First-ever gathering of Indigenous Mathematicians on November 5, 2021.

Tipping the Scales of Mathematical Leadership

The TPSE Leadership Institute

Michael Dorff, May Mei, Daniel Reinholz, and Tom Wakefield

If the past two years of the COVID pandemic have taught us anything, it is to prepare for the unexpected. Tomorrow's challenges cannot be predicted today. In the mathematics community, we need to prepare a dynamic community of leaders who will be ready to respond to these challenges as they arise. We learned how to do research from a thesis advisor in graduate school, joined an intellectual community after we received our PhD, and perhaps have a Teaching Center at our institution where we discuss pedagogy with our colleagues. However, the TPSE Leadership Institute is where we can go to prepare to become leaders at our institution, in our discipline, and at higher levels.

With support from the Carnegie Corporation of New York, TPSE (Transforming Post-Secondary Education in Mathematics) launched a Leadership Institute in Summer 2021. The Leadership Institute supports TPSE's mission to expand the capacity of the mathematical sciences community to enact change at the local and national levels, respond to future challenges, and engage in leadership positions at their institutions, in professional organizations, and within federal agencies. The Institute is designed to prepare and support a diverse group of future leaders in the mathematical community and supported an inaugural class of 17 Leadership Fellows.

The Institute offers a variety of programs to engage Fellows and offers impactful professional development. The year-long engagement in the Institute includes a two-day kick-off workshop in early summer, bimonthly webinars, bimonthly meetings between the Fellow and the Fellow's mentor, meetings and events at the Joint Mathematics Meetings, and a graduation from the program in May. A complete list of the inaugural class of Fellows and a description of their projects can be found on the TPSE website (www.tpsemath.org/faculty-participants). This program is ongoing and evolving, and it is likely that future iterations will include new activities, such as networking with prior fellows.

Learning about Leadership

The Leadership Institute begins with a two-day workshop with the goal of expanding Fellows' vision of what leadership means, exposing Fellows to new leadership skills, refining Fellows' project ideas, and increasing the Fellows' motivation to make a difference as a leader. The diverse group of presenters at the inaugural workshop included Linda Braddy, Deirdre Smeltzer, Ron Buckmire, Pamela Harris, Rachel Levy, Bill Velez, Suzy Weekes, Karen Saxe, Brit Kirwan, and Kathryn Leonard. Presenters discussed critical leadership topics such as communication, managing conflict, leadership styles, and shared their insights and perspectives on their personal leadership experiences and journey. These presentations helped reveal the hidden curriculum of leadership practice in a way that allowed Fellows to see behind the curtain and grapple with the realistic challenges that come along with leadership responsibility.

May Mei, Associate Professor and Department Chair of Mathematics at Denison University, observed "leadership isn't about the conveyance of a specific knowledge set. So what else can you do but watch the way others lead and take from those examples? My mentors and peers act as prisms to refract my own experiences through. And the leadership institute provides dedicated time to devote to this."

Tom Wakefield, Professor and Department Chair of Mathematics at Youngstown State University, remarked "The workshops and webinars stressed the importance of self-reflection when developing and refining one's leadership style. There is no one-size-fits-all or "best" style and the ability to reflect, pivot when necessary, and utilize the strengths and interests of those involved are critically important."

Working with a Mentor

Each Leadership Fellow is matched with a mentor who has expertise related to the Fellow's work and project. Mentors provide advice on leadership and serve as a sounding board for the Fellows regarding their leadership project and future leadership opportunities. Mentors for the 2021–2022 Fellows include Linda Braddy, David Bressoud, Su Dorée, Michael Dorff, Rick Gilman, Mark Green, Pamela Harris, Deanna Haunsperger, Sandy Ho, Tara Holm, Brit Kirwan, Rachel Levy, Ricardo Moena, Uri Treisman, Bill Velez, Cindy Wyels, and Stan Yoshinobu.

May Mei commented that her mentor, Rick Gillman, "has been an amazing sounding board as I process and reflect on my experience as a department chair and my forays into department-wide and campus-wide strategic planning."

Jayadev Athreya, Professor of Mathematics at the University of Washington and Director of the Pacific Institute for the Mathematical Sciences (PIMS) in Canada, proposes helping PIMS support Indigenous-led initiatives in the mathematical sciences. His mentor is Mark Green who established the Institute for Pure and Applied Mathematics (IPAM) at UCLA. Jayadev praised Mark as a mentor saying he "has been a valuable source of advice and a great sounding board as I've worked on diversifying PIMS funding base, and establishing a culture of incorporating diversity, equity, and inclusion in everything PIMS does."

Designing a Leadership Project

Each Leadership Fellow designs their own project to work on during the year they participate in the Institute. This is to help each Fellow gain further leadership experience. For each project, mentors offer advice and the Institute provides up to $1000 in financial support. Examples of projects include:

- Kamuela (Wela) Yong, Associate Professor of Mathematics at the University of Hawai'i - West O'ahu, is working on building an Indigenous Mathematicians Community. This is a community where Indigenous people can come together to encourage and provide support to each other in the pursuit of mathematics. It will serve as an inspiration for up-and-coming Indigeneous mathematicians and will educate the mathematical community about the work and stories of their Indigenous peers as well as the rich, varied cultures and histories of Indigenous peoples in general.
- Nathan Alexander, Assistant Professor of Data Science and Interdisciplinary Studies at Morehouse College, is developing a community data hub to focus on examining, communicating and advocating for more justice-oriented data practices.
- Maria Lorenz, Professor of Instruction at Temple University, proposes curricular changes to create 2-credit co-requi-

A discussion led by Nan Sattler on the theme of Managing Conflict for a meeting of the Leadership Fellows.

site courses for their entry level mathematics courses that lead to calculus.

Why participate in the Institute?

The Institute stresses that there is not a single path to leadership, and there are many different types of leaders (both formal and informal) who help move the work of our community forward.

With few leadership development opportunities devoted exclusively to the mathematical sciences, the TPSE Leadership Institute provides a unique opportunity to cultivate future leaders in our discipline and to form a valuable network among mathematicians interested in developing their leadership skills. Daniel Reinholz, an Associate Professor of Mathematics at San Diego State University, commented "As faculty members we often get stuck in our own silos, and the pressure to "publish or perish" obscures the bigger picture. This fellowship focuses on the bigger picture—developing leadership skills to help foster the type of mathematical community we'd like to see in the future—and this is of the utmost importance, especially at this time in history."

Wela Yong indicates that he "chose to participate in the Institute because I am building a community for Indigenous mathematicians and can learn best practices from established mathematical communities as well as building leadership skills. This Institute has given me the opportunity to have regular meetings with a mentor from a similar organization where I can share ideas and learn more about what works and what doesn't work." Jayadev Athreya notes that "The network of emerging leaders I've been able to connect with via TPSE has also been a tremendous resource." Tom Wakefield remarked "The Institute provided the rare opportunity to gain leadership experience and mentorship specific to the mathematical sciences. I sought the advice and ability to meet and connect with other Fellows who are interested in making a positive impact on the mathematical community and at their home institutions. It has been a tremendously valuable experience."

More information about the TPSE Math Leadership Institute and the application requirements can be found at www.tpsemath.org/leadership. Applications are due by April 15, 2022. ■

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