simplify your answer, and explain your counting arguments.
   (a) (5 points) What is the difference between a permutation and a combination? Explain.

5. **Ugh, as if!**

It is laundry day, so Cher has a very limited wardrobe. Her computer just told her that what she has in stock is:

- seven blazers
- ten mini-skirts
- twelve shirts (including a collarless shirt from Fred Segal)
- nine dresses (including a white Calvin Klein dress and an Alaïa dress; in case you didn't know, Alaïa is like a totally important designer)
- fifteen pairs of over-the-knee socks
- eleven pairs of shoes (mostly chunky platforms and Mary Janes, and a pair of red satin Jimmy Choos)

(a) (5 points) On her first day of school, Cher wants to wear her Dolce and Gabbana yellow plaid mini-skirt and matching blazer. How many outfits can she put together for her first day of school if she wants to wear the blazer and skirt with a shirt, shoes, and socks?

2. **It's a make it work moment**

Let A and B be finite sets. Prove or disprove the following claims:

(a) $|A \cap B| = |A| + |B|$.
(b) $|A - B| = |A||B|$.
(c) If A and B are disjoint, then $|A \cup B| = |A| + |B|$.
(d) $|A \cup B| = |A| + |B||A \cap B|$.

Online Teaching: You are not a bot

Since the online class setting might feel a little bit impersonal at the beginning, I have created this graded survey for you to get to know me and viceversa.

On the first day of class in the usual classroom setting, I spend some minutes introducing myself to the students. As a student, I appreciated when my instructors tried to get to know me. However, the online setting is quite different from the classroom setting, but I would still like to get to know you. So, here's a couple of things about me:

My first name is Allechar and my last name is Serrano Lopez (it is a two-word last name). My preferred pronouns are: she, her, hers. When you write your emails or talk to me, you can refer to me as Allechar.

I am a third year graduate student in the Math Department interested in number theory and arithmetic geometry. I was born in Costa Rica, so my first language is Spanish and when we meet (online/in-person office hours) you might notice that I have an accent and I make grammar mistakes sometimes; you should feel free to correct me.

I got my undergrad degrees at Universidad de Costa Rica. I have a B.S. in Math and another one in Economics. I worked in the research department of the Central Bank of Costa Rica for two years before coming to Utah.

On a more personal note, I like Star Wars (except for the prequels) and Disney/Pixar movies. I practice ashtanga and enjoy reading. I really like ice cream and trying different types of gummy bears.

-Allechar

Question 1 5 pts

It's your turn to tell me something about you.

Math 2200
Summer 2019
Mid-term student feedback
06/21/19

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1. **About student activities**
    - Was there any point in the course where you were uncomfortable in a discussion or in completing a written assignment?
    - If you had a question about the readings, did you ask Allechar for more information?
    - If there is an element of the readings you dont understand, please describe how you respond to that element (e.g., do you email Allechar, look up information online, wait to see if it will be covered in lecture, etc.)
    - Which topic have you found the most difficult so far? What do you think made it difficult?
    - Have you discussed the class topics or readings outside of class? If so please describe what you discussed and with whom.
2. **About expectations and outcomes**
    - Are the class activities what you expected when you registered for the course?
    - Will your experience in this course prepare you for future courses? Why or why not?
    - Do you feel that the workload of this course is comparable to other courses? Please provide examples in your response.
    - Did you expect more or less class participation/more or less reading/more or less writing?
3. **About instructor activities**
    - Do the lectures and/or class activities help you learn? Why or why not?
    - How does Allechar respond to student questions?
    - Do you feel comfortable asking questions in class or by email? Why or why not?
    - Does Allechar seem interested in the topics of the course?
    - Does Allechar provide further explanation when needed?

- Do people seem comfortable sharing opinions or asking questions in class? Do you? Why or why not?
- Are you comfortable speaking to Allechar outside of class (e.g., in office hours or over email)?
- Do you feel Allechar is more receptive to certain viewpoints? Certain students?

4. **About instructor expectations and objectives**

   - Please describe what you believe to be the most important idea or skill you have learned from this course so far.

5. Generalities

   - Do you feel Allechar cares about the students, their progress, and successful course completion?
   - Do you feel Allechar has created a welcoming and inclusive learning environment? Why or why not?
   - Do you think Allechar treats students with respect? Why or why not?
   - Would you recommend Allechar (as instructor) to other students? Why or why not?
   - Does Allechar meet your expectations of the quality of a UofU instructor?
   - Would you recommend this course to others? Why or why not?
   - Does this course/this instructor have had an educational impact on you?
   - Do you have any specific recommendations for improving this course?
   - What are one to three specific things about the course or instructor that especially helped to support student learning?
   - What are the strengths of this course?
   - What parts of the course aided your learning the most?
   - What are one to three specific things about the course that could be improved to better support student learning?
   - What parts of the class were obstacles to your learning?
   - What changes might improve your learning?

NATIONAL HISPANIC HERITAGE MONTH

SEPTEMBER 15TH-OCTOBER 15TH

WHY?

The purpose of National Hispanic Heritage Month is to recognize the contributions of Hispanic and Latinx Americans to the country's history, heritage, and culture.

HISPANIC OR LATINX?

Hispanic and Latinx are often used interchangeably, but they mean two different things.

Hispanic usually refers to people that speak Spanish and/or descend from Spanish-speaking populations.

Latinx is a gender neutral term used to refer to people from or descended from people from Latin America (everything below the U.S., including the Caribbean).

For example:

- someone from Brazil is Latinx but not Hispanic because they speak Portuguese in Brazil;
- someone from Spain is Hispanic, but not Latinx because Spain is a European country.

HISTORY

National Hispanic Heritage Month started as National Hispanic Heritage Week, which was signed into law by President L. Johnson in 1968. In 1988, this week was expanded into a month by a law signed by President R. Reagan.

Why does it start in the middle of September?
There are five countries in Latin America that celebrate the anniversary of their independence on September 15th: Costa Rica, El Salvador, Honduras, Nicaragua, and Guatemala. In addition, Mexico, Chile, and Belize celebrate their independence in September (9/16, 9/18, and 9/21, respectively).

NATIONAL HISPANIC HERITAGE MONTH

SEPTEMBER 15TH-OCTOBER 15TH

OPPORTUNITIES

Chicana/o Scholarship Fund
Utah Opportunity Scholarship

STUDENT ORGANIZATIONS AT THE U

- **Association of Latino Professionals in Finance and Accounting (ALPFA)**
- **Latinos in Action (LIA)**
- **Latinas Telling Testimonios (LTT)**
- **Latino Medical Association**
- **Movimiento Estudiantil Chicanx de Aztlan (M.E.C.H.A)**
- **Muxerista Mothers**
- **Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS)**
- **Xicana/o Graduate Council**

CELEBRATIONS IN SLC

Hispanic Heritage and Street Festival: community parade and other activities such as food vendors, live music, dance performances, local artisans, etc.
Utah Latino Business Expo: inclusive event that brings together business, community, and culture.
Utah Symphony Celebración Sinfónica: Utah Symphony performs classical music from Latin America.

NATIONAL HISPANIC HERITAGE MONTH

SEPTEMBER 15TH-OCTOBER 15TH

ADRIANA SALERNO

BATES COLLEGE

Adriana is a Venezuelan mathematician. She earned her undergraduate degree at the Universidad Simón Bolívar and her Ph.D. at the University of Texas. Her main area of research is number theory, and she is also interested in communication and teaching math to a more inclusive and diverse STEM workforce. Adriana is editor-in-chief of the inclusion/exclusion blog for AMS and was part of our AWM Speaker Series in Spring 2019.

ANTHONY VÁRILLY-ALVARADO

RICE UNIVERSITY

Tony is a Costa Rican mathematician. He earned his B.S. at Harvard University and his Ph.D. at UC Berkeley. His main area of research is arithmetic geometry. Tony is committed to disseminating mathematics at all levels and is interested in creating opportunities for students from underrepresented backgrounds to engage in the discovery of mathematics. Tony is the founder and director of *Patterns, Math & You*, a program for middle school students.

ROCHELLE GUTIÉRREZ

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Rochelle received her B.S. from Stanford University, and her M.S. and Ph.D. from University of Chicago. Her main area of research are issues of identity and power in mathematics education, paying particular attention to how race, class, and language affect teaching and learning. Rochelle gave a Hugo Rossi presentation on campus last year about issues of diversity and equity in mathematics education.

PAMELA E. HARRIS

WILLIAMS COLLEGE

Pamela is a Mexican-American mathematician. She received her B.S. from Marquette University, and her M.S. and Ph.D. from the University of Wisconsin-Milwaukee. Her research interests are algebra and combinatorics. Pamela helped create and develop www.Lathisms.org, and she co-organizes research symposia and professional development for the national conference of SACNAS. Pamela became the first member of her family to graduate from high school and has shared her life experiences as a young Dreamer in multiple interviews.

GABRIEL SOSA CASTILLO

COLGATE UNIVERSITY

Gabe is a Colombian mathematician. He received his B.S. from Universidad de Costa Rica and his Ph.D. from Purdue University. His research interests include combinatorial and computational commutative algebra, graph theory, and mathematics education. He is one of the co-founders of www.Lathisms.org. He was at JMM this past January as part of *MAA Invited Paper Session on Inspiring Diversity in Mathematics: Culture, Community, and Collaboration.*

Visit www.Lathisms.org to find out more about Latinx and Hispanics in Mathematical Sciences

LGBT HISTORY MONTH

OCTOBER 1ST-31ST

WHY?

The purpose of LGBT History Month is the observance of lesbian, gay, bisexual, and transgender history, and a celebration of those who have come before us.

HOW IS IT DIFFERENT FROM PRIDE MONTH?

LBGT History Month is a celebration of our elders who have acted as role models and have led our way. LGBT History month is also celebrated in United Kingdom and Canada, in February and October respectively.

LGBT Pride Month is celebrated in June. It promotes self-affirmation, dignity, equality, and increased visibility of lesbian, gay, bisexual, and transgender people. LGBT Pride Month commemorated the Stonewall riots from 1969.

HISTORY

LGBT History Month was first celebrated in 1994. It was founded by Rodney Wilson, a Missouri high school teacher.
October was chosen because National Coming Out Day is on October 11th. National Coming Out Day commemorates the date of the Second March on Washington for Lesbian and Gay Rights in 1987. October also commemorated the first National March on Washington for Lesbian and Gay Rights in 1979.

LGBT HISTORY MONTH

OCTOBER 1ST-31ST

OPPORTUNITIES

LGBT Resource Center Scholarships
Bastian Scholarship (B.W. Bastian Foundation)

STUDENT ORGANIZATIONS AT THE U

- **The Diversity Graduate School Application Advisory**
- **Inclusive Earth**
- **in-STEM**
- **LGBTQ and Allies in Medicine**
- **Out for Business at the David Eccles School of Business**
- **Out in Science, Technology, Engineering, and Mathematics (oSTEM)**
- **Pride Law Caucus**
- **Queer and Trans Students of Color (QTSOC)**
- **Students for Queer Arts, Resistance, and Education (SQUARE)**
- **LGBTQ+STEM**

EVENTS

Fabulous Fridays: free food, games, meeting new people.
Big Q-T Welcome: to build community and learn about resources.
Gay-la and Silent Auction: fundraiser to support LGBT Resource Center scholarships, emergency funds, and student programs.
Pride Week: planned by a volunteer committee of faculty, staff, and students accross the university.
Lavender Graduation: Students graduating in May, August, or December, undergraduate and graduate, are invited to take part in the celebration. You can register through the LGBT Resource Center website.

You can find more information by visiting lgbt.utah.edu.

LGBT HISTORY MONTH

OCTOBER 1ST-31ST

RON BUCKMIRE

OCCIDENTAL COLLEGE

Ron is a Grenadian-born mathematician and LGBT activist. He created the Queer Resources Directory, the first comprehensive directory of LGBT and HIV/AIDS information on the Internet, in 1991, before the World Wide Web was invented. The QRD was one of several named plaintiffs in a successful Supreme Court challenge to the 1996 Communications Decency Act. His interests involve applied mathematics, numerical analysis, mathematics education, LGBT history and sexual orientation law.

ANTHONY BONATO

RYERSON UNIVERSITY

Anthony received his B.S. from McMaster University, and his M.M. and Ph.D. from University of Waterloo. He is interested in graph theory, with applications to real-world complex networks and graph searching games. He has a blog called *The Intrepid Mathematician* where he writes about mathematics and mathematicians for a non-mathematician audience. He describes himself as part-time Larry King of mathematics.

ROBERT BRYANT

DUKE UNIVERSITY

Robert was the 63rd president of AMS. He received his B.A. from North Carolina State University and his Ph.D. from University of North Carolina at Chapel Hill. He works in differential geometry; Bryant surfaces and Bryant solition are named after him. Robert is part of the board of directors of EDGE, a transition program for women entering graduate studies in the mathematical sciences. He is also a board member of Spectra, an association for LGBTQ+ mathematicians.

AUTUMN KENT

UNIVERSITY OF WISCONSIN-MADISON

Autumn earned her B.A. at University of North Carolina and her Ph.D. at University of Texas. She works in geometry and topology. She organized the LG&TBQ+ conference and is a promoter of trans rights. Autumn also participated in an interview about being a trans mathematician. You can find her story in *Living Proof: Stories of Resilience Along the Mathematical Journey*.

ANDREW HODGES

WADHAM COLLEGE-UNIVERSITY OF OXFORD

Andrew is a British mathematician and author. During the 1970s, he participated in the gay liberation movement. He is the author of the critically acclaimed book *Alan Turing: The Enigma*, which inspired *The Imitation Game*. He has also written several works that popularise mathematics and science. One of his main research interests is twistor theory.

You can join the outlist or allylist of Spectra (the association for LGBTQ+ mathematicians) by visiting lgbtmath.org.

NATIVE AMERICAN HERITAGE MONTH

NOVEMBER 1ST-30TH

WHY?

The purpose of Native American Heritage Month is to provide a platform for Native people to share their culture, traditions, music, crafts, dance, and ways of living.
We should also recognize the need to address issues faced by Native people and work towards building solutions.
For our institution, the observance of this month is of particular importance because of the long relationship that the University has had with the Ute Indian Tribe. Our campus is located on the historic homeland of the Ute tribe.

FEDERALLY RECOGNIZED TRIBES OF UTAH

Ute Indian Tribe of the Uintah & Ouray Reservation
Ute Mountain Ute Tribe
Confederated Tribes of Goshute
Skull Valley Band of Goshute
Paiute Indian Tribe of Utah
San Juan Southern Paiute Tribe
Navajo Nation
Northwestern Band of Shoshone Nation

HISTORY

1912: Dr. Arthur C. Parker, a Senecan Indian, persuaded Boy Scouts of American to set aside a day for "First Americans" and they did so for three years.
1914: Red Fox James, a Blackfoot Indian, rode horseback from state to state and obtained the endorsement of 24 states to approve a national day to honor Indians.
1915: Congress of the American Indian Association approves a plan concerning American Indian Day.
1916: First American Indian Day in a state is proclaimed in New York.
1990: November is declared as National American Indian Heritage Month

COMMUNITY RESOURCES

- **Navajo Nation Teacher Education Consortium (NNTEC)**
- **Utah Division of Indian Affairs**
- **Utah Department of Health-American Indian/Alaska Native Initiatives**

NATIVE AMERICAN HERITAGE MONTH

NOVEMBER 1ST-30TH

STUDENT ORGANIZATIONS AT THE U

- **American Indian Business Leaders (AIBL)**
- **American Indian Science and Engineering Society (AISES)**
- **American Indian Women and Allies Association (AIWAA)**
- **Inter Tribal Student Association (ITSA)**
- **Society for Native American Graduate Students**
- **Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS)**

PROGRAMS AND EVENTS

Soup & Tutoring: every first Tuesday of the month in the American Indian Resource Center (AIRC). Provides soup and tutoring for any subject.
Year-End Honoring and Graduation Ceremony: ceremony celebrating Native graduates.
Pow Wow: hosted by the Inter-Tribal Student Association. Meeting to honor cultural and religious practices of the Native American Indian community.
American Indian Woman Scholar: an ambassador is chosen every year and contributes to community outreach.
Pathways for American Indians Through Higher Education (PATHs): The College of Education at the University of Utah is dedicated to creating pathways for American Indians that lead to educational excellence in a variety of education fields. Four departments and the Urban Institute for Teacher Education offer preparation for teachers, leaders, counselors, and educational researchers – as well as an annual lecture series.

You can find more information by visiting diversity.utah.edu/centers/airc

NATIVE AMERICAN HERITAGE MONTH

NOVEMBER 1ST-30TH

FREDA PORTER
PORTER SCIENTIFIC INC.

Freda Porter is president and CEO of Porter Scientific Inc., a company that provides environmental consulting, industrial water and wastewater treatment services. She earned her B.S. in Applied Mathematics from University of North Carolina Pembroke, her M.S. from North Carolina State University, and her Ph.D. from Duke University in Applied Mathematics. She is a member of the Lumbee tribe and is now the Tribal Administrator. She was awarded the 2010 Stellar Award by US Women's Chamber of Commerce, 2009 NC Minority Business Person of the Year, the 2007 UIDA American Indian Business of the Year and UNCP Business Person of the Year. Porter has been honored by the North Carolina Equity Commission with the CARPATHIAN Award for Speaking Out and was featured in a PBS documentary entitled BREAKTHROUGH: The Changing Face of Science in America.

ROBERT MEGGINSON
UNIVERSITY OF MICHIGAN

Robert is a mathematician of Oglala Lakota (also known as Oglala Sioux) heritage. He obtained a B.S. in Physics from University of Illinois at Urbana-Champaign and went on to work as a programmer for years. While working, he realized that his true passion was mathematics and went back to school to get an M.S. in Statistics and a Ph.D. in Mathematics. Robert has talked about how his cultural background has affected his worldview; his dislike of the Native American sports mascot at Illinois, Chief Illiniwek, and his interactions with professors are examples of this. He is concerned with the problem of underrepresentation of minorities in mathematics and works directly with Native American middle and high school students on the Turtle Mountain Chippewa (Ojibwa) reservation in North Dakota.

CLAUDETTE ENGBLOM-BRADLEY

Claudette is a member of the Iñupiat tribe and retired from the University of Alaska. Her interests and research in mathematics education include education technology, culture-based mathematics curriculum, and constructivist pedagogy. In 1994, Claudette worked on the Math in Navajo Weaving project which was conceived as a three-week dual understanding math education program. Her service included summer science camps for middle school rural students in the Doyon region.

THOMAS STORER

Thomas Storer was a member of the Navajo tribe. As a mathematician, he did research in combinatorics. Storer is known as one of the first Native Americans to earn a Ph.D. in mathematics in the U.S. and to reach a position of full professor at a major university. As a child, he learned string figure-making from his grandmother. String figure-making is an activity that has been carried out by many societies of oral tradition; it consists of producing geometrical forms using a string knotted into a loop. Storer became a string figure-making enthusiast and published an article in which he developed formal approaches of string figure-making.

"After learning my thousandth or so figure, I began searching for a book or article which spoke to the beautiful 'system' which I dimly apprehended underlying these disparate string-figures - to no avail. The wordy ramblings of collectors were too imprecise to satisfy, and topological Knot-Theorists apparently dismissed the entirety of the string figures of the world as 'trivial'. And, although I learned a great deal from both groups of writers, I hungered for an approach which was neither too weak to be effective, nor so powerful that it identified (and as 'trivial', at that) all the objects of my insatiable interest. And, since such work still does not exist,to my knowledge, I have decided to write one, chronicaling my development of such a system over the ensuing years."

(Storer, 1988, p. iii)

CELEBRATING MATHEMATICIANS WITH DISABILITIES

ABRAHAM NEMETH

Abraham was an inventor and mathematician. He studied psychology, and earned his undergraduate degree from Brooklyn College and an M.A. from Columbia University. During his undergrad, he studied mathematics and physics, but his academic advisor discouraged him from pursuing mathematics. After working at agencies for the blind, Abraham decided to pursue mathematics and obtained a Ph.D. from Wayne State University.
In advanced courses, he found that there was a need for a braille code that would communicate mathematics in a more effective way. He developed the Nemeth Braille Code for Mathematics and Science Notation, which is still used today. Abraham needed to make use of sighted readers to read mathematics textbook that were otherwise inaccessible; he also needed a method for dictating his math work for transcription into print. This led to the invention of MathSpeak.

SOLOMON LEFSCHETZ

Lefschetz obtained a degree in engineering from the École Centrale Paris. After an industrial accident, he pursued mathematics. He received a Ph.D. in algebraic geometry from Clark University. He worked at the University of Nebraska and the University of Kansas before receiving a permanent position at Princeton University.
While working at Princeton, Lefschetz offered a John S. Kennedy Fellowship to John F. Nash Jr. This led to Nash pursuing his graduate degree at Princeton instead of Harvard.
Lefschetz made numerous contributions to mathematics including the Picard-Lefschetz formula, Lefschetz pencil, Lefschetz fixed point theorem, and many more. He also contributed to the advancement of mathematics in Mexico and sent several students back to Princeton University.

JOHN FORBES NASH JR.

John F. Nash Jr. was an American mathematician who made important contributions to game theory, differential geometry, and PDEs. He obtained a B.S. and M.S. in mathematics from Carnegie Institute of Technology (now Carnegie Mellon University) and a Ph.D. from Princeton University, with a 28-page dissertation on noncooperative games. Nash is the only person that has been awarded both the Nobel Prize in Economics and the Abel Prize.

CARYN LINDA NAVY

Navy works on set-theoretic topology. She earned her undergraduate degree from MIT, where her undergrad advisor introduced her to topology. She attended graduate school at University of Wisconsin-Madison and worked as an assistant professor at Bucknell University. Navy is also a computer scientist and has used her skills to improve assistive software.

BERNARD MORIN

Bernard was a French topologist. He received his Ph.D. from the Centre National de la Recherche Scientifique and spent most of his career at the University of Strasbourg. Morin was a member of the group that first exhibited an eversion of the sphere.
The eversion of the sphere is the process of turning a sphere inside out in a three-dimensional space. Yes! It is possible to continuously and smoothly turn a sphere inside out without cutting, tearing, or creating creases. The first proof of the existence of a crease-free eversion was created by Stephen Smale (he also won the Fields Medal in 1966).

CELEBRATING MATHEMATICIANS WITH DISABILITIES

FACULTY ROLE AND RESPONSIBILITIES

PROTECTING STUDENT CONFIDENTIALITY

- Faculty are not entitled to know the diagnosis of a student and should not ask students to disclose the specifics of their disability.
- Documentation related to accommodations must be kept separate from a student's departmental file.

FACULTY AT THE U HAVE:

- The **right** to:
  - ask for verification;
  - consult the CDA to discuss requested accommodations;
  - identify and determine the abilities, skills and knowledge that are essential and fundamental to academic courses and programs;
  - expect the student with a disability to meet the same academic standards as peers in the course.
- The **responsibility** to:
  - inform students of the procedure to request accommodations;
  - maintain confidentiality;
  - provide accommodations in a timely manner;
  - identify and determine the abilities, skills and knowledge that are essential and fundamental to academic courses and programs;
  - inform students that all course material can be made available in alternative format with prior request.

ACCOMMODATION PROCESS

- Student completes an intake appointment with a Disabilities Advisor in the CDA.
- Student submits supporting documentation that establishes a disability exists and what reasonable accommodations are appropriate.
- The CDA determines approved reasonable accommodations.
- Faculty will receive official written, electronic, or verbal notice of accommodations from CDA.

SCHOLARSHIPS

- **Louise J. Snow Scholarship**
- **Keaton Walker Scholarship**
- **Poulson Family Endowed Scholarship**
- **Alumni Association and the CDA Scholarship**
- **Craig H. Neilsen Scholarship**

Note: This was prepared with information provided by the Center for Disability and Access. For more information, please visit: https://disability.utah.edu/

CELEBRATING MATHEMATICIANS WITH DISABILITIES

PERSON FIRST

Be aware and sensitive of the language used. Acknowledge that the individual is a person first by using the person's first name and avoiding labels. Refer to the person in terms that acknowledge their ability, merit, and dignity.

PERSON FIRST LANGUAGE

- Speak of the person first, then the disability.
- Emphasize abilities, not limitations.
- Don't label people as part of a disability group.
- Avoid patronizing or giving excessive praise or attention.
- People with disabilities overcome attitudal, social, educational, architectural, transportation or employment barriers NOT the disability.

WORDS MATTER

- A disability *rather than* disabled or handicapped.
- Learning disability *rather than* learning disabled.
- Seizure disorder *rather than* Epileptic.
- Without speech or nonverbal *rather than* mute or dumb.
- Emotional disorder or mental illness *rather than* crazy or insane.
- Non-disabled *rather than* normal or healthy.
- Uses a wheelchair *rather than* confined to a wheelchair.

ETIQUETTE

- Ask the person with a disability if they want assistance before helping.
- Call the person by their first name only when extending that familiarity to all others present.
- When introduced, offer to shake hands. People with limited hand use or artificial limbs can usually shake hands.
- Do not try to avoid common idioms like "see", "walk" or "hear" around people with disabilities. Being overly conscious of a person's disability can cause discomfort and awkwardness for both of you.
- Use a normal tone of voice. If the person cannot hear or understand they will let you know.
- Do not assume that a person with one disability also has other disabilities.

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