WREN

2022/2023

ANNUAL REPORT

THE **WREN** COMMITTEE





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2022 Milestones

In 2022, the Women's Research Engineers Network (WREN) achieved new milestones as it continues to grow and shift the perception of women in engineering and STEM, more broadly.

These milestones include:

Launch of the WREN website

Australia-ASEAN Grant with five other international universities

Gender equity research projects in **Australia** and Brazil

Inaugural WREN Symposium



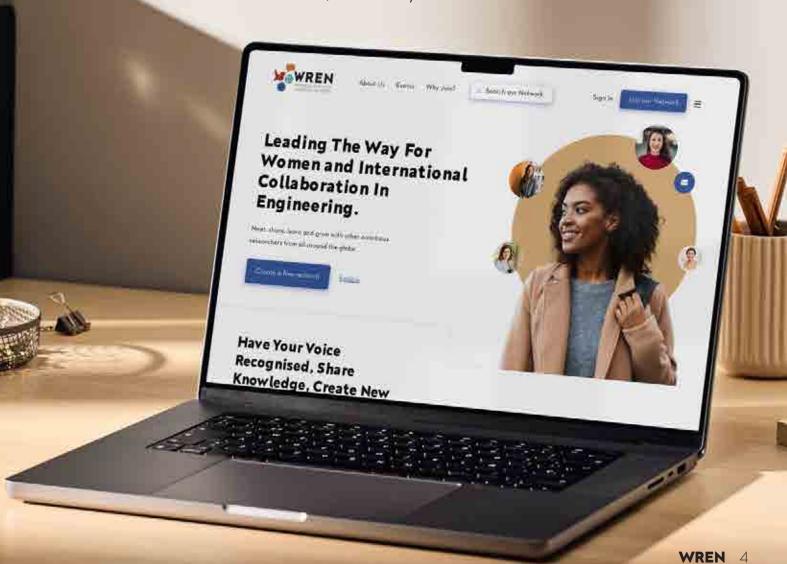
http://thewren.global

Website

In May 2022, the WREN officially launched its website. It features a platform where research engineers around the globe can become a member, connect with others, find collaborators and engage with the WREN activities such as its events and blogs. Members can post on the Collaboration Board to search for new partners in projects or to ask questions such as about certain research fields or useful tips to navigate hurdles in academia. You must become a member of our website to gain access to the Collaboration Board.

The website also features an <u>In the press</u> webpage filled with member-contributed stories and articles related to their research, summaries from past events, and matters related to equity, diversity and inclusion.

From its launch to March 2023, a total of 87 members joined our website. The countries they were joined from were Australia, Brazil, the UK, Malaysia, Thailand, Indonesia, Vietnam, Singapore, the USA, and Norway.



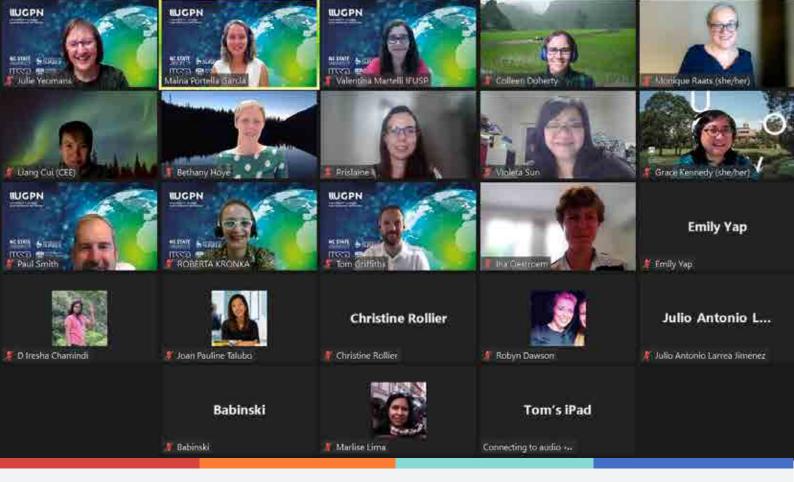
Expanding **Frontiers**

In 2022, the Women's Research Engineers Network continues to expand its frontiers by partnering with universities in the ASEAN. This partnership is the result of successful funding offered by the Australia-ASEAN Council in April 2022. The universities WREN has partnered with are:



WREN continues to have a strong relationship with Australia through the University of Wollongong, and with Brazil through the University of Sao Paulo and the Federal University of Ouro Petro.





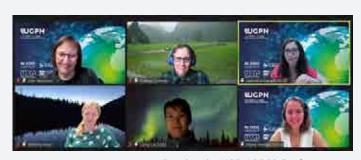
Attendees from the UGPN 2022 Conference "Women in STEM" Panel

Women in STEM: **Building Successful** International **Collaborations**

WREN was invited by the Organising Committee of the UGPN Annual Conference, led by the University of Wollongong, Australia, to host a session on women in STEM. UGPN is the University Global Partnership Network between four universities, which include the University of Wollongong, Australia, University of Sao Paulo, Brazil University of Surrey, UK, and the North Carolina State University, USA.

On 17th March 2022, WREN hosted a keynote and panel session, titled "Women in STEM - Building Successful International Collaborations". The keynote speaker was Prof. Julie Yeomans from the University of Surrey, UK, where she talked about the gender disparity at the UGPN-partnered universities and how the process of grant applications is shifting in the UK.

The second half of the event featured a panel of women researchers, Dr Bethany Hoye (UOW, Australia), A/Professor Colleen Doherty (North Carolina State University, USA), Professor Valentina Martelli (University of Sao Paulo, Brazil), Dr Liana Cui (University of Surrey, UK), as well as Prof. Julie Yeomans. The panel was led by Dr Maina Portella Garcia, Chair of WREN, to explore the panellists' experiences in international collaboration and gaining successful UGPN grants. There was a total of 42 participants, attending from the UK, the US, Brazil and Australia.



Panel at the UGPN 2022 Conference session, Women in STEM, hosted by WREN.



From left to right: Grace Kennedy, Dylan Chresby, Meg Cummins, Dr Holly Tootell, Ina Oestroem, Georgia O'Neill and Jillian Noad.

INWED in Australia

Every year, the 23rd of June marks International Women in Engineering Day (INWED). The day was initiated by the Women's Engineering Society, a charity to support women in engineering in the UK. In Australia, the WREN partnered with the University of Wollongong (UOW), iAccelerate and Sicona Battery Technologies to host an in-person event in Wollongong, Australia. The event celebrated women in engineering, their pathways and discussed the ways in which industry is shifting to be more inclusive.

The keynote speaker, Meg Cummins, a UOW alumnus and young water engineer at Aurecon, spoke about her pathway into engineering, the adversities she faced along the way and how she discovered humanitarian engineering.

Her talk was followed by a panel led by Grace Kennedy, WREN Committee member. The panel consisted of Georgia O'Neill (UOW undergraduate engineering student and Junior Engineer at Aegis Engineering), Ina Oestroem (PhD student at UNSW and WREN's then EDI Coordinator), Dr Holly Tootell (Senior Lecturer in Information Technology, then UOW, and Australian National Superstar of STEM), Dylan Chresby (Managing Director and Principal Engineer at Aegis Value Engineering) and Jillian Noad (Innovation Portfolio Manager at BlueScope Steel Limited).

The event was saw over 40 attendees which consisted of UOW staff and students, entrepreneurs, industry representatives and the wider community. Here is our recap of the event.



Meg Cummins giving her keynote talk on her pathway into engineering.



The panel sharing their insights and experiences, led by Grace Kennedy.





WREN hosts and panellists at the INWED event held in Brazil.

INWED in Brazil -Panel Discussion: How to Write Successful **Research Grants**

An International Women in Engineering Day event was also held in Brazil. The event, "Mesa Redonda: Sucesso em Projetos de Pesquisa" (Panel Discussion: How to Write Successful Research Grants). was held together with the Graduate Program in Civil Engineering from the Federal University of Ouro Preto (PROPEC). It was a panel discussion held online with four guest speakers, all senior female engineers with recognised reputation and academic prestige: Arlene Sarmanho (Civil Eng./ UFOP), Rosa Malena Lima (Minas Eng./UFOP),

Maria Teresa Aguilar (Metallurgical and Materials Eng./UFMG) and Roseli de Deus Lopes (Electrical Eng./USP). The event was hosted by Mainã Portella (UOW), Chair of WREN, and Julia Mendes (UFOP), Brazil Representative of WREN.

The broadcast took place on 23 June 2022, reaching a peak audience of 67 researchers from all levels. Since then, the recording has over 300 views and 50 likes. Here is a recap of the event.



Boosting International Collaboration: **Exploring Challenges** and Opportunities

On 23rd of August 2022, WREN held its first Australia-ASEAN event. It was a panel discussion titled, "Boosting International Collaboration: Exploring Challenges and Opportunities". The panel consisted of five senior academics:

Associate Professro Made Tri Ari Penia Kresnowati, Institut Teknologi Bandung, Indonesia Professor Ping Yu, University of Wollongong, Australia,

Associate Professor Sansanee Auephanwiriyakul, Chiang Mai University, Thailand

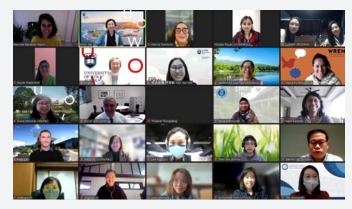
Professor Hon Wei Min, Deputy Vice-Chancellor - Academic, UOW Malaysia (then KDU University College), Malaysia

Associate Professor Huynh Thi Thanh Binh, Hanoi University of Science and Technology, Vietnam

The event was opened by the University of Wollongong's Vice-Chancellor, Professor Patricia Davidson. Her welcome message highlighted the opportunities that the Australia-ASEAN collaboration brings and that we are now in a "critical time in the history of world for innovation and discovery". She also reminded that as scientists and engineers, we are the "champions of the future" as we navigate through obstacles.

The panel discussion explored two key topics of diversity in research and boosting international collaboration. In the first half ot the event, invited academics shared their experiences of why diversity is important. They recounted the positive impact it has made in research and the outcomes that come from the diversity of team members, whether it is their personal background or field of expertise.

In the second half of the event, the panel was asked about their experience in developing international collaborations and its importance. The panel emphasised the importance of finding commonality and intersectionality with other national and international researchers to develop trust. understanding and commitment. It was also rec-

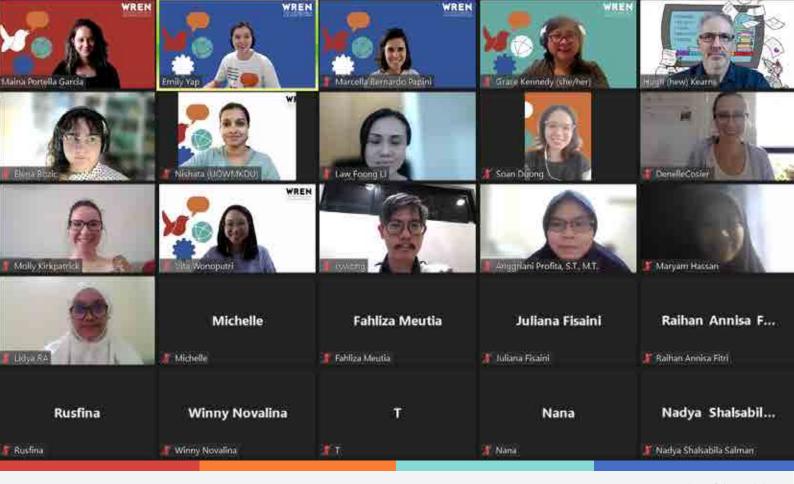


Screenshot of some of the attends of the inaugural Australia-ASEAN event

ommended, especially for young researchers, to access as many available resources and opportunities such as networking events and conferences, maintaining connections and seeking advice from senior academics. Finding international collaborators also brings opportunity to access specific fields of expertise that might not be as available nationally.

The panel highlighted the significant change the COVID-19 pandemic has made in how researchers collaborate. Many activities had to transition online which has proven challenging with the various time zones. However, to promote international collaboration, some countries and institutions offer grant funding to encourage and incentivise researchers to travel and visit other institutions. Many international funds are also competitive and require preparation before applying as an international team. So transitioning to a hybrid mode of online meetings and in-person visits helps deepen connection in the lead-up to grant applications. Watch the recording.





Attendees of the workshop

12 Weeks to **Publication Workshop** (AU/ASEAN)

On the 28th of October 2022, a workshop was held for audiences in Australia and the ASEAN focused on professional development. The workshop was "12 Weeks to Publication", delivered by Hugh Kearns of iThinkWell. It was attended by 50 participants who found the workshop insightful with the many tips Hugh shared.



Hugh Kearns delivering the workshop





Screenshot of some of the attends of the teaching and research forum

Hierarchical Segregation in Teaching and Research

On November 2022, WREN held the forum "Hierarchical Segregation in teaching and research: how to solve the gender gaps in STEM?".

Opening the event, Prof. Julia Mendes and her team from UFOP and UFJF evaluated the graduate programs of Civil, Environmental and Transport Engineering in Brazil, investigating the advisor-advisee relationships by gender and analyzing the current scientific production of professors and students.

Our second quest was Brazilian researcher Camila Infanger Almeida, PhD Student in Political Science at the University of São Paulo and a specialist in gender studies. She introduced the Brazilian movement "Parent in Science", which urges to secure better opportunities for moms in the academic field.

Last, Associate Prof. Shamika Almeida, Associate Dean (Equity, Diversity and Inclusion) in the Faculty of Business and Law at the University of Wollongong, Australia, inspired us with her life story. She presented important reflections about menopause and caretaking; how minorities are rarely seen in the "popular groups"-which reflects on their networking; the importance of having a "diversity statement" in funding applications so that mothers and minorities can have effective chances of winning; how mentoring for women, especially in their early careers, is critical for balancing the scales in research, and much more.

The live event had 54 attendees. Since it was uploaded on Youtube, it has been watched 36 times. Watch here.



Promotional flyer of the forum

The First WREN Symposium

COLLABORATING FOR THE FUTURE

Working Towards the UN Sustainable Development Goals

29th - 30th March 2023 (AEDT)*

Talks | Posters | Networking

Two sessions a day

Online

* Please check the event page for your time zone





Promotional flyer of the first WREN Symposium

WREN 2023 Symposium

On 29th and 30th of March 2023, the inaugural WREN 2023 Symposium, "Collaborating for the future - Working Towards the UN Sustainable Development Goals" was held online. It brought together researchers from interdisciplinary fields and across the globe to share their work on achieving the UN Sustainable Development Goals and to initiate new international collaborations.

The symposium was opened by welcome messages from professors of WREN's partnered universities of the University of Wollongong, Australia and Malaysia, Bandung Institute of Technology, Indonesia, and the Federal University of Juiz de Fora, Brazil. It was then followed by two days full days of talks, poster presentations and networking.

Day One saw invited speakers give their keynote talks. Professor Regina Berreta from the University of Newcastle gave her presentation titled, "Gender Balance in STEM: A journey of challenges and successes". She spoke of her experience migrating to Australia and establishing her career as a woman research in STEM and navigating the waters to hold several leadership points such as the Associate Dean of Equity, Diversity and Inclusion in the Faculty of Engineering and Built Environment. She also spoke about co-founding HunterWISE, a network to support girls and young women in STEM in the Hunter Region of the state of New South Wales. Australia.

The second keynote talk was by TPr. Ts. Norliza Hasim, Chief Executive Officer of Urbanice Malaysia, a Centre of Excellence for Urban Wellbeing and Sustainability. TPr. Ts. Hasim shared her experience and approaches she applied to transform the urban landscape of Malaysia. She spoke of the importance to embed the community in projects by involving them through consultations and empowering them through education to improve the quality of life and Malaysia's built environment. She ended her talk feeling reassured of the young people across the world striving to make changes for a sustainable future.

The first day also featured a panel discussion titled, "Making the Move to Industry". Two professional engineers, Dr Maina Portella Garcia and Dr Erica Castilho Rodrigues, shared their experiences previously working at a university and their transition to industry. Dr Portella Garcia currently works for the APA Group, a large Australian organisation, and Dr Castilho Rodrigues works for a small start-up in Brazil called Galena. They also gave their tips for young soon-to-graduate PhD candidates who aspire to work in industry and how to overcome challenges.



Screenshot from the keynote talk session by Prof. Regina Berretta.

On Day Two of the symposium, two special workshop sessions were held to bring the symposium participants together with five experts, each facilitating a selected UN Sustainable Development Goals for roundtable discussions. Differing from workshops to develop professional skills, these workshops provided an opportunity to network, learn new perspectives and research in the goal, and form new collaborations. The experts for the morning session consisted of Prislaine Santos, University of Sao Paulo, Brazil, Dr Marian Wong, Ty Christopher and Dr Leela Kempton from the University of Wollongong,

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Screenshot of some of the attends of the first WREN Symposium

Australia, and Flavia Tuane from UniFEI, Brazil. The experts for the afternoon session consisted of Prof. Shamika Almeida, Prof. Faisal Hai and Prof. Tim McCarthy from the University of Wollongong, Australia, Dr. Ir. Retno Gumilang Dewi from the Bandung Institute of Technology, Indonesia, and Ir Ts Dr Nagentrau A/L Muniandy from Taylor's University, Malaysia.



feedback >





Ms Grace Kennedy, Chief Project Investigator, presenting results at the UOW VC EDI-T Project Showcase.

Gender Equity Research in Australia

The WREN committee members who are affiliated with the University of Wollongong (UOW) successfully received funding from the inaugural UOW Vice-Chancellor's Equity, Diversity, and Inclusion Transformation Fund. The project, "Women in STEM - Developing a Grass-roots Roadmap to Gender Equity in the Faculty of EIS" was awarded \$4,100. The project Chief Investigator was Grace Kennedy with the team comprised of Dr Maina Portella Garcia. Dr Marcella Bernardo Papini, Dr Emily Yap from the Faculty of Engineering and Information Sciences, Lorraine Denny from the Professional & Organisational Development Services, Lucas Hughs from the Research Services Office, Dr Emanuela Brusadelli and Emily Matthews from the Faculty of Arts, Social Sciences and Humanities.

The objectives of the project were to ascertain the existing barriers preventing women from career opportunities in the Faculty of Engineering and Information Sciences, and to develop a grass-roots roadmap to support better equity-centred leadership. It involved:

- An informal consultation with the women in the faculty
- A survey to investigate individuals' perceptions and experiences of gender equity in the faculty, and
- An in-person workshop of unconscious bias training, findings from the survey and discussion of strategies to mitigate gender bias

WREN Research Mission to the University of Wollongong

The WREN committee members who are affiliated with the University of Wollongong (UOW) successfully received funding from the inaugural UOW Vice-Chancellor's Equity, Diversity, and Inclusion Transformation Fund. The project, "Women in STEM - Developing a Grass-roots Roadmap to Gender Equity in the Faculty of EIS" was awarded \$4,100. The project Chief Investigator was Grace Kennedy with the team comprised of Dr Maina Portella Garcia, Dr Marcella Bernardo Papini, Dr Emily Yap from the Faculty of Engineering and Information Sciences, Lorraine Denny from the Professional & Organisational Development Services, Lucas Hughs from the Research Services Office, Dr Emanuela Brusadelli and Emily Matthews from the Faculty of Arts, Social Sciences and Humanities.

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The Mission

In May 2023, A/Prof. Dr. Julia Mendes (Federal University of Juiz de Fora, Brazil) and Prof. Dr. Nishata Royan (UOW, Malaysia) embarked on a research mission to the University of Wollongong (UOW), Australia. This trip, funded by WREN, aimed to foster collaboration, explore cutting-edge research initiatives, and promote gender equity in the STEM field. Throughout their visit, Julia and Nisha engaged in various activities, establishing valuable connections, and achieving significant outcomes, listed below.



Exploring Sustainable Solutions and Embracing Technological Advancements

The mission commenced with a visit to the SMART Infrastructure Facility at UOW, where the researchers met with Dr. Aziz Ahmed to explore large-scale 3D printing equipment for sustainable plastics recycling. This collaboration aimed to facilitate multidisciplinary research, contributing to the development of the circular economy in both Australia and Malaysia. The day was completed with a visit to the Sustainable Buildings Research Center (SBRC) at UOW's Innovation Campus. Dr. Jingjing Liu hosted the visit and presented the multiple strategies developed at the SBRC to promote energy efficiency in buildings. The discussions held during these activities laid the foundation for future collaborations and sustainable engineering initiatives.

The team also visited the Industry 4.0 Hub, specifically the Robotics and IoT Research Institute at UOW. Dr. Grace Kennedy and Dr. Emily Yap provided insights into the latest advancements in robotics and the Internet of Things (IoT). These interactions offered opportunities for knowledge exchange and potential collaborations in the realm of innovative technologies.

Strategic Planning

A significant highlight of the mission was the Annual Strategic Planning Meeting of WREN. The meeting brought together the researchers that steer WREN's activities, including, besides Julia and Nisha, Dr. Emily Yap, Dr. Jingjing Liu, Dr. Lihong Su, Dr. Marcella Bernardo Papini, Dr. Shiva Pedram, Dr. Vita Wonoputri, Dr. Mainã Garcia, and M.Sc. Flavia Tuane Moraes. During this gathering, the participants engaged in constructive discussions, envisioning future endeavours and initiatives aimed at advancing women's participation in engineering. The meeting served as a platform for sharing experiences, exchanging ideas, and strengthening the global network of women in engineering. The team also visited the Industry 4.0 Hub, specifically the Robotics and IoT Research Institute at UOW. Dr. Grace Kennedy and Dr. Emily Yap provided insights into the latest advancements in robotics and the Internet of Things (IoT). These interactions offered opportunities for knowledge exchange and potential collaborations in the realm of innovative technologies.





Workshops and Knowledge Sharing

Julia delivered a thought-provoking workshop on "Ethics in Artificial Intelligence," while Nisha presented her original research on "Innovative Sustainable Composites with Reinforced Natural Fibers for a Greener Future." These workshops were open to a broad audience, fostering awareness and understanding of crucial topics in engineering. The recorded session can be watched in this link.

Cultural Exchange and Networking

In the spirit of collaboration and cultural exchange, the team engaged in various activities and networking opportunities. They connected with Dr. Marcella Bernardo from UOW and Dr. Giulio Mattera from Università degli Studi di Napoli Federico II. These interactions not only fostered professional relationships but also enriched the cultural experience, broadening perspectives and nurturing cross-cultural connections.



WREN Brazil Representative Prof Julia Mendes in her visit to Associate Deans EDI from the University of Sydney

Promoting Gender Equity

Julia also met with esteemed professionals to discuss challenges, initiatives, and academic policies of gender equity in engineering. The project is further detailed in the next section. WREN thankfully acknowledge the experts who dedicated their precious time to this important subject: Dr. Shamika Almeida, Associate Dean of EDI at the Faculty of Business and Law (UOW); Dr. Madeleine Du Toit, Associate Dean of EDI at the Faculty of Engineering (UOW); Dr. Ben Thornber, Associate Dean Research at the Faculty of Engineering (University of Sydney), Dr. Kalina Yacef, Associate Dean Research Education of the Faculty of Engineering (University of Sydney), and Dr. Marjorie Valix, Chair of the EDI Committee (University of Sydney).



Meeting between WREN Brazil Representative Prof Julia Mendes and UOW academics about a collaborative research proposal

Outcomes of the Mission

- Project Submission: A collaborative effort resulted in the submission of the project proposal "Improvement of the thermal performance of buildings through Artificial Intelligence: optimization of materials, energy flexibility, costs, and environmental impact" to the Brazilian funding agency FAPEMIG. The project, involving Prof. Julia Mendes (UFJF), Prof. Georgios Kokogiannakis (UOW), Dr. Marcella Bernardo (UOW), and Dr. Daniel Daly (UOW), aimed to leverage artificial intelligence to enhance building performance in Brazil and Australia.
- Potential Partnerships: The mission facilitated the establishment of contacts with potential future partners in academia, industry, and research institutions. These connections serve as valuable foundations for future collaborations, fostering innovation and knowledge exchange in sustainable engineering practices.
- Contribution to EDI: The mission contributed to Prof. Julia's CAPES project on "Gender differences among Engineering Professors: diagnosis and suggested conduct for Brazilian Graduation Programmes." The insights provided by international experts in EDI enriched the project's development, paving the way for inclusive practices in engineering research and mentorship.

Overall, this research mission to the University of Wollongong showcased the dedication of the WREN team to advance sustainable engineering practices and promote gender equity in the field.

Gender Equity Research in Brazil

In 2023, WREN supported the Brazilian project "Gender differences among Engineering Professors: diagnosis and suggested conduct for Brazilian Graduation Programmes", funded by CAPES (Coordination of Superior Level Staff Improvement) and coordinated by WREN's Brazilian representative A/Prof. Dr. Julia Castro Mendes.

The project aims to understand the main gender-related factors and challenges that affect the development of scientific careers of female academics in Engineering, in order to propose future public policies that contribute to gender equality in STEM. More specifically, the research team, comprised of 1 female coordinator (Prof. Julia) and 3 female postgraduate students, seek to elucidate the factors that contribute to gender asymmetries in the careers of Engineering professors in Brazilian postgraduate studies. Based on the understanding of these factors and the moments in which gender inequalities among academics are perpetuated, more assertive public policies can be proposed. In this way, this project has the potential to change the way in which Engineering postgraduate programs approach gender issues and promote systematic and concrete improvements in selection processes, in the affiliation of professors, in female representation in prestigious positions, in the metrics of publications of women, among others.

In May, thanks to WREN's support, Prof. Julia Mendes was able to connect with researchers and Deans of Equity, Diversity and Inclusion from the University of Wollongong and other Australian institutions, leading to insights that greatly contributed to this project.

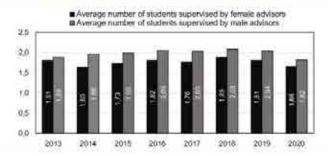
Research outcomes

In 2023, the research team submitted the article "Female representativeness in Brazilian graduate programs in Civil, Environmental, and Transport Engineering", to the "Revista da Avaliação da Educação Superior", ISSN 1982-5765, still under review. The team is also working on 3 other manuscripts.

The team also wrote a blog post for WREN: "Biases and effects that permeate the female career in academia", in which they explore 16 key challenges that STEM women face in academia, providing a brief description and exemplifying their impacts. Some of the covered challenges were the leaky pipeline, the scissor effect, the representativeness bias, the cumulative advantage effect, the glass ceiling effect, and the double and triple burden effect. The article sought to encourage a more indepth discourse on this topic, hopefully contributing to fostering a fairer and more equitable academic career for all genders, worldwide.



Ratio of advisees to advisors according to the advisor's gender





194%Growth since 2022

36.5%Average open rate.

Engagement with the WREN Community

Ongoing engagement with the WREN Community was through monthly newsletters and social media, including <u>Instagram</u>, <u>Facebook</u>, <u>Twitter</u> and <u>LinkedIn</u>.

On top of promoting and recapping WREN events, the newsletters featured two topics, called Gender Matters and Research Spotlight. These topics give the opportunity to early- and mid-career researchers to promote their research and to bring to the forefront news related to gender equity in academia.

Here are some cool numbers: - We have increased our subscribers by 194% since June 2022 (380 to 725). - Our average open rate is 36.5%, a great number in comparison with the average of 28,5% for Education newsletters on Campaign Monitor (23% on Mailchimp) - Our average click rate is 1.9%. This is not so good in comparison with the average of 4.4% for Education newsletters on Campaign Monitor. (But that's because our newsletter is more read-based - we are not trying to sell stuff, so that 4.4% is not so important to us).

