Professional Leave Report Cover Sheet

Name: Maria Nogin

Department: Mathematics

College: Science & Mathematics

Leave taken: ◉ Sabbatical ○ Difference in Pay ○ Professional Leave without Pay

Time Period: ◉ Fall 2023

○ Spring

○ Academic Year

○ Other

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# Sabbatical Leave Report

Maria Nogin
Department of Mathematics

This report is for the sabbatical leave I took during the Fall 2023 semester. The purpose of the leave was to further develop a few different aspects of the Math Circle program as well as conduct scholarly activities related to it.

1. Publishing materials.

   I have gone through, proofread, re-organized when needed, completed with all solutions whenever any were missing, added some instructor's notes to, etc. all of our materials for groups of grades 3–4, 4–5, 5–6, 6–7, 7–8, and 8–9. Since a number of other Math Circles as well as teachers at local schools (many of them are our past students) had previously requested access to our materials/resources, I have decided to proceed with posting all of our materials for free instead of publishing them through a publisher that would sell them. They are now available in the open-source format so that other leaders are able to extract any topics/problems they like, change the headers from "Fresno Math Circle" to their own circle/school, or modify the content in any manner they like. I also wrote brief descriptions for each grade level to make it easier to find any topics they like (and other leaders, of course, have the freedom to use these for any grade levels they see fit.) I have sent the info/link regarding this posting to a number of other circle/club leaders as well as school teachers, local and remote, and already received many thanks.

2. Visiting other math circles.

   During the fall semester, I visited three out of town math circles: the San Jose Math Circle (currently meeting at Santa Clara University), the San Francisco Math Circle (at San Francisco State), and the Fullerton Math Circle (at CSU Fullerton). At all three, I met with the leaders and instructors and exchanged valuable ideas about teaching Math Circle and training student leaders. At San Jose, which welcomes guest speakers, I led a session for a group 7–9th graders. At San Francisco, I attended two sessions for 2–3rd and 4–5th graders, and at Fullerton, I attended a session for 9–12th graders. All of these observations were very interesting and informative.

3. Submitting papers for publication.

   As expected, I have written two papers during my leave. I have submitted both to journals. One was accepted pending revisions and the other one is still under review. For the first, I am working on the requested revisions and plan to send those to the editor within a few weeks.

4. Writing a grant proposal.

   As I mentioned in my leave proposal, it is easy to find funding focused on research, underrepresented minorities, or students who fall behind the standard school curriculum, but none of these would be a good fit for our program which is designed for talented and advanced youth. I spent countless hours searching for a grant that would be a good fit. Unfortunately, I was not able to find much. One program by NSA that seemed to be a good fit has been in the process of revision (their website for educators states: "NSA's K-12 STEM Outreach activities are currently being re-evaluated to ensure alignment with our strategic objectives. Requests for STEM outreach activities are not being accepted at this time." I kept monitoring the website, but it's been in this state for the last few months. The only open and fitting program that I could find was the MAA Neff Outreach Grant. It only covers up to $6,000, but, in the absence of a better option, I have written and submitted a proposal to this program.

I found it extremely beneficial to have one semester free of the teaching and service duties. Although I love teaching, having more free time and a more flexible schedule last semester allowed me to pursue projects that I would not be able to pursue during a regular teaching semester. I would like to thank the College and the University for this wonderful opportunity to engage in the activities that were highly beneficial to me, the Department, the University, and our students.

# Sabbatical Leave Proposal

Maria Nogin
Department of Mathematics
September 25, 2022

I respectfully request a sabbatical leave during the Fall 2023 semester in order to work on the project outlined below.

**Background: Fresno Math Circle program.**
In AY 2015-16, I founded, and have been coordinating since then, Fresno Math Circle, an enrichment program for elementary, middle, and high school students. We currently have four groups of grades 3-4, 5-6, 7-8, and 9-12 meeting biweekly during the academic year. We also host a few local and national math competitions for students in all grades from 1-12 and offer practice sessions for them. The sessions are taught by Mathematics faculty and Fresno State students. The student helpers are mostly prospective or current credential students aiming to become K-12 teachers. A few permanent helpers are paid. In addition, students in MATH 145 (Problem Solving) participate in the sessions for high school students while students in MATH 149S (Capstone Mathematics for Teachers) both observe and help with a lot of the Math Circle sessions as part of their Service Learning. I feel that all these students benefit a lot from the program receiving valuable hands-on experience working with K-12 students on advanced and exciting mathematics.

**Purpose of the leave.**
The purpose of the leave is to further develop a few different aspects of the Math Circle program described above as well as conduct various scholarly activity related to it. Specific planned activities are listed in the next section.

**Description of the proposed project.**
I plan to work on the following four tasks during Fall 2023.

1. Publishing materials.
   Since 2015, I (until 2019 jointly with my colleague Adnan Sabuwala) have worked on developing a lot of materials for all of our age groups. The materials for six years of math circle (grades 3-4, 4-5, 5-6, 6-7, 7-8, 8-9) have been used a few times each. Multiple improvements have been made to these over the years. I think it is now time to disseminate this work so that other math circles, school math clubs/teams, etc. can benefit from it. I have previously contacted a publisher (specifically, MSRI/AMS series called Mathematical Circles Library) who expressed interest in such materials. I also saw a lot of interest from other math circle leaders in my making the materials available through open access. If granted a sabbatical, I want to look into open access publishing and work on any necessary editing to fit their format. One way or another, I am committed to publishing our materials.

2. Visiting other math circles.
   During my previous sabbatical leave, I was able to visit two other math circles. I have learned a lot during those visits and thus felt that they were very beneficial for our program. I would like to visit some other out of town math circles (specifically, for example, those in San Jose and Fullerton) during my next sabbatical leave. I have standing invitations from both of the aforementioned math circles. Each visit would be for a few days depending on schedule of their meetings. The purpose of such visits is both to give presentations and learn more ideas for our own math circle. Since a lot of math circle sessions tend to be held on weekdays, such visits are problematic during a teaching semester.
3. Submitting papers for publication.
   During the last few years before the pandemic I attended a few conferences where I gave talks related to the Fresno Math Circle program and met with other math circle leaders to exchange our experiences and ideas. I have been invited on multiple occasions to submit papers to the Journal of Math Circles. This is a peer-reviewed journal that welcomes various types of articles related to math circles or similar outreach programs. I have a few different ideas for appropriate articles. However, I have not had the time to write them being busy with both teaching and running Fresno Math Circle (for which I do not currently receive any assigned time). I expect to be able to write two papers during my sabbatical leave.
4. Writing a grant proposal.
   Last but not least, I would like to do further work in the area of grant applications. Since 2017, we have been successful in securing a few smaller ($5,000-6,000) grants supporting Fresno Math Circle. We used this money to pay our student helpers and buy supplies and prizes. However, it would be great to find a bigger source of funds that could also pay for faculty time. It is easy to find funding focused on research, underrepresented minority, or students who fall behind the standard school curriculum, but none of these is a good fit for our program which is designed for talented and advanced youth. Looking for a grant that would be a good fit and writing a good application will take time.

**What CSU resources, if any, will be needed to support the project?**
The only part of the proposed project that may require CSU resources is travelling to other math circles. If funding is available, I may apply for some to partially cover the cost of my travel. However, it should be noted that many math circles welcome outside speakers and guest leaders and may be able to cover my expenses. I will definitely look into that option as now, after a few years of teaching our Fresno Math Circle and having developed many materials and activities, I feel I am in a good position to provide such service.

**The amount of time requested.**
The amount of time requested is one semester (Fall 2023).