

EARLY CAREER

The Early Career Section offers information and suggestions for graduate students, job seekers, early career academics of all types, and those who mentor them. Angela Gibney serves as the editor of this section. Next month's theme will be voices for the BIG network.



Good Ideas

Summer Research in Mathematics at MSRI

Kuei-Nuan Lin and Augustine O'Keefe

In the fall of 2018 our research quartet decided to apply to summer programs at research institutes in an effort to collaborate in person. Three of us are at undergraduate-focused institutions in small departments where we are siloed with respect to research area. We had been meeting

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DOI: <https://dx.doi.org/10.1090/noti2391>

weekly over Zoom (which was still somewhat novel back then), but being able to spend a week or more together would catalyze our progress. Given that two of us, the authors of this article, would have small children that following summer, it was important to us that whatever program we applied to would provide substantial family support. Among the programs we considered and applied to, MSRI's Summer for Research in Mathematics program (SRiM)—formerly known as the Summer for Women in Mathematics—offered the most extensive family support. The following is from the program's website:

MSRI has access to private sources of funding that makes it possible for women with children to fully participate in its scientific activities. This may be in the form of lodging and reimbursement of travel expenses for children who accompany the member to Berkeley, plus lodging and travel expenses for a caregiver. It may also take the form of reimbursement of additional expenses incurred if the children stay home, thus allowing the member to attend the program.

For the authors of this article, being able to bring our families at little to no extra cost was the main reason we were able to participate in such a program. Because of our participation in this program in July 2019, our group made significant progress during our residency at MSRI. Making substantial headway on projects in the summer is particularly important for those of us with at least a 3–2 teaching load. We were able to submit our article in October 2019 for peer review despite being in the middle of the semester.

Our Experience at SRiM

We were awarded the SRiM grant which would support our group for a two-week residence. In the award email, we were provided a link where we could inform MSRI of whether or not we wanted to eat our dinners at a campus dining hall, or if we wanted to receive a \$25 per diem for us and each of our accompanying family members. Breakfast would be provided at the dining hall, and lunches were provided up at MSRI. We were also encouraged to contact MSRI regarding what our childcare situation would be, if that applied. It was very easy to get the support we needed and the staff were incredibly prompt with responses. MSRI covered the airfare for all of us plus our family members, with a cap of \$600 per round-trip ticket.

Once at MSRI, our entire group was housed in the same wing on the same floor of a dormitory on campus. We were all in two-bedroom suites with a kitchen and private bathroom. Those of us with families had a suite to ourselves, while those of us traveling alone had private rooms sharing the third suite. MSRI provided each suite with basic kitchen supplies such as pots and pans, dishes, utensils, paper towels, etc. Up the hill at MSRI we were provided with a temporary ID allowing us to use the bus for free, two offices each equipped with two computers, access to the extensive mathematics library at MSRI along with its journal subscriptions, and access to various workspaces throughout the building.

We expected to be surrounded by other researchers, those affiliated with the SRiM program and perhaps those who weren't. In fact, the majority of those also in residence at MSRI identify as part of a group that has been historically excluded within the mathematics community. There were indeed three other groups supported by SRiM, along with another group supported by the then burgeoning MSRI ADJOINT program, and the undergraduate students and faculty involved in the MSRI-UP program. As a result, the environment was not only welcoming but also affirming. Through daily lunches together and a cocktail party sponsored by MSRI, there was ample opportunity for community-building across the groups.

In the middle of our residence, we were invited to have breakfast with the Deputy Director of MSRI, H el ene Barcelo. It was a lovely spread and all dietary restrictions were accommodated. During this breakfast, we learned more about the donors who made our visit possible. We also talked about our personal experiences as women researchers in mathematics, particularly from the viewpoint of being at undergraduate institutions, and what further support SRiM could provide in the future.

Throughout our stay, the staff at MSRI did an amazing job supporting us and responding to unforeseen needs as they arose. Additionally, because we were able to provide receipts early, we got our reimbursement checks before we left. It should be noted that family support is taxable income.

Below we provide details we think are pertinent and (hopefully) useful to those with children who are thinking of applying. Our children are of very different ages, and thus, so were our experiences.

Kuei-Nuan Lin. Chris Marshal, the program manager at MSRI, was helpful and offered quick replies to all questions and concerns that we asked. Her responses reduced a lot of stress during the planning process. We took the offer of \$25 per diem since MSRI provided kitchen essentials at the apartment. From Monday through Friday, I arrived at MSRI around 9 a.m. and left my kids with my husband with the strict order that they cannot interrupt my work unless there is an emergency. We agreed to meet back at the apartment at 6 p.m. for dinner. During the weekends, we rented a car

for grocery shopping and the rental cost was covered by MSRI. I found this experience extremely positive for my family and me. I become stressed when I am away from home for conferences, so having my family with me and being able to see them at the end of the day reduces my anxiety and improves my productivity. Surprisingly, I had the energy to keep working after my children were sleeping.

Augustine O'Keefe. I was pregnant at the time we applied, and my baby was around 6 months old at the time of travel. I resolved to have him with me no matter the program we participated in. I had been on parental leave in the spring and so the idea of leaving the baby with my partner for 7–8 hours each day seemed hard enough. Being so supported by MSRI and the SRiM program was such a relief for so many reasons, not the least of which being that my child was breastfed. I would have otherwise had to spend a fortune to ship breastmilk home. In addition to having a key to my office at MSRI, I also had a key to the private nursing room. In it, there is a changing table, a comfortable rocking chair with a side table, and a folding divider for additional privacy. When being showed the room by staff I requested a small desk so I could more comfortably edit our paper while pumping. (I mean, is pumping ever comfortable?) The desk was there by the time of my first pumping session. MSRI also covered the cost of renting a crib, high chair, and other baby supplies that one might not want to travel with. We had begun our two-week stint with the dining hall option for meals but decided it was more convenient for dining with an infant to switch to the per diem.

I would advise that if you have a dietary restriction, bring snacks just in case. MSRI does their best to accommodate dietary restrictions, but the caterer ultimately decides what to serve. Ever accommodating, I was offered additional per diem to cover supplemental lunch costs. Worst case scenario, you can run down to the cafeteria in the Lawrence Hall of Science to pick something up.

Applying to SRiM

Here are some general guidelines to keep in mind if you are thinking about applying to the SRiM program and/or other programs of its kind.

- *Go to the right conferences and be prepared.* Constraints such as travel support or family obligations mean that picking the right conference(s) to attend is essential. Look up the main speakers and conference participants to decide if it is worth the effort of traveling. Read the abstracts and, if you can, some of the associated papers before attending the conference. While there, talk to people and ask questions; this is what leads to collaborations. Once you and your potential collaborators find a particular question to work on, start looking for funding opportunities for future meetings and collaborations. Some institutes only have summer

programs, such as SRiM, while others offer collaborative opportunities throughout the year.

- *Read the application guidelines carefully.* Due to funding sources, many programs require someone in the research group to be a citizen or permanent resident of the home country. Read all the rules carefully and decide if your group meets the criteria. Keep in mind the project requirements. Some programs require you to have partial results and some do not. The SRiM program is indeed one for which your group is expected to have made progress towards your project goals at the time of applying.
- *Ask around.* Often the program's website will show recent recipients of the grant whom you might contact for any advice, or even to receive a copy of their successful application. It helps to know someone, but people are often friendly and want to help others succeed.
- *Sell yourselves!* Make sure to highlight your expertise and your contributions to the field(s) germane to your proposal. As mentioned above, the SRiM program privileges project proposals for which the group has already made progress; be sure to highlight any partial results your group has achieved.
- *Keep working.* While you are waiting, you need to keep working with your collaborators online as you never know if your group will get the grant or not. Even if you do get the grant, the proposed time of your visit may not work for your entire group, or the funding could be insufficient for those with little support from their institutions.
- *Be communicative.* If your group decides to turn down an offer, be sure to let the institute know early so they can give the opportunity to another group. In 2019, we were second-round awardees. Because those first-round recipients communicated early to MSRI that they were passing on their offer, we were able to plan early (which is so important with small children). On the flip side, if you have not heard by the decision date listed on the program's website, do not hesitate to contact that program to see what the status of your proposal is. Keep checking in, letting them know your group is still interested.

Again, to our knowledge, the SRiM program at MSRI offers the most support for researchers with children as compared to other institutes. The first author had also been a part of another research group that had been accepted to more than one institute's collaboration program. Because of the excellent family support that SRiM offers, that group took MSRI's offer.

If your group does not get a grant, do not be disappointed as you never know what could happen. As mentioned above, our group was a second-round awardee.

Regardless, we have all learned how to live virtually (for better or worse). Take advantage of those new skills to keep working together, even if just a short weekly check-in to see how you all are doing; you can always apply again next year. Good luck!



Kuei-Nuan Lin



Augustine O'Keefe

Credits

Photo of Kuei-Nuan Lin is courtesy of Kuei-Nuan Lin.

Photo of Augustine O'Keefe is courtesy of Augustine O'Keefe.

IMA Math-to-Industry Boot Camp

Fadil Santosa and Daniel Spirn

The IMA Math-to-Industry Boot Camp is an intensive six-week summer training program that prepares mathematics PhD students for internships and careers outside of academia. Though the program has its roots in industrial modeling workshops, this program was specifically developed to help address two demographic challenges to the mathematics community: (1) an overabundance of mathematics PhDs in relation to the number of permanent academic positions and (2) the growing need for mathematically sophisticated scientists in industry and government workplaces. Since 2016, the Boot Camp has trained well over 200 math and statistics PhDs students with very promising results.

Over the past several decades there has been a large increase in the number of students pursuing degrees in mathematics at the graduate level. And while the number of mathematics students finishing with PhDs has been increasing, the percentage of traditional tenure-track and tenured positions has decreased precipitously nationwide. For example the percentage of tenured faculty in US higher education across all subjects has dropped 20% between

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DOI: <https://dx.doi.org/10.1090/noti2387>