Initiatives to foster a community of early career and/or underrepresented researchers in Operator Algebras

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Scene Setting

Operator algebras is a branch of functional analysis with two main subareas: C^*-algebras and von Neumann algebras. Women are significantly under-represented in both.

- Striking gender imbalance: in 2015 only 17% of researchers were women; 2nd lowest percentage of women out of thirty mathematical research areas.

  

  A. Brisbin and U. Whitcher. *Women's Representation in Mathematics Subfields: Evidence from the arXiv*. The Mathematical Intelliger, vol 40(1) (2018), 38–49.

- Very few women on editorial boards; conferences with few woman on organising committees; in 2024 the annual Canadian Operator Symposium (COSy) had no women speakers....

Overview of Initiatives

Young Mathematicians in C*-algebras (YMC*A)

“A conference organised for and by master/Ph.D.-students and postdocs in Operator Algebras (both von Neumann and C*-algebras) and related areas, with the goal of fostering scientific and social interaction between young researchers.”

Operator Algebra Mentor Network (OAMN)

“OAMN is committed to fostering gender diversity within mathematics, particularly in the field of operator algebras. Established in response to the need for mentorship and support for underrepresented individuals facing abuse or harassment, OAMN operates on a three-tier structure – senior mentors, junior mentors, and mentees.”

Women in Operator Algebra (WOA)

One-week conferences where women work in pre-established teams on research problems with the goal of eventually writing a research article in a journal article.

Overview of Initiatives (cont'd)

Groundwork for Operator Algebras Lecture Series

"Using a combination of mini-courses, problem sessions, and expository talks, this program will provide graduate students with an accelerated introduction to the basics of operator algebras. GOALS aims to increase participation and retention in the field by persons from traditionally underrepresented groups by removing technical barriers to the field and building a strong community of support amongst the participants, contributors, and organizers."

Young Mathematicians in C*-algebras

- Started in 2015 in Copenhagen with about 100 participants. Then Münster, Copenhagen, Leuven, Copenhagen,....,Leuven, Glasgow, Copenhagen.
- Modeled after the "Young Topologists Meeting" for algebraic topologists.
- 1 week, 2-4 minicourses plus talks by participants.
- Advisory committee of senior researchers, but students and ECRs organise.
- Accommodation provided in hostels.
- Funding: host institutions and/or large grants of senior researchers; ad-hoc small grants; NSF funding for US participants; lecturers often fund themselves.
- In 2018 and 2019, conference was preceded by Young Women in C*-Algebras (YWC*A)
- 2019 group photo (I counted 20 women in the photo; apparently there were about 130 participants.)

Operator Algebras Mentor Network

- https://oamentornetwork.wordpress.com/.
- OAMN: supporting early-career women researchers. European Women in Mathematics Newsletter, Feb. 2022.

"During the 2018 YMC*A, it became apparent that several early-career women had lacked mentors to advocate on their behalf in a situation of abuse or harassment by a more senior mathematician. In some cases, little or no action was taken within their department or institution. Such a lack of support has already led multiple women in our mathematical community to leave positions early or, in order to avoid risking their career's longevity, to endure distress until they could find another position."

"The Network began with 14 of the women participants of the YMC*A 2019 as mentees. It created its first groups in Feb. 2020 with 14 Mentees, 13 Junior Mentors, and 10 Senior Mentors, split into 12 groups."

OAMN con’td

- OAMN poster.
- Mentor groups and Board both operate on a three-tier structure – senior mentors, junior mentors, and mentees.
- Activities: mentoring, career advice, and community building, facilitated through annual mentor group rematching and events such as conference meet-ups, career panels, and mentor-focused workshops.
- Mentees are women, mentors can be of any gender.
- Now spans 26 countries across North America, Europe, Asia, Africa, the Middle East, and Oceania.
- Currently 32 mentees, 29 junior, 22 senior, 9 affiliates, 36 alumni.
- Great community building, though success varies across mentor groups.
- I have one big concern....

Women in Operator Algebras

Collaborative-research workshops.

- Started organising in 2016, workshops held at BIRS in 2018, 2021 (hybrid) and 2023.
- Modelled on "Women in Number Theory".
  - Groups of 5–7 with 2 co-leaders.
  - Co-leaders design a research project, provide background reading prior to workshop.
  - First and last day of workshop, brief lectures to describe problem and progress.
  - Organisers apply for funding to support travel.
- Advertised widely.
- To be respected by the community, outcomes had to be journal articles.
- Very positive feedback from participants; very respected by the community, women are now much more visible at conferences.
- Reinforced OAMN.

Groundwork for OA Lecture Series

Aims to increase participation and retention by traditionally underrepresented groups by removing technical barriers.....
https://www.ipam.ucla.edu/programs/summer-schools/groundwork-for-operator-algebras-lecture-series/

- US-based, held at Institute for Pure and Applied Math.
- NSF + funding by organisers' institutions/grants.
- 20-30 masters and PhD students each year.
- 2 minicourses on C*-algebras and von Neumann algebras, with problem sessions and TAs, over 2 weeks.
- Culminating 2-day conference with invited speakers.

GOALS (cont'd)

From a NSF report for 2020 and 2021 programs: self-reported demographic information for the 39 total participants:

- (gender) 13 identified as female, 1 as female and gender nonconforming, 1 did not report, 25 as male;
- (race) 1 identified as an American Indian or Alaska Native, 8 as Asian, 2 as Black or African American, and 21 as White;
- (ethnicity) 8 participants identified as Hispanic or Latino.

Example of hope

https://www.birs.ca/events/2024/5-day-workshops/24w5175

Discussion

- Initiatives in other areas of mathematics?
- In Asia and Oceania?