Committee for Women in Mathematics

CWM funded activity reports in 2022

Summary

The International Mathematical Union Committee for Women in Mathematics sponsors a number of initiatives aimed at establishing or supporting networks for women in mathematics, preferably at the continental or regional level, and with priority given to networks and individuals in developing or emerging countries.

In total, ten initiatives were approved for 2022.

The first three are regional events, involving several countries : the Latin American and Caribbean Workshop on Mathematics and Gender, a hybrid event with 15 attendees in person and 165 attendees online , the second African Women in SageMath Workshop, in Nigeria, with 65 attendees (among them 55 women), and finally the third, held in Tajikistan, where 74 scientists took part, including 27 female researchers from 4 countries from Central Asia.

The next five events were national events. The Gabonese Women in Mathematics Association was launched during a workshop with 45 participants (among them 30 women), and attendees from Cameroon, Congo and France. The II Brazilian Meeting for Women in Mathematics had a hybrid work model, with 110 in person attendees (among them 87 women), broadcasted via YouTube. In Ghana, a one-day hybrid workshop gave an opportunity for 273 participants (among them 181 women) to rethink about the challenges prompting the gender gap in science, with attendees from Ghana, Nigeria, Uganda and Zambia. A event focusing on the networking of women mathematicians was held in Oman, for the first time in this country, with participants from Bangladesh, Nepal, Qatar, the UAE, Lebanon, Pakistan, the Philippines, Sri Lanka, and Turkey, as well as Bahrain, Austria, and France, in person and via online mode. There were 50 participants (among them 30 women). In India, the activity supported was the Mathematical Workshop for Young Women, with 68 participants selected from more than 600 candidates.

The remaining two of the approved activities will be finalized in 2023. Indeed, the creation of the Asian Oceanian Women in Mathematics (AOWM) website is in progress, as well as the update of the African Women in Mathematics Association (AWMA).

Finally, the special day for women in mathematics at the Pan African Congress of Mathematicians PACOM 2021 (held in 2022) which had been proposed by AWMA was canceled.

We are happy to conclude that the organizers of the CWM sponsored events were able to invent new ways of implementing initiatives, improving the connections between Women in Mathematics all over the world.

Marie-Françoise Roy and Neela Nataraj

CWM funded Initiatives in 2022[1]
Regional events
Mexico

Latin American and Caribbean Workshop on Mathematics and Gender

Title, location and data :
Latin American and Caribbean Workshop on Mathematics and Gender (22w5053)**,** Oaxaca, México. From 15th to 20th May 2022.

Contact Information: Martha Gabriela Araujo-Pardo, gabyaraujop@gmail.com, garaujo@im.unam.mx.

Supported Activity Details:
The workshop had a hybrid format with 15 people attending in person and 165 people attending remotely (counting the participants, Organizing Committee, and special invites). Approximately 98% of the participants were women or people from the LGBTQ+ community.
Participants were from the following countries: Argentina, Belgium, Brazil, Chile, Colombia, Cuba, Dominican Republic, EEUU, Mexico, Panama, Paraguay, Peru, Spain, and Uruguay.

Sponsors:
1. Committee for Women in Mathematics. International Mathematical Union: Airplane tickets for two Mexican participants and a partial ticket for one Argentinian participant. Bus tickets for two Mexican participants and funding for food and for local attendees who were not staying at "Casa Matemática Oaxaca" (conference hotel). Amount: 1000 euros.
2. BIRS-Oaxaca financed all local expenses for all participants.

Context of the Activity:
The workshop was organized by three members of the Gender and Diversity Committee of the Mathematical Union of Latin America and Caribbean (UMALCA), Carolina Araujo, Gabriela Araujo-Pardo and Andrea Vera, and Silvia Fernández-Merchant, a Mexican Mathematician that works in California State University. This group of mathematicians proposed a multidisciplinary research workshop in mathematics with a strong scientific framework on Gender and Mathematics functioning as its hub. One of our main goals was the creation and enhancement of collaboration networks among Latin American women working in high-level mathematics.
Aligned with this plan, the workshop consisted of two general components. The first one sought to jumpstart high-level mathematical research collaborations among members of the Latin American community through the creation of research groups in various areas of mathematics.
The scientific framework of the Gender and Mathematics component of this workshop was based on the work carried out by the Chilean research Project PIA Anillo SOC180025 "Women in mathematics in Chile, sociology of a scientific field from an interdisciplinary and gender perspective".
(From now on: "Anillo de Matemáticas y Género", www.anillomatematicasygenero.cl/.)

A short report on activities about women in mathematics:
In the afternoons we had hybrid activities related to gender and mathematics, organized by the "Anillo de Matemáticas y Género", www.anillomatematicasygenero.cl/.
We had originally proposed that one of the research groups would be on gender and mathematics. However, this was intended to be a fully face-to-face workshop. Given that the format of the

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1   Reports provided by the organizers of the initiatives.

workshop was hybrid and that only 15 people could attend in person, we decided to make the gender axis a transversal axis for the whole workshop, i.e., to dedicate every afternoon of the week to a talk or workshop on gender, facilitated by specialists in the area. This, together with other factors, gave priority to mathematicians attending the workshop in person. Nevertheless, the mere fact of having brought together 15 mathematicians in person and more than 50 in an online format to discuss topics of science and gender from a theoretical point of view constitutes an innovative and novel event of tremendous power to generate knowledge.

Broadly speaking, the activities developed in this axis were:

- Introductory talk by mathematician Andrea Vera-Gajardo: "Mathematics and gender: a map and a plan".
- Talk by social science researcher Carla Fardella: "The importance of gender in the scientific profession".
- Workshop on Impostor Syndrome, by Karina Batistelli and Julia Plavnik (mathematics).
- Talk by Uzuri Albizu, a researcher in mathematics education and gender: "Science and gender: crossroads and interstices. Reflections on experiences, optics, and practices of feminist scientists".
-Talk on concrete proposals to close gaps by mathematician María Isabel Cortez: "Gender Gap in Mathematics: from experience, research, and action".
- Talk by researcher and philosopher Eulalia Pérez Sedeño: "Feminist epistemology and epistemic justice".

It should be noted that there was great interest from all participants in discussing these topics, each talk and workshop gave rise to very interesting discussions that lay the groundwork for an emerging line of research in mathematics and gender.

A short report of academic activities:
In the first hour in the morning, we started the day with a plenary talk on one of the topics in mathematics that we research in this workshop, the rest of the morning was used to work on research groups:

1) Research group on Algebraic Geometry – Organized by Carolina Araujo.
2) Research Group on Algebraic Quantum Groups – Organized by Eugenia Ellis
3) Research group on Dynamical Systems - Organized by Luna Lomonaco
4) Research group on Combinatorics and Discrete Geometry – Organized by Silvia Fernández-Merchant.
5) Research Group on Differential Geometry and Differential Equations – Organized by Gabriela Ovando.
6) Research group on Extremal Graph Theory – Organized by Silvia Fernández-Merchant.
7) Research group on Probability Theory – Organized by Laura Eslava
8) Research group on Gender and Mathematics – Organized by Andrea Vera

Outreach Efforts and Creation of Collaboration Networks:
All the groups were interested in the creation of collaboration networks, because of this workshop, collaboration networks have been created between the different research groups and in some of them, specific groups of Latin American and Mexican women mathematicians have been created in the different research areas. As two examples we have the group on Discrete Mathematics called "Matemáticas InDiscretas" and the seminar in Mexico called "Aleatorias y Normales" that aims to create a network among Mexican female mathematicians who work in probability and statistics and is organized by the participants of this workshop in this area. There are probably other groups that we don't know about that are in formation and consolidation.

Activities outside of the workshop with the presence of the workshop attendees:
We consider that it is important to share the outreach activities that were carried out to strengthen links with the local community of Oaxaca, taking advantage of the presence of workshop attendees:
1. A round table that took place on Wednesday 18th at the Public Library "Andres Henestrosa". The

organizers were Sara Carrillo (Universidad Autónoma Benito Juárez de Oaxaca) and Luis Miguel García (UNAM and CGD Umalca). The panelists were: Eugenia Ellis, Natalia Garcia-Colin, Irma Leon, Gabriela Ovando, and Andrea Vera. The round table was titled Possible futures: experiences of Latin American women in mathematics and was held in a hybrid modality.

You can see the video here https://www.youtube.com/watch?v=vAXJ7IMQH0A, attended by about 40 people in person.

2. A children's workshop on a Public Library called Caminando sobre fichas de dominó taught by Dr. Loiret Alejandria Dosal Trujillo.

3. A talk at the Universidad Benito Juárez del Estado de Oaxaca (UABJO), Gráficas y Diseños de Bloques: Una Buena amistad. The speaker was Dr. Gabriela Araujo Pardo, the actual President of the Mexican Mathematical Society and organizer of this workshop. We think that, in this position, she is the right model for young student girls in mathematics.

Conclusions and recommendations:
It is important to note that this workshop opened collaboration networks and networks between Latin American mathematics and even more between mathematics from the same country.

Although many of us have been working intensively together since 2016 (or before) on issues of inclusion and gender, as can be well observed three of us belong to the Gender and Diversity Commission of the Mathematical Union of Latin America and the Caribbean. The creation and increase of new collaboration networks are fundamental and this workshop opens these spaces for work and reflection. We hope to continue having these spaces where the work among women who do mathematics is getting stronger and allows collaboration between this group and their students.

Link of the conference: https://www.birs.ca/events/2022/5-day-workshops/22w5053

Nigeria
Women in SageMath Workshop

Summary:
This workshop was a collaborative conference addressed to young African researchers. Particularly, but not exclusively, to young female researchers. The workshop attracted participants from some West African countries. There were at least 6 research projects. The workshop followed the scheduled time-table of a full week of participants working in groups, engaging in talks and panels on Women in Mathematics, presentation of AWMA, the CWM, and CIMPA opportunities and group presentation. The workshop was held during the week, Monday through Friday, with official times beginning at 9:00 am and ending at 5:00 pm, with a coffee break and a lunch break.

Title, location and date :
Women in SageMath, Pan African University Life and Earth Sciences Institute (including Health and Agriculture) (PAULESI), University of Ibadan-Ajibode Road, 200132, Ibadan, Nigeria, 12 – 16 September 2022

Contact Information:
Name: Ini Adinya
Address: Room 203, Department of Mathematics, University of Ibadan.
Email address: iniadinya@gmail.com

Supported Activity Details:
Number of attendees: 65
Number of women attendees: 55
List of Countries represented: Benin Republic, Burkina Faso, Cameroun, France, Germany, Nigeria, Switzerland, Uganda.

Context of the Activity
The workshop is part of the long tradition of conferences (https://wiki.sagemath.org/Workshops). Since 2007, more than 100 Sage Days have been organized around the world. During these days, participants discover the SageMath software, develop their programming skills and contribute to the development of the software. SageMath is free mathematics software developed by the research community, students, and research engineers. It relies heavily on voluntary contributions as well as on the one-off funding of research projects. Women in SageMaths have already been organized in six different countries (United States, South Korea, France, Canada, Greece, and Senegal). All have been successful (see for example http://africanwomeninmath.org/activities/conference/women-in-sage-in-senegal organized by E. Lorenzo García and M.-F. Ouedraogo in September 2021).

A short report on activities about women in mathematics:
The workshop followed the scheduled time-table of a full week of participants working in groups, engaging in talks and panels on Women in Mathematics. Prof. Marie Françoise Ouedraogo gave a talk about the African Women in Mathematics Association (AWMA) and the Committee for Women in Mathematics (CWM) and their activities. Prof. Elisa Lorenzo Garcia gave a presentation on CIMPA, other related opportunities for researchers, and networking. During this session, participants talked about their research experiences.

A short report of academic activities:
Two months before the conference, an online event of introduction to Sage and opening of a workshop chat via the Zulip platform to encourage contact between the participants and the group leaders before the in-person part of the workshop was done. After the opening ceremony on the first day, we started by getting Sage installed on individual laptops and a general overview of Sagemath was presented by Prof. Elisa. During the other days, we had break-out sessions with five groups as follows:
- Combinatorics Group facilitated by Dr. Olivia Nabawanda, Mbarara University, Uganda,
- Complex Analysis Group facilitated by Dr. Anna Somoza (online),
- Cryptography/Number Theory Group facilitated by Dr. Sabrina Kunzweiler, Ruhr-University Bochum, Germany),
- Group Theory Group facilitated by Dr. María Cumplido Cabello, Universidad de Sevilla, Spain
- Applied Mathematics Group facilitated by Dr. Ini Adinya, University of Ibadan, Nigeria.
The last day was devoted to the presentations of the projects from each group and the closing ceremony. Representatives for each group presented the summary of what the group had learned so that members from other groups could also benefit. After the presentation of work, we had a Girls' outreach event. A talk was delivered to secondary school girls by Professor Elisa Garcia after which a quiz competition was conducted among the schools present.

Conclusions and recommendations:
Most of the participants were new to Sagemath, so we started with the basic operations using Sagemath. The participants were fascinated with the features in Sagemath. They were also intrigued by the fact that their work could also be saved as a Latex document. They worked hard at times late into the night on their own. They were excited about the things they could do with Sagemath in their research. The networking time was also a great opportunity to get to know women also working in their area of specialization and opportunities available for research. The participants in all the groups desired that more such workshops should be held regularly. The participants also recommended that for future workshops, the time length should be at least two weeks. Overall, we had a great time.

Tadjikistan
Modern Problems of Mathematics and its Applications

Summary:
The International Scientific and Practical Conference "Modern Problems of Mathematics and its applications" was held by the Department of Mathematical Analysis and Theory of Functions of the Faculty of Mechanics and Mathematics of the Tajik National University with the support of the Committee for Women in Mathematics of the World Union of Mathematicians on October 20-21, 2022. 74 scientists took part, including 27 female researchers from 4 countries. The best scientific works of young women participating in the conference were awarded with Diplomas and the conference prize. The work of the International Scientific and Practical Conference "Modern Problems of Mathematics and its applications" was shown on one of the Central TV channels of the Republic of Tajikistan on October 21-22, 2022 5 times.

Title, location and date:
International scientific and practical conference "Modern problems of mathematics and its application", Republic of Tajikistan, Dushanbe, October 20-21, 2022.

Contact Information:
Rajabova Lutfiya, Doctor of Physical and Mathematical Sciences, Professor, Head of the Department of Mathematical Analysis and Theory of Functions of the Tajik National University.
Address: Republic of Tajikistan, Dushanbe, Chashmasor30/2 str.,4 ; E-mail: lutfya62@mail.ru

Supported Activity Details:
Number of participants: 74 participants, 27 of them are women. The following countries are represented at the conference: Republic of Tajikistan, Republic of Uzbekistan, Republic of Kazakhstan, Russian Federation.

Context of the Activity:
Development of scientific cooperation of women mathematicians of Central Asian countries: discussion of modern problems and problems of mathematics, its applications, obtained scientific achievements of mathematicians, especially women mathematicians; contribution of women mathematicians of Central Asia to the development of mathematical science.

The Scientific and Practical International Conference "Modern Problems of Mathematics and its Applications" is a continuation of the projects in Central Asia carried out with the support of the Women's Committee of the International Union of Mathematicians - an international scientific conference held in Alma-Ata in 2016 under the chairmanship of Bakhyt Alipova, PhD President of CAWMA.

A short report on activities about women in mathematics:
- 9 women represented Republic of Tajikistan
-12 women represented Republic of Uzbekistan
- 5 women represented Republic of Kazakhstan
- 1 woman represented Russian Federation

2 participants Nurtazina Karlygash and Serimbekova Akniet representing Republic of Kazakhstan, Astana, Gumilyov Eurasian National University made reports, other participants of the conference could not come for objective reasons.

A report on the contribution of women mathematicians to the development of mathematical science in Tajikistan was presented at the plenary session of the conference.

The diploma of the conference and the prize were awarded to three scientific reports of the participants of the conference:

1st place – Shukurova G.N., a young teacher of the Department of Higher Mathematics of the Tajik National University for the report "On the theory of symmetric three-dimensional integral equations of the Volterra type with a singularity and a logarithmic singularity in the core", scientific supervisor Professor Radzhabova L. N.

2nd place – Serimbetova A., Master's student of the L.N. Gumilyov Eurasian National University for the report "Algorithm for source identification in graph from the point of the machine learning view", supervisor Associate professor of the L.N. Gumilyov Eurasian National University Nurtazina K.

3rd place - Rustamova H.R. - lecturer of the Department of Information and Communication Technologies of the Tajik National University for the report "Economic and mathematical model of potato production and marketing-one of the elements of food independence ", scientific supervisor Professor A. Juraeva.

Along with the financial support of CWM, the Rector's Office of the Tajik National University provided comprehensive organizational and financial support, which consisted of providing local transport expenses to conference participants, organizing a coffee break for 2 days, renting a conference hall, and media coverage.

A short report of academic activities:
At the plenary session of the conference, the Rector of the Tajik National University, Doctor of Economics, Professor Khushvakhtzoda K.H., Dean of the Faculty of Mechanics and Mathematics, Candidate of Physical and Mathematical Sciences, Associate Professor Kosimov I.L. made a welcoming speech.

Plenary reports were made by:

Radjabov N. Redefined system of integral equations of Voltaire type, for which the entire boundary is a singular line. Tajik National University, Dushanbe, Tajikistan.

Dzhangibekov G., Savlatov S.F. On the polycernic half-plane function Im>0 and its relation to two-dimensional integral operators. Tajik National University, Dushanbe, Tajikistan

Nurov I.J., Karimov M.M. Homotopy completely continuous vector fields in bifurcation problems. Tajik National University, Dushanbe, Tajikistan

Nurtazina1 K.B., Murzabekova2 G.Y., Kazibayeva3 S.T. Controllability and Inverse Problem For The Wave Systems. L.N. Gumilyov Eurasian National University, 3 Seifullin University, Astana, Kazakhstan.

Shamsudinov F.M., Valiev R.S. On one redefined system of first-order differential equations with two internal singular lines. Bokhtar State University named after Nosira Khusrava, Bokhtar, Tajikistan.

Radzhabova L.N. About the contribution of women mathematicians in the development of mathematical science in Tajikistan. On the theory of a redefined system of Volterra-type integral equations with special lines. Tajik National University, Dushanbe, Tajikistan.

Recommandations:
It is necessary to strengthen the cooperation of mathematical scientists, especially women mathematicians and young researchers from Central Asian countries, to develop cooperation of mathematical scientists from Central Asian countries, especially women mathematicians, with scientists, as well as with higher educational institutions and scientific organizations of developed countries.
The Mathematics of Central Asian countries should take an active part in the projects of the World Union of Mathematicians.

Involve young people in research activities. Create favorable conditions for research activities for young girls and women.

Regularly hold International scientific conferences, round tables and seminars.

National events

Gabon

Workshop for launching the Gabonese Women in Mathematics association

Summary :
As part of the launching of the Gabonese Women in Mathematics Association, we organized a workshop on the theme : "Mathematics at the heart of development, a look at the Gabonese Mathematician Woman" This workshop was intended as a workshop for the popularization of mathematics, a place of exchange between women in the mathematical community. It was punctuated by an opening ceremony presided by Professor Guy Martial Nkiet, Research Professor in the Mathematics Department of the Faculty of Sciences of the University of Sciences and Techniques of Masuku, who in his speech urged women, and especially the Gabonese woman to feel a full member of the Gabonese mathematical community, to work for the awareness of young girls to scientific studies. The two first days were devoted to the talks and panel discussions. During the last day, Gabonese women mathematicians worked between them in order to finalise the statutes and officially implement the Gabonese women in Mathematics Association. The workshop ended with a presentation of the certificates of participation.

Title, location and dates:
The first workshop of GABWMA, Libreville, Gabon , from 2022-04-05 to 2022-04-07.

Contact Information:
Isabelle Ngningone Eya, i.ngningoneeya@gmail.com, neyi94@yahoo.fr

Supported Activity Details:
Number of attendees: 45 participants
Number of women attendees: 30 women.
List of Countries represented: Cameroun, Congo, France, Gabon.

Context:
Gabon doesn't have an organization for women in mathematics like some other countries in Africa and worldwide. Officials in Gabon, namely in my university (the Vice-Chancellor, the Dean of the Faculty of Science, and the head of the Mathematics Department) recognize commitment to combating under-representation of women in science and mathematics. But no formal organization of women in mathematics has been put in place to my knowledge in the country yet. However, some exchanges and discussions between Gabonese women mathematicians have been initiated since January 2019 in order to share our teaching activity and teaching documents. We also shared useful administrative information concerning our professional careers. The first official meeting of the Gabonese women mathematicians took place on 30 October 2021 in Libreville in a convivial room offered by an association concerned with the development of Science in Gabon.
The equality of women and men today is generally regarded as established, as definitely acquired. What is the actual situation in the school or university as regards mathematics? In particular, what about Gabon?
Ubiquitous in industry or services, mathematics also appears in many other sectors, influencing our daily lives and contributing to the resolution of various problems : energy, health, environment, climatology, sustainable development, etc. at the service of the great challenges of today and tomorrow.
They are at the heart of development, which is why today we focus on Gabonese women mathematicians who also have to contribute to this development.
This workshop was intended to be a meeting of women and men having everything in common mathematics, a moment of exchange, of discussions, on the diversity of the fields of mathematics. The idea being to get the message out, mathematics is also for you women and girls of Gabon.

Activities about women in mathematics:
On the activities about women in mathematics, we had two presentations online. We have first a presentation by Cécile Armana, who told us about her career as a mathematician in France, and gave her testimony. Then we had a presentation by Marie Francoise Roy, who presented to us the various associations of women in mathematics in the world, their objectives, their actions.
We had two round tables, a first round table on the theme "Women mathematicians in the sub-region of Central Africa", the participants from Cameroon and Congo, and the Gabonese participants were able to share their different experiences. The Secretary General of the Cameroon Women in Mathematics Association(CAWOMA) was able to tell us about the establishment of this association. The women present were able to describe the difficulties they encounter in the exercise of their profession, and the concerns they have for reconciling family life and making a career.
A second virtual round table on the theme "The challenges of the advancement of the female mathematician" was planned for the second day but this one was not held because of technical problems. However, we were able to hold a round table around the theme of the gender gap, the awareness of boys and girls. In particular, we asked the teachers present to tell us about their attitudes in the classroom, their behavior towards their male colleagues.
On the last day, we held our general assembly, finalized the statutes, and then we set up the association's management team.
We relied on the statutes of the AWMA (African Women in Mathematics Association).

Academic activities:
We had nine presentations, two of which were by men, one by the only female PhD student in mathematics currently at the Masuku University of Science and Technology in Gabon.
On the first day the talks were :

Marthe BETOUE ETOUGHE, Ecole Normale Supérieure (Libreville, Gabon) "Partial Differential Equations at the interface of many scientific problems."

Paule Joyce MBENANGOYE, University of Science and Technology of Masuku (Franceville, Gabon) "Stochastic processes and pandemic strategies"

Winnie OSSETE INGOBA, Marien NGOUABI University (Brazzaville, Congo) "What is Tropical Geometry : Amoebas in Mathematics, A new idea about Ronkin's currents or function"

Françoise NGOUFACK, Omar Bongo University (Libreville, Gabon) "Nash balance and stable contracts"

On the second day, we had:

Anne HANWA, University of N'Gaoundéré (Cameroon), Secretary General of the Cameroon Women in Mathematics Association (CAWOMA). "Elliptic nets of ranks 1 over Edwards model of Elliptic curves"

Tony EZOME MINTSA, University of Science and Technology of Masuku (Franceville, Gabon) "Algebraic equations for the security of our personal data"

Saidou MAHMADOU, « Estimating COVID-19 Excess Mortality from local civil registries and facilities in Gabon », Lambaréné Medical Research Centre (CERMEL, Gabon)

Isabelle NGNINGONE-EYA, University of Science and Technology of Masuku (Franceville, Gabon) "Mathematics and Infectious Diseases"

On the second day, a participant, former student of the Faculty of Science, currently a civil aviation technician, asked us for a presentation, which she was able to do the last day before the general meeting :

Phicillia Leslie NYANGUI, "Mathematics at the heart of development : case of transmission and reception of data in air navigation"

Through these lectures, we wanted to show that mathematicians are everywhere even where we least expect them.

Conclusions and recommendations:
This workshop allowed us once again to highlight the problems encountered by Gabonese women in Mathematics, and more particularly for the continuation of their careers. Possible solutions have been identified, such as distance learning. We decided to look for universities that offer such possibilities because many women teachers in high school want to continue their careers but due to lack of information and funding, they have had to give up.
In order for our emerging association to serve future generations, we have decided to carry out actions in primary and secondary schools through science awareness campaigns, mathematics

rallies and participate in all the days celebrating mathematicians, so that the Gabonese girl can see female role models.

Considering the small number of women in mathematics in Gabon, the vast majority of secondary school teachers, and their dispersion in the different provinces of Gabon, we opted for at least one meeting per year, while continuing our discussions and sharing through the discussion forum.

Brasil

The II Brazilian Meeting for Women in Mathematics

Summary:

The II Brazilian Meeting for Women in Mathematics (2º Encontro Brasileiro de Mulheres Matemáticas - 2º EBMM) took place at the Benedito Nunes Events Center, at the Federal University of Pará (UFPA), in Belém do Pará, Brazil. The event had a hybrid work model, with in person and remote participation, broadcasted via YouTube (link).

Title, location and dates:

II Brazilian Meeting for Women in Mathematics (2º Encontro Brasileiro de Mulheres Matemáticas - 2º EBMM), Brazil, Belém, Pará, 2022-06-17 to 2022-06-18.

Contact Information:

Juliana Silva Canella

Avenida Governador Magalhães Barata, number 979, Apartment 208, Block 2, São Brás

66063-904 Belém, Pará, Brazil.

E-mail: jscanella@ufpa.br

Supported Activity Details:

The data in the table below were extracted from the registrations made previously, considering only in-person participations. They were asked about gender identification:

NUMBER OF ATTENDEES					
	WOMEN	MEN	NON BINARY	NOT ANSWERED	TOTAL
Students	50	12	1	0	63
Professors/researchers	37	9	0	1	47
TOTAL	87	21	1	1	110

The data in the table below show the regions of the country and the states that had representatives at the event:

STATES BY REGION				
NORTH	**NORTHEAST**	**MIDWEST**	**SOUTHEAST**	**SOUTH**
Acre (AC), Amazonas (AM), Pará (PA)	Bahia (BA), Ceará (CE), Paraíba (PB), Pernambuco (PE), Rio Grande do Norte (RN)	Distrito Federal (DF), Goiás (GO)	Minas Gerais (MG), São Paulo (SP), Rio de Janeiro (RJ)	Rio Grande do Sul (RS)

Context of the Activity:
In 2018 the World Meeting for Women in Mathematics took place in Rio de Janeiro, a satellite event of the International Congress of Mathematicians (ICM). The following year the first Brazilian national event for women in mathematics was held, in July 2019. Also in Rio de Janeiro took place the Brazilian Meeting for Women in Mathematics (EBMM). These initiatives have led the Brazilian mathematical community, especially women, to a great debate and confrontation about the gender imbalance in Brazilian mathematics. Aiming to expand these discussions and to promote scientific activities of women in mathematics, we proposed the II EBMM. The proposal to hold this event in 2022 originated due to the fact that the first edition had been held almost 3 years ago and also because the (WM)^2 would also take place this year. One of the highlights of the first edition of the EBMM was the involvement and participation of women from all regions of the country. In order to maintain this philosophy, as well as to seek regional integration of mathematics, we proposed the event be held as a satellite event of the X Brazilian Mathematics Biennial Conference, in the city of Belém, in the northern region of Brazil.

Due to a series of uncertainties caused by the pandemic situation and thinking about fulfilling our goal of reaching the largest possible number of participants, the 2nd EBMM was thought and structured with live activities broadcasted in the YouTube Channel of the Mathematics Faculty, ICEN/UFPA, with the possibility of interaction via chat, and some parallel live and remote activities. The transmitted activities were: roundtable discussion, scientific lectures, presentations of projects and initiatives, presentations of mathematical dissemination projects, and videos of experience reports, the latter preceding each of the presentation activities. The non-transmitted activities, which took place simultaneously in person and remotely, were the poster sessions and some project initiatives previously selected by the Scientific Committee.

A short report on activities about women in mathematics:
The event addressed topics such as Gender in Mathematics, Post-Pandemic University Policies, Motherhood and Maternity: impacts on professional career, Amazonian Women in Mathematics, Racial/Gender Violence in the academic environment. In addition to discussions involving teaching and learning in mathematics from Basic Education to Higher Education.The list of Projects and Initiatives Implemented or To be Implemented (only in Portuguese) may be found attached (APPENDIX A) to this report.

Lectures

Title: *Mulheres nas Exatas: insurgências necessárias (Women in Exact Sciences: necessary insurgencies)*
Speaker: Maria Cristina Elyote Marques Santos
Universidade do Estado da Bahia – UNEB

Title: *Os desafios da universidade pública pós-pandemia da Covid-19 (The Challenges of the Post-Covid-19 Public University)*
Speaker: Simone de Almeida Delphim Leal
Universidade Federal do Amapá – UNIFAP

Roundtables

Mulheres Amazônidas na Matemática (Amazonian Women in Mathematics)
Moderators: Irene Castro Pereira (UFPA) and Maria Rosilene dos Santos (UFAM)
Participants: Jane Beltrão (UFPA) and Joelma Morbach (UFPA)

Maternagem e Maternidade: impactos na carreira profissional (Maternity and Mothering: impacts on professional career)
Moderators: Maité Kulezka (UFRPE) and Luciana (UFJ)
Participants: Carolina Bhering de Araujo (IMPA), Janice Pereira Lopes (UFG) and Natália Conceição Silva Barros Cavalcanti (IFPA)

Violência de Gênero/Raça no Ambiente Acadêmico (Race/Gender Violence in the academic environment)
Moderators: Simone Moraes (UFBA) and Juliana Miranda (UFAM)
Participants: Christina Brech (USP), Eliade Ferreira Lima (UNIPAMPA) and Zélia Amador de Deus (UFPA)

Projects for Mathematical Dissemination

1. *"BoaMática"*, Vanessa Balbina da Silva Lopes Miguel – Universidade Estadual do Rio de Janeiro (UERJ)
2. *"Matemáticas Negras" (Black Female Mathematicians)*, Manuela da Silva Souza – Universidade Federal da Bahia (UFBA)
3. *"MatematiQueer"*, Renata Arruda Barros – Instituto Federal do Rio de Janeiro (IFRJ)

Short Experience Reports Videos

- Evelin Heringer Manoel Krulikovski, *Minha experiência na Matemática*, Universidade Nova de Lisboa
- Gisele Pereira de Oliveira Xavier, *O Uso de Oficinas Pedagógicas na Disciplina de Laboratório de Ensino de Matemática: Ambiências Formativas no Ensino Remoto Emergencial*, Universidade do Estado de Minas Gerais (UEMG)
- Karolline Vitória Soares da Silva, *Minha vida acadêmica na Matemática*, Universidade Federal do Amazonas (UFAM)
- Kelly Brandão Maciel, *Tabuleiro Math*, Universidade Federal da Bahia (UFBA)
- Kelly Brandão Maciel, *A Matemática dos Penteados Trançados,*, Universidade Federal da Bahia (UFBA)
- Manuela Longoni de Castro, *O resgate através do MaEs de Gurias*, Universidade Federal do Rio Grande do Sul (UFRGS)
- Maria Clara Batista Baia, *Minha experiência na Matemática*, Universidade Federal do Pará (UFPA)
- Sandra Maria Maciel dos Santos, *A experiência dos programas PIC e OBMEP: a presença feminina no município de Coari*, SEDUC Coari, Amazonas

A short report of academic activities:

Next we include the list of all the lectures in Mathematics. There were also poster presentations.

Lectures

Title: *Alguns comentários sobre teoria da percolação (A Few Comments on Percolation Theory)*
Speaker: Maria Eulália Vares (IM/UFRJ)

Title: *Sobre o Comportamento Aritmético de Números de Liouville em Funções Racionais (On the Arithmetical Behavior of Liouville Numbers in Rational Functions)*

Speaker: Ana Paula Chaves (UFG)

Conclusions and recommendations:

The 2nd Brazilian Meeting of Mathematical Women brought together women who work in mathematics, from basic education to higher education, students and teachers, from basic education to university education, as well as researchers from research institutes, presenting and getting to know the work of their counterparts, discussing issues inherent to the construction of a mathematical environment, of dissemination, teaching and research, in which science is the protagonist, and that the specificities of different areas, as well as the regional ones, are respected. The EBMM, once again, provided ample space for participants to speak and listen, both for those who participated in person at the Benedito Nunes Events Center at UFPA, and for those who participated remotely through the YouTube channel of the Mathematics Faculty ICEN/UFPA.

On the one hand, there were strong manifestations alerting to the gender and ethnicity/race difficulties, still present in professional environments and academic structures, which must be faced and fought against. On the other hand, there was also encouragement, as many young participants reported that they felt encouraged to pursue mathematics. The discussions at the meeting also enabled an exchange of information and research that can result in partnerships and new initiatives in Mathematics.

The organizing committee intends to keep the 2nd EBMM webpage, https://sites.google.com/view/iiebmm, active for possible consultations, as well as the videos of the transmissions on the Mathematics Faculty ICEN/UFPA channel on YouTube. In addition, the participants will be invited to fill out an evaluation form, pointing out suggestions and future perspectives for the event. At the closing ceremony it was decided that the 3rd Brazilian Meeting of Mathematical Women will take place in 2024 in Salvador, Bahia. As a final product of the 2nd Brazilian Mathematical Women Meeting, the Organizing Committee will make an e-book with the activities, experiences, projects and people involved in this edition of the meeting, in order to give knowledge and information to the entire Mathematical Community of its relevance.

Ghana

Evidence Based Approach to Bridging the Gender Gap in STEM

Summary:
Gender Gap in Science, Technology, Engineering and Mathematics (STEM) is a pressing issue globally as women make up only 28% of the workforce in STEM. The gender gap is particularly high in the fastest-growing and highest-paid jobs in computer science and engineering. The STEM gender gap is much more evident in Africa and especially for Ghana where several efforts adopted to bridge this gap remain far-fetched. Recognizing this, our *STEM Research Working Group* organized a workshop on the theme "Evidence-based Approach to Bridging the Gender Gap in STEM". The one-day workshop (*in-person and virtual*) (1) presented an opportunity for over 270 participants to rethink about the challenges prompting the gender gap in the scientific and academic communities. The forum also enabled us to obtain baseline data towards conducting joint research on innovative ways to ensure gender parity in STEM across West Africa. The workshop was partly funded by the Committee for Women in Mathematics and attended by STEM lecturers, administrators, postgraduate and undergraduate students at universities, and female tutors in Colleges of Education as well as science and mathematics teachers and students in second cycle institutions in Ghana, Uganda, Zambia and Nigeria. The Guest of Honor, Prof. Mawutor Avoke,

Vice Chancellor of UEW, reiterated the UEW admission policy for increasing females in the Mathematics programme and the need to ensure gender parity in STEM. Discussions on challenges, global networking and innovative approaches towards bridging the gender gap in STEM were facilitated by Prof. Deborah Olufunmilayo Makinde of Obafemi Awulowo University, Nigeria, Prof. Deborah Olayide Ajayi of Department of Mathematics, University of Ibadan, Nigeria, Dr. Mercy Badu, Department of Chemistry, Kwame Nkrumah University of Science and Technology, Ghana, and Dr Gloria Armah, University of Education, Winneba, Ghana. Among the issues underscored were to build networking among females in STEM across institutions of higher learning in Africa; mapping out mentorship schemes between lecturers in faculties of STEM and Girls in Senior High School and setting up of girls' coding clinics at the senior high schools. The workshop was covered by UEW Publications, UEW Radio Windy Bay and other national electronic and print media houses. The success and euphoria around the workshop illustrated the desire for STEM despite the many challenges in the area. In the interest of bridging the gender gap in STEM, participants resolved to facilitate and support similar projects in the future.

Title, location and Date:
Female in STEM Workshop 2022*: Evidence Based Approach to Bridging the Gender Gap in STEM*
Ghana, Winneba
2022 September 15, Thursday

Contact information:
Peter Akayuure (PhD) and Mss Dorcas Attuabea Addo
Department of Mathematics Education
University of Education, Winneba
pakayuure@uew.edu.gh and dorcas@aims.edu.gh

Supported Activity Details:
Number of attendees: 273
Number of women attendees: 181
List of Countries represented: Ghana, Nigeria, Uganda and Zambia

Context of the Activity:
Over the years, our STEM research working group has been embarking on workshops and research activities including quiz competitions and documentation of indigenous ways of teaching mathematics and science. The group is also working to bridge the gender STEM gap and organizing workshops for teachers on indigenous and contextualized teaching of science and mathematics. This year, the focus was to create a strong mentorship, linkages and networking model to support women and girls in mathematics. The first step was to create a workshop session or forum for participants to rethink about challenges prompting the gender gap in the scientific and academic communities, and obtain baseline data to enable us to conduct joint research within West Africa on innovative ways to ensure gender parity in STEM.

Short report on Activities about Women:
The workshop facilitators were all female professors and PhD holders from Nigeria and Ghana. The keynote address on the theme *Evidence based approach to bridging the gender gap in mathematics/STEM,* was delivered by Prof. Deborah Olufunmilayo Makinde, Department of Mathematics, Obafemi Awulowo University, Nigeria. Prof. Deborah Olayide Ajayi of the Department of Mathematics, University of Ibadan, Nigeria facilitated the session on *Global networking and mentorship for females in Mathematics.* Dr. Mercy Badu from the Kwame Nkrumah University of Science and Technology, Ghana led discussion on *Innovative approaches to addressing gender gap in STEM and* Dr Gloria Armah of the Department of Mathematics Education, University of Education, Winneba, Ghana, facilitated the session on *Challenges faced*

by females in pursuing STEM related careers. The Guest of Honor, Prof. Mawutor Avoke, Vice Chancellor of UEW, who was represented by Prof. Samuel Asiedu-Addo expressed interest and reiterated the need to promote gender parity in STEM. The in-person participants included 15 Faculty female lecturers and 12 Heads of Department in Faculty of Science Education, UEW, 30 Women postgraduate students in mathematics, 100 Female students of Association of Mathematics Education, UEW, 30 Senior High School Girls and their 4 teachers, 4 STEM coordinators of Effutu, a Municipal Director of Education, Effutu Municipality, Winneba, a Director of Gender Mainstreaming Directorate, UEW, a representative National Council for Curriculum and Assessment (NACCA), Dean, Faculty of Science Education, Dean, School of Graduate Studies, UEW, Dean, Centre for International Programmes, UEW. The 72 virtual participants from universities in Ghana, Nigeria, Gambia, Uganda and Tanzania. Prof. Rubby Hanson, STEM advocate and Former Dean, Faculty of Science Education chaired the sessions. In all there were 273 participants made up of 181 females and 92 males. The workshop was covered by UEW Publications, UEW Radio Windy Bay and other national electronic and print media houses including Ghana News Agency and JoyNews. The success and euphoria around the workshop illustrated the desire for STEM despite the many challenges in the area. In the interest of the bridging STEM gap, it was concluded that such an interest be harnessed and nurtured with similar projects in the future.

Detail programme outline
Pictures from the event could be accessed from: Link to photos
Interview done by grant winners by Joy News: Access here
Coverage by University of Education, Winneba: Here
Presentations by Speakers
Keynote Address: Feminism The Magic of STEM Education
Global Networking and Mentoring Females in Mathematics
Innovative Approaches to Bridging the Gender Gap in STEM
Challenges faced by Females in Pursuing Mathematics related courses

Conclusions and recommendations:
From the euphoria that surrounded this workshop, it is clear that much work needs to be done to promote STEM, especially mathematics education. Future projects would consider instituting STEM Girls Clubs, mapping out mentorship scheme databases between lecturers in faculty of science and Girls SHS, Math Coding Clinics and reaching out to the pupils in the deprived or rural basic schools to provide career counseling on the choice of academic programs. Finally, to create a congenial environment for teaching and learning of STEM subjects, there is a need to engage parents as well as teachers as they are important stakeholders in the advancement of girls in STEM. Participants agreed that to succeed in breaking the STEM barrier in Africa, a cocktail of approaches would have to be employed.

Oman

To Constitute a Network of Women Mathematicians
in South Asian and Middle Eastern Region

Summary:
This is the first time in the Sultanate of Oman that an event focusing on the networking of women mathematicians was held. It took place at UTAS-Suhar on October 4-5, 2022 and was supported by IMU-CWM. Participants from Qatar, the UAE, India, Lebanon, Pakistan, the Philippines, Sri Lanka, Bangladesh, Nepal, and Turkey, as well as Bahrain, France and Austria, attended this event in person and via online mode. Six CWM Ambassadors from Bangladesh, Nepal, the UAE &

Lebanon, Oman, and India were part of this activity. Ramanujan Prize Winner Neena Gupta and Oman Mathematics Committee Chair Dr. Magda Al Hinai, and Dr. Lama Tarsissi were the keynote speakers of this networking event. The chief guest was Dr. Fatema Al Maqbali, Dean of the Oman College of Health Sciences, Oman. She encouraged and motivated women participants to take part in such networking events. This event opened up a platform for women mathematicians for future collaborations and activities focusing on mathematics and its applications. There were a total of 19 presentations on both days of this hybrid event. Women speakers' participation was 84.2%, whereas male speakers' percentage was 15.8%. We were able to create a network of women mathematicians across the region and are eyeing on strengthening this network by organizing more activities in the near future. Participants have enjoyed taking part in a meeting of this nature. Most attendees have asked the organizers to host another event of this kind.

Title, location, date:
To Constitute a Network of Women Mathematicians in South Asian and Middle Eastern Region
University of Technology and Applied Sciences-Suhar, Oman
 2022-10-04 and 2022-10-05

Contact Information:
Name: Dr. Deepti Thakur
 Address: B-105, UTAS-Suhar, Oman
 Email: deeptit.soh@cas.edu.om

Supported Activity Details:
Event's Official Webpage: **https://sites.google.com/view/owmmath**
Number of attendees:
Day 1: 50   Day 2: 50
Number of women attendees:
Day 1: 30 women   Day 2: 30 women
Number of HEI's Participation (National and International) : 30
List of Countries represented: Oman, Qatar, UAE, Bahrain, India, Pakistan, Sri Lanka, Bangladesh, Philippines, Nepal, Turkey, Franceand Austria.
Support : IMU-CWM and UTAS-Suhar

Report on the Activity:
Day 1 of the activity opened up with the national anthem; thereafter, a short video of UTAS-Suhar was played on the screen. A welcome address was given by Dr. Deepti, followed by the opening and congratulatory speeches by Dr. Hanifa, Assistant Dean for Academic Support Affairs, and Dr. Naktel, Head of the GR Department, UTAS-Suhar, Oman.
The event brief was given by Dr. Deepti in her short talk. There were eight presentations (in person) on Day 1 of the hybrid event. Dr. Majda Al Hinai, Chair of the Oman Mathematics Committee and a keynote speaker, shed light on how the Oman Mathematics Committee boosts awareness of mathematics in Oman. The Chief Guest, Dr. Fatma Al Maqbali, Dean of the Oman College of Health Sciences, distributed mementos and certificates to the presenters. Thereafter, the regular presentations started.
Dr. Hanifa al Qasmi discussed in detail how to model order reduction techniques for dynamical systems. Dr. Maimouna presented numerical simulation of selected three dimensional fluid structure interaction problems using open foam technologies and discussed the future possibilities in the said area. Dr. Fatma, in her presentation on women power, spoke on knowledge transfer, women's support to women, and their contributions in different spheres of life.
Dr. Kwather covered an area of medical sciences in her lecture and shared her knowledge on the development of breast cancer prediction models using the UK biobank dataset. She also discussed the risk of breast cancer, its prevention, and cure. Dr. Yaqoob expressed his views on the reliability

analysis of engineering systems. Dr. Ghanim spoke on space modeling for discrete modeling. Dr. Rajinder, in his presentation, discussed the recent trends in Fixed Point Theory and its Applications.

Round Table Discussion:
There was a round table discussion among the participants to share ideas, suggestions, and recommendations. The network round table meeting addressed contemporary questions about the opportunities, difficulties, and roles of women mathematicians in science and technology. Questions regarding a common platform for women mathematicians to share their expertise, knowledge and organize a workshop, symposium, or mini-conference in the near future are also raised and discussed. Moderation was done by Dr. Deepti.
For more pictures and videos, please click on the following link:
https://sites.google.com/view/owmmath/gallery
Day 2 of the event (online via Zoom):
Dr. Deepti opened up the online presentation platform via Zoom by welcoming all the participants. There were a total of 11 speakers from India, Qatar, Bahrain, Pakistan, Turkey, Bangladesh, Sri Lanka, and Nepal. The keynote speakers, Dr. Neena Gupta, Ramanujan Prize winner, spoke on G-actions on affine varieties and their applications, whereas Dr. Lama shared her knowledge on digital convexity. Dr. Dhana shared her views on networking and professional development for women in mathematics: a personal perspective. Dr. Salma Parvin emphasized on the importance of networking in reducing the gender difference in mathematics education. Dr. Aysha focused her talk on bandgaps: opportunities and challenges The other speakers who shared their experiences on different topics, viz., mathematics in AI, actuarial sciences, and group enumeration, were Dr. Musab, Ms. Noor, and Dr. Geetha respectively. Dr. Ozen and Dr. Yashika shared her talks through recorded videos. Dr. Jyoti Devkota stepped out of the Zoom meeting due to network failure in her place, and her slides were run on the screen by the organizing secretary. Dr. Marie(CWM-Chair) joined the event during the closing ceremony and appreciated the initiative of organizing such a networking event. During her address, she encouraged more activities of this nature in the near future. She shared her presentation slides with Dr. Deepti to share with the participants.
For Day 2 presentation pictures, please click on the following link:
https://sites.google.com/view/owmmath/gallery

Conclusion and Recommendations:
All the participants look positive, encouraged, inspired, and motivated while participating in this network event. The male participants have shown great interest and support in collaborating with female mathematicians on their research projects in the near future.
The main recommendations of the event are as follows:
1. Organizing a workshop, symposium, or mini-conference.
2. Formation of a common platform for knowledge sharing, i.e., a website, meetings (in person or virtually).
3. Availability of women mathematicians' network list on the event's webpage.
4. Joint research work.
5. Submission of a research proposal to TRC-Oman in collaboration with other women mathematicians.

Keeping in view the main recommendation, the organizing secretary is going to submit a proposal for organizing a workshop at UTAS-Suhar in the middle of 2023. This proposal stems from the fact that the event filled a void in the local mathematics community. The proposed follow-up activity will definitely be having a positive impact on strengthening the women mathematicians' network in the region.

Program Schedule, Brochure, Flyer and Committees Link:
https://sites.google.com/view/owmmath/program/event-schedule
https://sites.google.com/view/owmmath/program/brochure

Print and Digital Media Coverage:
The event was covered by both print and digital media. The news of the event was published in English-language dailies like the Oman Observer and Muscat Daily. The event's news was also reported in Arabic newspapers.
For pictures and videos, please click on the following link:
https://sites.google.com/view/owmmath/gallery

India

Mathematical Workshop for Young Women, an IWM Activity in 2022

Summary:

The Indian Women and Mathematics (IWM) aims to encourage more women to pursue higher education in mathematics, and to provide an environment, and exposure to new trends, that enables them to take up careers in mathematics. Every year at least one major event focusing on women in mathematics was organized by IWM in the initial years of its existence. Though it existed in some form since 2009, on the behest of National Board for Higher Mathematics (NBHM), Government of India, IWM was reorganized in 2015, with the aim to scale up its activities and increase its reach. Currently, IWM's National Executive Committee, chaired by Professor Vijaylaxmi Trivedi from Tata Institute of Fundamental Research, has 14 members from various reputed institutions in India.

The objectives of these activities of IWM align perfectly with those of the International Mathematical Union Committee of Women in Mathematics (CWM) - establishing and supporting networking for women in mathematics at continental and regional levels. CWM has been partially supporting our activities for the last seven years. Without this support, we would not have met many of our goals.

Activities of IWM:

Here we give a report of the activities which were held and being held in the year 2022.

1. IWM Annual Conferences
2. Regional Mini-workshop
3. Visitor Program
4. Mathematical Workshop for Young Women

The first three activities were supported by NBHM and the fourth was partially supported by CWM. More information about the IWM's past and recent activities is available on https://iwm.org.in/

1. *IWM Annual Conferences*:

• IWM Annual Conference 2021-22 (Online). This was hosted by the Department of Mathematics and Statistics, Banasthali Vidyapith, from January 28 to January 30, 2022. This is the IWM Annual conference 2021, which was delayed.

• IWM Annual Conference 2022 is going to be held from 27 December to 29 December 2022 at IISER (Pune). Following the earlier format of such programs there will be several plenary talks, invited talks, open discussions, opportunity for young women mathematicians to present short contributory talks, and poster presentations. Due to budget constraints we do not have participants

from other SAARC countries (Afghanistan, Bangladesh, Bhutan, Maldives, Nepal, Pakistan and Sri Lanka) this time.

2. *Regional Mini-workshop*: This one-and-a-half day event held on 9th and 10th December 2022 was hosted by VNIT Nagpur. The format of the workshop consists of lectures delivered by some well-known mathematicians from different areas of mathematics, poster presentations by young researchers and a panel discussion where women mathematicians could share their views and experiences.

3. *Visitor Program*: In the past up to three established women mathematicians delivered lectures in non-metro cities in different parts of India, and interacted with women (mathematics) students to promote and popularize mathematics research. This year was a period of recovery from the pandemic, so we were unable to conduct this activity in the usual manner. In 2022 we had one virtual talk by Prof. Loredana Lanzini from Syracuse University.

4. *Mathematical Workshop for Young Women*: In 2019, we had introduced thiq new programme which is meant for second year undergraduate women students hailing from different parts of the country. The workshop consists of lectures and tutorials/problem-solving sessions on three selected themes in mathematics. These are themes in higher level mathematics that rely on what the participants know in mathematics at their level of studies and complement what they study as undergraduate students. This activity had a very good response.

This year the workshop was held at IISER (Tirupati) from 13th to 23rd December 2022. We received 1000 Euros in the year 2022 from CWM. This was used to support (partially) the mathematical workshop for young women in mathematics, which this year was named `IWM winter school for young women in mathematics' . The budget of the workshop was around 2000 Euros.

Following is a more detailed report about the workshop.

It was a 10 day workshop, from 13th of Dec to 23rd Dec 2022, from 4 pm-8:30 pm. It was hosted by Indian Institute Science Education and Research, Tirupati (They had provided us with the technical support for the online programme).

Further details regarding the organizing committee the speakers the participants and their affiliations can be found at Indian IWM https://sites.google.com/view/iwm-iisert2022/home?pli=1. We called for applications of young women from across the country and had around 600 candidates (85% women, 15% men). We did an initial shortlisting of around 200 students, based on their academic records. These 200 students appeared for an online 30 minute MCQ-type test. They were asked to keep their videos on and were closely proctored by a team of resource people, who later were also tutors for this programme.

Based on their performance in the written test, we selected 68 students, all women, out of these 200. We thought around 60 would be a good number because the philosophy of the program is to make the students learn hands-on.

The courses that we covered were:

1. Real analysis (8 sessions of 90 mins each)
2. Linear Algebra (8 sessions of 90 mins each)
3. Elementary Number theory (4 sessions of 90 mins each)

Besides this, we had 1 hour tutorial sessions everyday (4 sessions for real analysis, 4 sessions for linear algebra and 2 sessions for elementary number theory). During each tutorial session, we divided the students into 5 zoom breakout rooms, so that we had around 12 students in each room. Each group was mentored by a tutor (a Ph.D. student/ Post-doc) where they encouraged the students to think and come up with correct complete answers.

There were around 55 students who attended regularly. The link below is a repository of the notes from the instructors and the tutorial sheets.

https://drive.google.com/drive/folders/1f2Pxu1CTe2Dv3cFTQIwwvGwh_ixSY5PN?usp=sharing