



World Forum For Women in Science

4th INTERNATIONAL CONFERENCE FOR WOMEN IN SCIENCE WITHOUT BORDERS

Organized By



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WORLD FORUM FOR WOMEN IN SCIENCE

BRAZIL 2020

4th INTERNATIONAL CONFERENCE FOR WOMAN IN SCIENCE WITHOUT BORDERS

(WISWB)

ENERGY, WATER, HEALTH, AGRICULTURE AND ENVIRONMENT FOR SUSTAINABLE DEVELOPMENT

**12-14th FEBRUARY, 2020
RIO DE JANEIRO, BRAZIL**

Organizing committee

- Prof Dr. Marcia Barbosa, director of Brazilian academy of sciences, chair for world forum for women in science-Brazil
- Prof. Dr Amal Amin, National research Centre-Egypt, founding chair of women in science without borders initiative (WISWB) and honorary chair for world forum for women in science-Brazil
- Prof. Dr. Andrea de Camargo, the University of São Paulo-Brazil, Co-chair for world forum for women in science-Brazil
- Prof. Dr. Carolina Cotta, The Federal university of Rio de Janeiro, Brazil, Co-chair for world forum for women in science-Brazil
- Prof. Dr. Marcia Margis-Pinheiro, The Federal University of Rio Grande do Sul, Brazil
- Mr. Vitor Vieira, Program Officer, Brazilian Academy of Sciences

Conference Leadership

Prof. Dr. Marcia Barbosa, Chair of the forum



Graduated (1981), master's (1984) and doctorate (1988) in physics from the Universidade Federal do Rio Grande do Sul. She is member of the Brazilian Academy of Sciences, the World Academy of Sciences (TWAS) and serves as a full professor from the Universidade Federal do Rio Grande do Sul. She has experience in Physics, with an emphasis on Condensed Matter Physics, working mainly in water. For the study of water anomalies, she was awarded the Loreal-UNESCO Award for Women in Physical Sciences and the Claudia in Science Award, both in 2013. In parallel, she works on gender issues for which she won the American Physical Society's Nicholson Medal in 2009. For her post-graduate work, she won the Anisio Teixeira da Capes Award in 2016 and for her work in favor of science, in 2018 she received the Medal of Scientific Merit from the presidency of the republic.

Prof. Dr. Amal Amin, Founding Chair of WISWB



The first Egyptian young scientist who attended world economic forum-Summer (WEF) DAVOS 2009 and 2010-China based on the initiative of IAP to empower the young scientists worldwide. She attended and co-organized the founding workshop of global young academy (GYA) in Berlin (2010) to become one of the few active founders of GYA and its executive committee member for the following three years after foundation (GYA; 2010-2013). She was founding group leader of women in science (WIS), member in science advice group and the selection committee of GYA. Dr. Amal wrote to ASRT to establish the Egyptian young academy of sciences (EYAS) and liaised the fact-finding mission of GYA to launch EYAS where ASRT responded to IAP initiative and launched EYAS (2012-2014). Therefore, Dr. Amal became co-founder and advisory board member of EYAS. Dr. Amal is associate professor at National Research Centre (NRC)-Egypt and she was group leader of the nanostructured polymers at the centre of excellence. She earned her B.Sc. in chemistry from Ain Shams University and her M.Sc. in organic chemistry from Cairo University. With a DAAD scholarship/Egypt joint fund at Ulm University-Germany/Cairo University, she earned her Ph.D. in polymer technology & catalysis. Since then, she has occupied different positions as visiting professor at nanotechnology program-faculty of engineering-Cairo University. Research stays brought her to France, USA and again to Germany for several times. She supervised and headed several international, national projects, postgraduate students and other activities. She organized and attended numerous national, international events/conferences worldwide and carried out two memorandums of understanding between Egypt, Georgia and MTU-USA. She was the founder and president for the Egyptian society for advanced materials and nanotechnology. She has lots of scientific publications in highly ranked journals and acts as reviewer and referee in nanotechnology, polymers and nanocomposites for international journals and organizations. She got several national, international awards and was nominated to IUPAC prize for WIS (2015). Dr. Amal was selected in many scientific reputable organizations as member as in task force for Islamic young academy (IWAYS, 2014), Arab-German Young Scientists Forum (2011), New York academy of science (NY, 2014-2016), TWAS Young Affiliate (2010-2014), founding member of AETDEW and NARIMA (North Africa research & innovation management association; 2020), etc. She attended the international IAP science communication workshop in Korea (2014) and co-organized several science days with EYAS along Egyptian governorates to enhance public science literacy. She joined workshop on developing global civics courses in the Arab region and was selected to attend world science forum 2015&2017 (moderator of WIS sessions and speaker) & 2019. She was selected for AAAS-TWAS science diplomacy course (Italy, 2016). Dr. Amal represented GYA in 2nd INGSA-EU conference on science policy making (Belgium, 2016). Dr. Amal participated in mentorship programs of NYA, GYA, etc and attended AAAS annual meeting in Boston (2017). Dr. Amal is the founding chair of the women in science without borders (WISWB) initiative and the world forum for women in science which is held every year world-wide where the first meeting was held in Cairo, (March, 2017), the 2nd WISWB was held in South Africa (March 2018), the 3rd conference was held again in Egypt 2019, the 4th forum

was held in Brazil (February 2020) and the next meetings will be held in Iraq dedicated for refugees in March 2021 & In Kenya in November 2021. Also, she is chair and organizer of Youth science forum (January 2021) and Saturday science webinars with themes of challenges facing humanity at the age of COVID-19 and beyond, Inspire me-success story, etc. Dr. Amal visited 35 countries tens of times and was invited to tens of high-level reputable meetings as TWAS-TYAN conference (Brazil, 2017, science diplomacy), NASAC international forum on women and sustainable development (Tanzania, 2018), youth employment (Turkey, 2018), renewable energy (Argentina, 2018), INGSA (Japan, 2018), Globlics (Ghana, 2018), etc. Dr. Amal achievements were featured in women in science-inspiring stories from Africa (NASAC-IAP-2017), SAYAS Success stories of young scientists (2016), scientific African (2019), nature (global, April 2020 & middle east 2020), the next truth (2018, 2020), NASAC book on (Women and sustainable development in Africa-2020), royal society of chemistry (2020), Women in Science. Africa edition in commemoration of Women's Month, August 2020, scidev.net/mena (2020) and others. Dr. Amal was selected as one of the most successful 40 women over 40 among (women of Egypt). She is member of SASTA and was advisory board member for Arab science week. She was appointed to act as a Panel Member of Students' Selection Committee with the Pan African University Institute of Life and Earth Sciences (Including Health and Agriculture). Dr Amal was a reviewer of ASM-AAAS-TWAS REGIONAL COURSE ON SCIENCE DIPLOMACY. In December 2020, she cofounded Northern African Research and Innovation Management Association (NARIMA) initiative. Dr Amal has several scientific and societal activities on national and international levels. She is especially interested in science communication, simplified science, increasing public awareness/literacy for science, science advice/diplomacy, innovation, science policy, science education, etc.

Prof. Dr. Andrea Simone Stucchi de Camargo, Forum Cochair



Andrea de Camargo is an Associate Professor at the São Carlos Physics Institute of the University of São Paulo (USP) in Brazil and a CNPq research productivity fellow level 1D. She has a Bachelor in Chemistry and a Masters in Inorganic Chemistry from the São Paulo State University (UNESP), and she got her PhD in Applied Physics from USP in 2003. Her thesis topic was the spectroscopic investigations of near-infrared laser active media such as rare earth doped glasses and crystal fibers. She is a fellow from the Alexander von Humboldt Foundation, having spent 3 years working at the Westfaelisches Wilhelms Universitaet Muenster in Germany (2008-11). Currently, she is one of the main investigators of an Excellence Research Center funded by FAPESP (Cepid project, CERTEV – Center for Research, Technology and Education in Vitreous Materials), and at IFSC she leads LEMAF (Laboratory of Spectroscopy of Functional Materials). Her broad research interests, in the area of luminescence, are based on the design, synthesis and spectroscopic characterization of host-guest photonic materials based on glasses, glass ceramics and nanoscopic structures, with photonic and biophotonic applications. She has published more than 110 papers. In 2007 she was recipient of the Brazilian L'ÓREAL Prize for Women in Science and from 2008-13 she was an Affiliated Member of the Brazilian Academy of Sciences. Currently, she is Scientific Director of the Brazilian Materials Research Society, Ambassador Scientist of Humboldt Foundation in Brazil and one her main interests is the Gender promotion in Science having also taken part in the Gender Studies Group of the Brazilian Physics Society from 2016-18.

Prof. Dr. Carolina Palma Naveira-Cotta, Forum Cochair



Dr. Carolina Palma Naveira-Cotta holds the BSc (2004), MSc (2006) and DSc (2009) degrees in Mechanical Engineering from the Federal University of Rio de Janeiro, Brazil. She is Associate Professor at the Mechanical Engineering (since 2011) at COPPE/UFRJ in Brazil. Dr. Naveira-Cotta was elected Affiliate Member of the Brazilian Academy of Sciences in 2014, is an elected member of the Scientific Committee of the International Center for Heat and Mass Transfer since 2016, and elected member of the Deliberative Council of the Brazilian Society of Mechanical Sciences and Engineering since 2017. She has published more than 145 papers, including 47 articles in international journals, 7 book chapters, and more than 90 articles in national and international congresses. She is also co-author of 3 books in international editorial companies. Heading the Nano and Microfluidics and Microsystems Laboratory, she has supervised more than 60 undergraduate scientific initiation and final graduation projects, 25 MSc thesis and 10 DSc thesis. She is research Consultant/Coordinator of Research Projects and Scholarship Programs with important companies, agencies and funding institutions, such as CNPq, FAPERJ, CAPES, PETROBRAS, GALP, GE, INB, COFECUB-France, CNRS-France, since 2005. She has experience in Transport Phenomena in Micro and Nano-scales, working mainly on microfluidics, inverse problems, hybrid methods, infrared thermography, heat transfer enhancement and thermal microsystems.

Prof. Dr. Marcia Margis-Pinheiro, Forum Cochair



Marcia Margis-Pinheiro is a Full Professor at the Genetics Department at the Federal University of Rio Grande do Sul, Brazil. She graduated in Biological Sciences at the State University of Rio de Janeiro, Master's degree in Biochemistry at the Federal University of Rio de Janeiro and Ph.D. in Plant Molecular Biology at the Universite de Strasbourg I – France. Her principal research interest is the understanding of the mechanism of plant responses to abiotic stress. During her career, she has supervised over 40 graduate students (Ph.D. theses and Master's degree). She has experience in the field of Genetics, with an emphasis on Plant Genetics, working mainly on the following topics: defense responses of plants against abiotic stresses, antioxidant metabolism enzymes, and functional plant genomics. Marcia is a Member of the Brazilian Academy of Sciences. Full member of the CNPq Genetics Advisory Committee (CA-GE) between July 2011 and June 2014. She was a member of the board of the Brazilian Society of Genetics (SBG), having been the first treasurer, first secretary, vice president, and finally president (2016 to 2018). Member of CTNBio between March 2012 and February 2014. Currently, she is Editor-in-Chief of the journal Genetics and Molecular Biology and President of the International Genetics Federation since September 2018.

**WORKSHOP ON SKILLS FOR
COMMUNICATION AND
LEADERSHIP IN A 5G WORLD**

VENUE : BRAZILIAN ACADEMY OF SCIENCES

**WORKSHOP ON SKILLS FOR COMMUNICATION AND LEADERSHIP
IN A 5G WORLD 10-11 February, 2020 | Rio de Janeiro, Brazil**
Venue: Brazilian Academy of Sciences (ABC)



Purpose

The workshop was directed to young female researchers looking for improving their abilities in areas such as public speaking, writing projects and papers, using social media and coordinating research and collaboration projects.



Topics

- -The Power of Narrative. The Power of Content.
- -The Written Words: the language of journalists
- -Practical Exercises on Writing Skills
- -Introduction to Storytelling for Presentations and Practical Exercises
- -Research and Social Media: how to engage your audiences
- -Social media, Videos and More: do you need a strategy?
- -Q&A Session - social media, storytelling and talking about science
- -Practical Exercises on Storytelling through Video and Social Media Applied to Science



Profiles

- **Mariana Fioravanti** is a biologist, social media specialist at Talent Marcel agency and founder of Supernova - influencer marketing, a company that connects brands to online content creators that are focused on Science and Education. She also has experience working with social media strategies for big science outreach events, such as Pint of Science, and YouTube channels, such as Manual do Mundo.
- **Meghie Rodrigues** is a science journalist. Among her areas of coverage are astronomy, climate change, technology and science policy. Her work has been featured at SciDev.Net, Chemical & Engineering News, Scientific American and other specialized media channels.
- **Nerina Finetto** is a director, producer, narrative strategist and founder of Traces & dreams, a platform that aims to celebrate researchers. She has made documentaries and programs about innovation, technology and the future for German broadcasters and international

organizations such as the Global Young Academy, created corporate videos for small and big companies for the internal and external communication, worked as a chief producer for business television projects, and loves to interview researchers and ask about their “whys”.



**ABSTRACTS OF WORLD FORUM
OF WOMEN IN SCIENCE
(WFWIS)
12-14 FEBRUARY**

VENUE: BRAZILIAN CENTER FOR RESEARCH



Iron and Manganese Biogeochemical Cycling in Doce and Paraopeba Rivers after Flooding by Iron Mining Tailings from Failed Dams

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In the Earth's surface environments, the element iron cycles between Fe (II), the most soluble, and Fe(III), considered insoluble. Fe(III) predominates in oxic environments, mostly in minerals as oxo(hydroxi)des and silicates, whereas Fe(II) predominates in anoxic environments, both as soluble Fe²⁺ ions and reduced minerals as magnetite (Fe₃O₄), pyrite (FeS₂), and other sulfides. At near-neutral pH, Fe(II) is quickly oxidized by O₂, generating insoluble Fe(III), which precipitates mostly as oxo(hydroxi)des. In anoxic environments, Fe(III) from minerals can be reduced chemically or microbiologically, generating either soluble Fe(II), secondary Fe(II) minerals such as magnetite or iron sulfides. In fact, heterotrophic microorganisms can boost Fe(III) reduction in several ways, through (i) direct reduction as part of energy metabolism, (ii) production of H₂S that could reduce Fe(III) in minerals, or (iii) production of reduced humic acids able to reduce Fe(III) in minerals. The manganese biogeochemical cycle works in much the same way as the iron cycle. Mn(IV) predominates in oxic environments as insoluble minerals, whereas Mn(II) is more soluble and occurs mostly in anoxic environments. Similarly to Fe, Mn(IV) can be reduced by chemicals or microorganisms in anoxic environments. On the other hand, Mn(II) oxidation by O₂ is very slow, leaving space for microorganisms and organic chemicals, which are the main responsible for Mn(II) oxidation to Mn(IV) in both aquatic and terrestrial environments. Oxidation of Mn(II) to Mn(IV) by microorganisms leads to mineral precipitation, mostly on their extracellular structures. On November 2015, an iron mining tailings dam bursted in Mariana municipality (MG, Brazil), released about 32.6 million m³ of tailings into the environment. Tailings from Fundão Dam followed Santarém Stream, Gualaxo do Norte River, Carmo River and Doce River until they reached the Atlantic Ocean almost a month later. On January 2019, another iron mining tailings dam failed in Brumadinho municipality (MG, Brazil). Dam I from Córrego do Feijão Mine contained around 12.7 million m³ of tailings, which ran through Ribeirão Ferro-Carvão floodplain and reached Paraopeba riverbed. Apparently, tailings were deposited in Ribeirão Ferro-Carvão floodplain and in Paraopeba riverbed, not reaching Três Marias Dam and São Francisco River. In both cases, river water quality was severely affected, with very high turbidity as well as increased iron and manganese concentrations. Presently, huge amounts of tailings remain in river sediments and floodplains. Hematite (Fe₂O₃), goethite (FeOOH), quartz (SiO₂) and kaolinite(Al₂Si₂O₅(OH)₄) were the main tailings components in both cases. In this work, we studied both the reductive and oxidative stages of Fe and Mn biogeochemical cycles in Doce and Paraopeba rivers in order to evaluate the potential of reductive stages to increase Mn and trace element concentrations in river water, as well as the potential of sessile microorganisms as sinks for Fe, Mn and trace elements dissolved in water. To access oxidative processes, we searched Fe-Mn oxide minerals in biofilms grown within Doce River and its tributary Gualaxo do Norte River using light and

electron microscopy techniques coupled to energy-dispersive spectroscopy. To understand reductive processes, we worked on the effects of organic substrates on Fe(III) and Mn(IV) reductive dissolution at the microcosm level. Anaerobic microcosms were built with sediments and water collected in Doce River, Gualaxo do Norte River and Paraopeba River. We added also glucose, yeast extract, or acetate as organic substrates to microcosms. Controls included microcosms without added organics, as well as sterile microcosms. Observation of biofilms showed manganese oxide precipitated in the mucilage of both diatoms and filamentous microalgae, whereas iron occurred in Fe-oxide particles adhered to the mucilage (or EPS) of both algae and prokaryotes. These results show the roles of Doce River biofilm microorganisms in (i) biostabilization of suspended particulate, and (ii) precipitation of Mn minerals in algal mucilage, decreasing soluble Mn concentrations in water, and thus bioavailability. On the other hand, the experiments on the reductive dissolution of Fe(III) and Mn(IV) oxides led to increased Fe(II) and Mn(II) concentrations in the liquid phase of anaerobic microcosms containing added glucose and yeast extract relatively to controls without added organics, and also to killed controls. Maximum Fe(II) concentrations were reached after 14 days. As an example, in Doce River microcosms the maximum average concentrations of soluble Fe and Mn were 1563 mg/L for Fe and 70 mg/L for Mn, which were 2000 and 70 times the values of control microcosms without added organics, and 5920 and 700 times the maximum values allowed for river water by Brazilian regulations, respectively. Such high concentrations indicate that native microorganisms are able to use organic substrates to boost reductive dissolution of iron and manganese from minerals in river sediments, leading to higher soluble Fe and Mn concentrations and increased bioavailability of Mn. Iron and manganese cycles in Doce River seem unbalanced after Fundão Dam burst, because Fe-Mn mineral dissolution seems favored relatively to Mn minerals precipitation. Our results imply in the need of urgent measures to control the organic load in rivers highly affected by iron mining tailings, in order to avoid mineral dissolution and increased Mn concentrations in river water. Acknowledgements: I thank the undergraduate students Alex Silva Santos, Pedro Sanjad, Ana Caroline Ribeiro da Cruz, and Raphael Pereira da Silva who worked actively in this project. My colleagues Diogo Jurelevicius, Marcos Farina, João Paulo Torres, Ricardo Erthal Santelli, Reiner Neumann, and Mirian Crapez also contributed to this collaborative work. This work does not count with financial support.

Developments on Heterogeneous Catalytic CO₂ Reduction to Solar Fuels

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The concentration of anthropogenic CO₂ emissions in the atmosphere are alarmingly increasing because of unrestrained fossil fuel consumption. These CO₂ emissions are causing a series of devastating environmental problems such as global warming and the rise of sea levels. In order to alleviate the greenhouse effect, the development of solar-driven technologies is therefore very crucial to mitigate the shortage of fossil fuel resources, and to offer a clean and sustainable way of energy production, which are considered the two greatest challenges of the century. Unlike most scientific research, which aim to use solar energy to generate electricity, solar energy can also be harnessed by recycling the carbon dioxide in the atmosphere through high-tech artificial photosynthesis with the objective of producing storable solar fuels from CO₂ and water. There are two types of solar fuels, the first being hydrogen, which can be produced by means of water splitting processes. The combustion of hydrogen generates water, which is a completely clean option for the environment. The second type of solar fuels consists of carbon-based fuels, such as methane (CH₄), carbon monoxide (CO), or alcohols such as methanol (CH₃OH) and ethanol (C₂H₅OH). The reduction of CO₂ is more challenging compared to water splitting processes. In fact, the production of hydrocarbon fuels requires multi-electron processes, transfer of electrons and protons, and breaking the C-O bonds to create new C-H bonds. Therefore, the choice of adequate candidate semiconducting materials is the key to succeed in solar fuel production by means of photocatalytic and (photo) electrochemical routes.

Bioprospecting Cellulases from Organic Wastes for Bioethanol Production in Kenya

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Bioethanol is a unique renewable energy source. Cellulolytic bioconversion of fermentable sugars is a feasible process for bioethanol production. The purpose of the study was to bioprospect for cellulolytic bacteria in forest soils, ruminant fecal matter and saw mills. A total of 72 soil samples were aseptically collected from Kakamega forest (28), Irangi forest(24) Gazi bay Mangrove forest (22) and categorized by source: Canopy, grassland, shrubs and rotting wood, in the case of from Kakamega and Irangi and intertidal waves, shrubs, plantation and grassland habitats for Gazi-bay. Initial sample processing involved measuring about 0.1g of soil, serial diluting with tap water (10-1-10-10) and spread plating on enriched solid cellulose and carboxymethyl cellulose (CMC) media. Distinct colonies were picked and streaked on both cellulose and CMC media. A total of 560 pure cultures were screened. A transparent zone was used as the cellulase activity indicator. The diameter of each isolate along with the diameter of the halo provided the enzymatic index (EI). Preliminary results indicate the optimal temperature and pH ranges as (37-40)°C and (7.0-7.4) respectively. There were no significant differences on duration of incubation. Total DNA has been extracted from soil samples and cow rumen. PCR amplification of the DNA from selected pure cultures is ongoing. Physico-chemical analysis of the soil samples and their influence on growth and proliferation of bacteria is also in progress. These results are discussed with respect to the specificity and efficiency of cellulases and their potential for bioethanol production.

Key Words: Bioconversion, cellulolytic bacteria, renewable energy, organic wastes.

Analysis of the 14-X S Scramjet Engine
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The Instituto de Estudos Avançados (IEAv) is an institute of science and technology belonging to the Departamento de Ciência e Tecnologia Aeroespacial Brasileiro (DCTA). In the Laboratório de Aerodinâmica e Hipersônica Prof. Henry T. Nagamatsu of the IEAv is being developed the 14-X engine. The 14-X engine is the Brazilian hypersonic aerospace vehicle that uses the hypersonic airbreathing propulsion system based on supersonic combustion (scramjet). The 14-X S engine is the first version of the project that will be tested in flight and refers of a technological scramjet demonstrator that will be to fly in Earth's atmosphere, at 30 km altitude with speed corresponding the Mach number 6.8. The 14-X S engine consists of an inlet composed by a blunt leading-edge region and three compression ramps (compression section), by the isolator and an intern expansion ramp (combustion section), and an extern expansion ramp (expansion section). In the blunt region of the 14-X S engine there is the incidence of a normal shock wave that decelerates the flow. Then, the flow is decelerated isentropically to the stagnation point and after will follow along of the blunt region. In the compression ramps there are the formation of oblique shock wave that decelerates the flow. After the combustion, the combustion products are accelerated in the expansion ramps generating the necessary thrust for the operation of the scramjet. The shock waves allow the flow to be guided into the combustion section. So, the 14-X S engine uses the physical phenomena that happen during the flight to get into operation, because it removes the oxygen necessary for combustion from the air and do not need to carry it on board. The oxygen corresponds about 65% of the total weight fraction of the rockets, and therefore using the scramjet technology there is a large increase in the payload fraction. Thus, it is possible to reduce costs, travel faster and more affordable.

Genomics & Bioinformatics Curricula Targeting Health and Biomedical Professionals & Researchers in LMIC

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Background: Genomics has accelerated since recent advances in whole genome sequencing. Potential uses of genomics include diagnosis, prediction and prevention of ill health. Genomics uses sequencing methods to generate high volumes of data. In genomics, bioinformatics is valuable for high-throughput data analysis. However, for genomics and bioinformatics to be adopted for patient care and clinical practice, in low- and middle-income countries (LMIC), there remains gaps in research and training. Genomics research is required to inform policy while training is necessary for all health professionals and biomedical researchers. Training enhances appreciation of both the potential and limitations of genomics and bioinformatics as diagnostic and predictive tools. In response to the above needs, we developed curricula for genomics and bioinformatics relevant for health professionals and biomedical scientists in LMIC. Methods: Faculty and collaborators based in LMIC, upper middle- and high-income countries carried out general needs' assessments, by identifying gaps in training of health professionals and biomedical scientists. The team also consulted published curricula by Makerere University, Rhodes University, University of Malawi, the H3BioNet consortium, the Collaborative African Genomics Network (CAfGen®) postgraduate program and the Wellcome Viral Bioinformatics and Genomics Overseas Course. Draft curricula targeting postgraduate medical doctors, veterinarians, nurses, biomedical scientists, biology professionals, pharmacists and computing scientists was then proposed. This training curricula was developed in consultation with a multidisciplinary team of clinicians and non-clinicians. This draft is one of few easy to adopt curricula, which should be tested and customized to address specific needs, in an integrated course. Results: A proposed state-of-the-art genomics and bioinformatics training curricula targeting LMIC health professionals and biomedical researchers was developed. Conclusions: Professionals and university departments from LMIC must discuss the draft curricula and establish minimum body of knowledge before endorsement for their own training. The curricula are an initial step towards mainstreaming genomics and bioinformatics sciences in LMIC education and healthcare systems. To ensure relevance and access, efforts should also spearhead programs for collaborative capacity building at both human and technological levels.

Conservation Planning in the Face of Climate Change and in in Rapidly Changing Landscapes

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Modern human-dominated landscapes are subject to frequent and intense environmental perturbations. One of the most serious challenges faces biodiversity conservation is associated with efficiency of protected areas under landscape changes & future climate changes. Protected areas (PAs) are considered as one of the most important and effective tools for conservation of biodiversity, as they buffer ecosystems and species against the pressures from human activities. For this reason, they are key components of conservation strategies planned to minimize biodiversity loss globally. However, they may play a limited role in facilitating biodiversity adaptation to climate change which is known as a threat to biodiversity globally. These changes will have significant implications for the relevant characteristics of protected habitats and currently available approaches for selecting conservation sites. In this study, we predicted the impact of future climate change on the distribution of three vulnerable ungulates both within and outside protected areas (PAs) in Semi-arid landscapes of Central Iran. We further evaluated the functionality of the present corridors connecting the PAs for the target species in the future. Future changes in present distribution of goitered gazelle (*Gazella subgutturosa*), wild sheep (*Ovis orientalis*) and wild goat (*Capra aegagrus*) were predicted by adapting an ensemble modelling approach and under the emission scenario of RCP 8.5. We then used Circuitscape software with present and future distribution models to identify corridors between the PAs and evaluate change in their functionality under warming climate. Conservation of viable populations of ungulate in Iran depends on the PAs. For the PAs to still maintain their role in conserving these mammals in warming climate, incorporating their potential future distribution into conservation plans, increasing protection status of the key PAs and maintaining altitudinal heterogeneity and landscape connectivity are recommended. **KEYWORDS:** vulnerable ungulates, species distribution modelling, latitudinal shift, landscape connectivity, circuitscape, corridors.

Networking is a Successful Aspect for Science Diplomacy and Fruitful Scientific International Relations

Amal Amin

National Research Centre, Egypt

Networking is a powerful tool in changing world to connect people world-wide specifically with science. Networking between scientists as well with the global interests and concerns is very vital as we are living together in the same world where we have to work together for the sake of humanity. Accordingly, science diplomacy is the perfect term and way to fulfill the increasing needs for development where international relations and cooperation are important elements for the progress and prosperity. Recently, the world has witnessed several successful networks and science diplomacy efforts through science based international organizations as TWAS, GYA, etc. Women in science without borders initiative and network is one of the promising one to connect people, scientists, NGOs, industry, private sector, youth, policy makers and stakeholders for the sake of development and sustainable development.



Alleviating Food Security and Nutrition Issues via Novel, Green, Cost- Effective Technologies

Arya S. Shalini

Institute of Chemical Technology, India

Effect of hydrodynamic cavitation (HC) processing on physicochemical (pH, oBrix, separation index, viscosity and color) properties, retention of nutritional bioactives (Vitamin C, total phenolics, antioxidant) and inactivation of enzyme (PME) in freshly squeezed orange juice sample was studied. HC at 4 bar pressures with a treatment time of 0 (control), 10, 20, 30, 40, 50, 60 and 90 min at low temperature (42°C) were investigated. No significant changes in pH, oBrix ($p < 0.05$) were found in HC treated juices. Decrease in flow behaviour index and increased flow consistency index in all HC treated juices was observed indicating the pseudoplastic behavior of the fluid. Degradation and loss in vitamin C and phenolics content were observed when juices were cavitated for longer. Change in yellowness of orange juice was noted. Only up to 34 percent of enzyme inactivation of pectin methyl esterase was observed. Therefore, HC appear to be good non-thermal processing methods for improving stability and physicochemical properties of orange juice without heat and preservatives. However, temperature plays an important role and further studies on increased temperature assisted cavitation experiments specially to inactivate pectin methyl esterase activity needed.

Greener Synthetic Protocols to Access Biologically Relevant Chalcogen-Containing Molecules

Sumbal Saba

Federal University of ABC, Brazil

Considering the importance of organochalcogen compounds in chemical and biological science due to their remarkable properties, there is an uprising interest in the development of eco-friendly and sustainable protocols to access these compounds.¹ The chromone, imidazo[1,2-a]pyridine and indole moieties are related with various therapeutic properties including anticancer, anti-inflammatory, antidiabetic and antimalarial. ² The medicinal properties of these derivatives have been related to an important strategy in drug discovery as novel chemotherapeutic agents. In this way, we have described several suitable methodologies to access 3-Se/S-indoles, -imidazo[1,2-a]pyridines and -chromones as well as simple arenes through direct C(sp²)-H bond chalcogenation, using iodine species or organic dyes as catalysts.^{3,4} In the present conference, I will discuss about our recent results on the application of iodine species in the preparation of different classes of chalcogen-containing N-heterocyclic compounds, using greener approaches.

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Monitoring of Air Pollution Using Energy Efficient Gas Sensors

Mahesh Kumar

Indian National Young Academy of Science, India

A design of an advanced sensing material such as MoS₂ is imperative to enhance the sensing performance of a sensor. Because, their usage alone for developing a practical sensor is impeditive owing to low gas response and slow response/recovery kinetics. We have fabricated a high performance NO₂ gas sensor using a hybrid of temperature-assisted sulfur vacancy within the edge-oriented vertically aligned MoS₂ (Sv-MoS₂) and crumpled rGO particles. Interestingly, the Sv-MoS₂ functionalized by optimized rGO concentration exhibited a significant enhancement of response to NO₂ (approximately 3 times higher than that of pristine vertically aligned MoS₂) with improved response/recovery kinetics. Such large improvement in the sensing performance could be attributed to the synergistic effect of controllable vacancy and interface engineering. The vacancy engineering offers abundant active sites through creating sulfur vacancy in additionally rich edge active sites of vertically oriented MoS₂ for more electronic interaction with gas molecules. While interfacing of p-type rGO particles with n-type MoS₂ lead to multiple out-of-plane vertical nano-heterojunctions as a sensitizing configuration for boosting the performance of the sensor. This work opens up a new avenue towards improving the sensing activity by controlling the electrical/chemical sensitization level of 2D materials via a synergistic defect and interface engineering.

Artificial intelligence Platforms for Drug Discovery for Neglected Diseases

Carolina Horta Andrade

Federal University of Goiás, Brazil

Computational models have earned recognition as reliable, fast, and inexpensive alternatives for toxicity evaluation of chemicals during the early stages of drug discovery. In this talk, we will present the development and application of artificial intelligence platforms involving structure-based drug design (SBDD) and machine learning and deep learning approaches for accelerating the discovery of new drug candidates for neglected tropical diseases, such as leishmaniasis, schistosomiasis, malaria and zika. We will also present some of our freely available platforms for predicting cardiac toxicity and skin sensitization potential of chemicals (<http://labmol.com.br/predherg> and <http://labmol.com.br/predskin/>), which combine quantitative toxicity prediction using machine learning algorithms with a visualization output, allowing users to perform rapid virtual screening of large chemical libraries aiming to identify putative hERG blockers and skin sensitizers.



Immunological Role of Gut Microbiome Among Patients with Breast

Cancer and its Relation to Anthropometry

Walaa Saad Hanafy Mahmoud

National Research Centre, Egypt

Background: Breast cancer (BC) is the most common malignancy in females in Egypt and it accounts for 32 % of cancers among Egyptian women. Several risk factors were identified to develop BC. Among these are infectious agents which are known to be the third highest after tobacco usage and obesity which now is recognized as a leading preventable cause of BC. Microbial dysbiosis characterizes the BC, both in the breast tissue and in the gut. The role of the breast microbiome in carcinogenesis is unresolved. In contrast to that, the gut microbiome was shown to produce or modify metabolites (e.g., LCA, cadaverine, SCFAs, estrogens), which, through the circulation, get to distant sites, such as the breast, where they modulate BC cell function. These metabolites appear to be important constituents of the tumor microenvironment. Dietary modulation of the microbiota could have synergistic and /or antagonistic effects during BC therapy. The aim of the project is to identify and validate the role of microbiome and/or their metabolites in control of breast carcinogenesis. Modulating the gut microbiota may result in the discovery of a novel treatment modality for such a devastating disease. We will point out to the most related microbiome metabolites that could affect the treatment of BC. The effect of the dietary intake on gut and breast tissue microbiome composition & their metabolites in BC will be addressed. Moreover, we will study gut and breast microbiome characterizations and their association with probiotics intake.

Development of a Secured Mobile Societal Health System

Agbelusi Olutola

Rufus Giwa Polytechnic, Nigeria

Health care access affordability and quality are problems and challenges in most society all around the world. There are well-established disparities based on income, geographical locations and the high costs of health care affordability which poses a lot of challenges for millions of people most especially women across the globe. Therefore, there is a need to pay grave attention to women's accessibility to health services by bringing health application to their door step in order to ensure healthy lives and promote well-being for all at all ages which is one of the seventeen sustainable development goal (SDGs) adopted by the general assembly of the United Nations. Hence this study. The research objectives are to design a framework, implement a secured mobile health system (SMHS) and evaluate the system empirically using some software standard metrics. Unified Modeling Language (UML) was used to design the framework in order to capture and model the functionality of the subsystems. The designed framework was implemented using android studio, Java programming language and Extensible Markup Language (XML) and Mongo Db for data parsing. Two encryption techniques (Rivest-Shamir-Adleman (RSA) and Advanced Encryption Standard (AES)) algorithm were compared based on their cipher length, key length, and decryption and encryption time in order to select a suitable encryption algorithm for the system security and the result shows that AES gives a better result. The evaluation of the system was carried out by deploying RTCHAT on user's mobile devices in Rufus Giwa Polytechnic community together with questionnaires. The user's responses were analysed using Statistical Package for Social Sciences (SPSS) and the result shows that the system is more than 70% reliable which is quite encouraging. In conclusion, good health is subject to human happiness and well-being and makes an important contribution to economic progress of any society as healthy women live longer and more productive. This research will go a long way to achieve the No 3 of the sustainable development goal (SDGs) adopted by the general assembly of the United Nations which is to ensure healthy lives and promote well-being for all at all ages. This will also allow every individual to discuss their health challenges and have an idea of whatever their passing through before getting to the hospital.

Rac1 Mutations in Human Developmental Disorders

Nurhuda Binti Mohamad Ansor

Universiti Sains Malaysia, Malaysia

Rac1 is a highly conserved small GTPase which plays crucial role in the regulation of actin cytoskeleton. Rac1 is known to involve significantly in the development of the nervous system during embryonic development. Nevertheless, mutations in RAC1 gene have not previously been associated with human developmental disorders. Recently, five different missense mutations in RAC1 gene were identified in five individuals. These individuals exhibiting varying degrees of developmental delay and intellectual disability. Since it is unclear how RAC1 mutations might cause the various phenotypes observed in the individuals, we aim to explore how the five mutations affect the cellular and developmental functions of Rac1. We used cell culture approaches to investigate the impact of Rac1 mutations on fibroblast cell spreading. Two mutations, C18Y and N39S, phenocopying a dominant negative mutation by suppressing lamellipodia formation while Y64D mutation phenocopying a constitutively active mutation which results in increased lamellipodia formation. We also used *Drosophila* to investigate how the mutations impact development. When expressed in the neurons, one of the mutations, Y64D, results in delayed pupation and impaired larval motility while expression of Y64D in the epidermis induced filopodia formation during embryonic dorsal closure. Collectively, our findings provide a better understanding into the cellular and developmental effects of RAC1 mutations that are associated with human developmental disorders, in the search of promising therapies or diagnosis for these conditions.

X-Ray Fluorescence Analysis of Selected Micronutrients in Ten African Indigenous Leafy Vegetables Cultivated in Nairobi, Kenya –

Alix Dehayem-Massop

University of Nairobi, Kenya

Introduction: there is a growing interest on vital roles of micronutrients in the maintenance of good health and enhancement of the immune system for prevention of diseases. Methods: energy dispersive X-Ray fluorescence (EDXRF) spectrometer was used for qualitative and quantitative analysis of selected micronutrients Zinc (Zn), Iron (Fe), Magnesium (Mg), Calcium (Ca) and Potassium (K) in ten African indigenous leafy vegetables (AILVs) (Corchorus olitorius, Cucurbita moschata, Amaranthus blitum, Brassica carinata, Cleome gynandra, Solanum scabrum, Crotalaria ochroleuca, Urticadioica, Manihot esculenta, Vigna unguiculata) which are cultivated, marketed and consumed in Kenya and across East and West Africa. Results: in this study, the highest levels of Calcium, Zinc and Iron were found in Urticadioica leaves (75.0 mg/g), Manihot esculenta leaves (0.1 mg/g) and Cucurbita moschata leaves (1.0 mg/g). Amaranthus blitum leaves exhibited the highest content of Magnesium (9.5 mg/g) and Potassium (36.5 mg/g) respectively. This study demonstrated that based on weight and bioavailability, 10g of Cucurbita moschata (dried weight) provides between 57% to 136% daily value of iron for children age between 7 and 10 years old and can provide up to 41%, 81% and 27% daily value of iron for female aged 18+, lactating females aged 18+ and males aged 18+ respectively. A 10 g portion of Urticadioica leaves (dried weight) will provide 75% or 58% of the daily value of calcium based on the North American or western European recommendation respectively while the same amount of Amaranthus leaves provides between 37% to 50 % of daily value of magnesium for adults nineteen years and older based on their weight. The daily value of zinc despite its dependency with age, weight and Zinc bioavailability can be supplied by 10 g of Manihot esculenta leaves (dried weight) at a percentage ranged from 8% to 39%. Based on the 3510 mg daily recommendation, 10 g of Amaranthus, Brassica carinata, Cleome gynandra and Cucurbita moschata (dried weight) will provide 10.4%, 10.0%, 9.8% and 9.3% daily value for potassium respectively. Conclusion: the research findings are scientific evidences of the nutritional contribution of African indigenous leafy vegetables.

Advances on Eco-Friendly Plastic Materials Enabling Sustainable Development

Karen de Souza do Prado

Federal University of São Carlos, Brazil

Although the use of plastics allowed outstanding advances in several areas (e.g. packaging, transportation, communication, health, energy and agriculture) over the last six decades, in the recent years this versatile material has been considered with concern in terms of sustainable development. This is due to the increasing share of plastics in solid wastes, which mostly accumulate, rather than decompose, in landfills or the natural environment, contaminating freshwater systems and terrestrial habitats. To solve this problem, great efforts have been made by many women scientists across the world in order to reuse or recycle to a maximum extent these plastic wastes, or to make plastics more biodegradable. In this context, this work aims to present some of the advances made by Brazilian and international women scientists (including the authors) in the last decade in order to make plastics more eco-friendly materials. These include recycling of post-industrial and post-consumer thermoplastics and the reuse of thermosets in polymeric composites, using synthetic or natural fibers from lignocellulosic wastes as reinforcements and inorganic particles as fillers; blending plastic materials from different sources in order to achieve improved properties; use of natural polymers from different sources; and increase the use of biodegradable plastics in different applications. The results obtained by these women scientists stands out and are a very important contribution to the future of plastic materials, showing that plastics can enable a sustainable development.

Investigation of the enzymatic arsenal secreted by *Myceliophthora thermophila* during sugarcane bagasse growth with a focus on LPMOs

Maria Angela Bernardes Grieco

Federal University of Rio de Janeiro, Brazil

The high demand for energy and the increase of the greenhouse effect drive us to develop new technologies to efficiently deconstruct the lignocellulosic materials into sugars monomers. Sugarcane bagasse is a rich polysaccharide residue from sugar and alcohol industries. The thermophilic fungus *Myceliophthora thermophila* is an interesting model to study the enzymatic degradation of plant biomass because its genome encodes an extensive repertoire of cellulolytic enzymes including 23 Lytic Polysaccharide Monooxygenases (LPMOs) from the Auxiliary Activity family 9 (AA9). AA9 LPMOs are known to oxidatively cleave the β -1,4 bonds some of them being part of the last generation cellulases cocktails for the improvement of cellulose depolymerisation. To achieve a deeper understanding of the LPMO activity on natural substrates, *M. thermophila* was grown on sugarcane bagasse with various cellulose/hemicellulose/lignin proportions. The secreted proteins were analyzed using proteomics taking advantage of two mass spectrometry methodologies. This approach unravels the secretion of many CAZymes belonging to the Glycosyl Hydrolase (GH) and AA classes including several AA9 LPMOs that may contribute to the biomass degradation observed during fungal growth. Two AA9 LPMOs, called MtLPMO_A and MtLPMO_B, were expressed in *Pichia pastoris* and enzymatically characterized. As expected, MtLPMO_A and MtLPMO_B were both active on cellulose. They differed in terms of optimum temperatures and regioselectivity releasing either C1 or C1-C4 oxidized oligosaccharides, respectively. LPMO activities were also measured on sugarcane bagasse substrates with different levels of complexity. The partially delignified bagasse was the best substrate considering the oxidized oligosaccharides released and the acid treated bagasse was the best pretreatment to improve the glucose release.

Multimodal - In-Car Interaction Towards the Adoption of Autonomous Vehicles

Omayma Alqatawneh

University of Huddersfield, UK

Autonomous Vehicles (AV's) are part of a critical shift that articulates a technological leap forward. AV's propose solutions to current transportation problems in order to change how people address mobility. They also present an opportunity to improve independent mobility for people with disability and the elderly. While AV's have the potential to improve safety and enhance the quality of life, many people appear reluctant to adopt the technology due to safety and control issues. The AV concept needs a new technique of communication to overcome the challenge of earning the trust of future customers, as they form the demand in the technology market and future investments in infrastructure. The user interface is fundamental to the way people perceive the driving experience. Innovative means for user interface development and interaction design are required to expedite the adoption of technology. The present research is proposing a multimodal in-car interaction design that is poised in the future to be implemented for AV's. Therefore, passengers need to be able to operate the car in the way they want to be driven to maintain a high level of trust and comfort. This communication can be verified through visual, and auditory approaches. Such as, presenting a new concept of a car with multimodal in-car interaction that fulfils customer requirements and is suitable for its purpose. This concept is employed into fictional scenarios that reflect future vision through different mediums (images, video and interaction design) in order to examine product acceptance and to investigate the multimodal efficiency. The results of the present project will contribute to how adequate the information we are providing to the potential user is, and how it could be enhanced. To investigate AV's is not only to provoke the general acceptance of the technology but to examine when, how, and why to trust the technology.

Evaluation of the Effect of Rare Earth Metal Doping (La, Ce, Lu and Yb) on CaO Used as Catalyst in the Synthesis of Ethyl Biodiesel

Pâmela Felipe Guebara, Brazil

The use of heterogeneous calcium oxide catalysts has been interesting in the transesterification reaction for biodiesel production. The binary mixing of these metal oxides with trivalent ions, synthesized in a simplified manner by traditional methods, generates both an increase in their stability and a fatty acid conversion rate. In general, CaO has many precursors and each of them directly influences the catalytic activity. In this work, the mixture between Ca(OH)₂ and CaCO₃ was chosen. In addition to precursors, metal doping during co-precipitation positively influences both the structural organization and the amount of active sites, which act directly on the catalytic activity of these materials that were characterized by XRD, BET and TG. Biodiesel production was conducted at 70 ° C for 12 h in a closed system with 1:20 (oil / ethanol) and 5 (w / w) of catalyst / oil mass. Quantification was performed by GC-FID.



Study of Women's Participation in the Organizing Committees and Poster Presentations of the Brazilian Polymer Congress

Talita Angelica dos Santos

Federal University of ABC, Brazil

Taking into account the environmental issues and the daily needs of modern man, it is becoming increasingly important to study polymeric materials in Brazil in order to solve existing problems and seek environmentally friendly alternatives for the large-scale use of these materials. . The Brazilian Congress of Polymers (CBPol), is the largest forum in the area of polymeric materials in Brazil and it addresses various topics such as biopolymers, functional polymers, polymer nanocomposites, rubbers, elastomers, thermosets, polymer degradation, additives and synthesis. , modeling and characterization of polymers among others. Taking into account the importance of research on polymeric materials, the aim of this paper was to perform a literature review and map women's participation in the organization committees and in the presentation of papers in the form of poster of the Brazilian Polymer Congress held in 2013, 2015 and 2019. The composition of the organization and the scientific and technological committee were analyzed, and a total of 1,118 papers were evaluated in 2013, 814 papers in 2015 and 589 papers in 2019. The results showed that female participation in Organizing committees were respectively 35, 42 and 29% in 2013, 2015 and 2019, which indicates lower participation of women in the organization and in the scientific and technological committees of the event. For poster works, in all editions of the event, works written by women alone represented less than 15%, which is similar to the average value found for works written by men only. It was noted that most of the work (over 70%) was written by men and women together, which may indicate partnerships between researchers and equivalence of quality or scientific production. Through the analysis of the data, it is noted that although in the presentation of posters women have a percentage of work comparable to men to the congress organization, it is still composed mostly of men, who in general have been involved in the area for a longer time. These facts may be justified because the area of polymeric materials predominantly involves the courses of chemical engineering, materials and bachelor of chemistry, which are areas that still have a high percentage of male participation. Although there has been evolution in recent decades, in Brazil, it is known that due to cultural and socioeconomic factors the participation of women in the exact area has not yet reached an equal level, so it is necessary to formulate public policies aimed at gender equity in science and technology.

Applications of Medical Image in Nuclear Science

Inayá Correa

Federal University of Rio de Janeiro, Brazil

This study aims to show how X-ray images can contribute significantly for several clinical diagnosis. Advanced techniques such as computerized microtomography and fluorescence with synchrotron radiation are involved. Several pathologies will be presented, such as osteoporosis, cushing, and HIV.

Woman in Science through the Entomological Perspective

Jane Margaret Costa de Frontin Werneck

Oswaldo Cruz Foundation, Brazil

The aim of this study is to bring an analysis on the woman participation on the Entomology since the very first publications in this field of knowledge. The most significant entomological contributions for health, environment and agriculture will be stressed and discussed.



O Cenário de Impactos Ambientais na Amazônia e os Desafios e Iniciativas para o Desenvolvimento Sustentável

Fabiana Barbosa Gomes

Centro de Estudos Rioterra, Brazil

Diante do cenário de impactos que ocorrem na Amazônia, como os desmatamentos e queimadas, é necessário analisar as causas que contribuíram para o estabelecimento desses processos, muitos em decorrência principalmente das ações de ocupação instituídas para a região e também avaliar as consequências para os diversos atores que ocupam e vivem na Amazônia, bem como para a paisagem e seus recursos naturais. Neste contexto, surgem os desafios do que se pode fazer para estabelecer formas alternativas de desenvolvimento aliadas a sustentabilidade que se adequem a este ecossistema e sua população hoje tão diversa. Mas também, se desenvolvem iniciativas a nível mundial e local que já começam a clarear e apontar caminhos para um modelo de desenvolvimento sustentável para a região Amazônica.

Edible Toppings of Polymeric Blends of Corn Starch and Celery Potatoes

Applied to Acerola

Rejane Dias Pereira Mota

Federal Institute of Goiás, Brazil

As coberturas comestíveis são aplicadas diretamente no recobrimento de determinados alimentos para protegê-los e prolongar a vida útil, principalmente no pós-colheita. Essa é uma alternativa ecológica para a diminuição do consumo de embalagens não biodegradáveis, além de garantir o armazenamento e aumentar a vida de prateleira desses alimentos. Diante disso, a presente pesquisa visa à aplicação da solução filmogênica de amido, proveniente da blenda polimérica entre milho (*Zea mays*) e batata-aipo (*Arracacia xanthorrhiza*), em frutos de acerola (*Malpighia emarginata*) e o estudo de seu comportamento em relação às propriedades do fruto. A pesquisa tem caráter experimental, explicativa e aplicada, onde a cobertura comestível é produzida através da coleta das matérias-primas e da extração do amido. Nesse processo foram obtidos 136,57 g de amido de batata-aipo (ABA), e o amido de milho (AM) foi adquirido em sua forma comercial. Os amidos foram caracterizados quanto ao poder de inchamento (PI), índice de solubilidade (%S), microscopia óptica e viscosidade, demonstrando grânulos circulares com fendas, de maior PI, menor temperatura de gelatinização e maior viscosidade para ABA e grânulos maiores de superfície lisa, com menor PI e maior temperatura de gelatinização para AM. Os filmes comestíveis foram elaborados pelo método casting, e foi selecionado o de valor médio de Pva com proporção de 50% dos amidos para ser aplicado por imersão como revestimento das acerolas, apresentando boa aderência. Foi realizada análises físico-químicas nos frutos com e sem cobertura (controle), encontrando valores próximos e constantes para pH e °Brix, a diminuição da Vitamina C em função do tempo, e menor perda de massa para o fruto com cobertura comestível, demonstrando eficiência na conservação da acerola.

Other Topics

- -Lifestyle Modalities and Health Outcome of People in Urban Areas in Africa, Chinelo Henrietta Okonkwo-(University of Nigeria)
- -Electronically Divergent Tris-Cyclometalated Homoleptic Ir(III) Complexes: Synthesis and Applications in Health and Agriculture, Rachael Everlyn Njeri, (University of Nairobi)
- -Functionalized Polyethylenimine Coated Magnetic Nanoparticles for Lead Removal, Chimaine Feudjio Tsague, (University of the Western Cape)
- -Biophotonics with Emphasis on Female Diseases, Natalia Mayumi Inada, (University of São Paulo)
- -The gender gap in mathematics and the natural sciences: where are we now? - Silvina Ponce Dawson (International Union of Pure and Applied Physics)
- -Nanostrategies for Removal Endocrine Disruptors from Drinking Water, Solange Binotto Fagan, (Franciscan University)
- -Roundtable: Parent in Science: Fernanda Staniscuaski (Federal University of Rio Grande do Sul) & Camila Infanger Almeida (University of São Paulo) & Hugo Aguilaniu (Serrapilheira Institute)
- PENDING
- -How to Face Environmental Stresses in Agriculture: rice as a model - Marcia Pinheiro Margis (Federal University of Rio Grande do Sul)
- -Digital Transformation in the Oil and Gas Industry - Sylvia dos Anjos (Brazilian Association of Petroleum Geologists)
- -The Role of Inflammation on Amyloid Diseases - Debora Foguel (Federal University of Rio de Janeiro)
- - Biodiversity and Climate Change Research for Sustainable Development, Fernanda de Pinho Werneck, (National Institute for Amazonian Research)
- - Dietary Change for an Unchanged Climate: interactions between climate, energy and food - Joana Portugal Pereira (Federal University of Rio de Janeiro)
- - Hydrocarbons in the Marine Environment: how to track the presence and origins - Angela de Luca Rebello Wagener (Pontifical Catholic University of Rio de Janeiro)



10-14 February, 2020
RIO DE JANEIRO, BRAZIL



World Forum for Women in Science – Brazil 2020

4th International Conference for Women in Science
without Borders: *Energy, Water, Health, Agriculture
and Environment for Sustainable Development*

THE EVENT WILL TAKE PLACE IN RIO DE JANEIRO AND WILL BE DIVIDED IN TWO PARTS:

• **WORKSHOP: SKILLS FOR COMMUNICATION AND LEADERSHIP IN A 5G WORLD**

DATE: FEBRUARY 10 – 11, 2020 | VENUE: BRAZILIAN ACADEMY OF SCIENCES

Purpose: The event is dedicated to young researchers seeking to develop skills in the areas of public speaking, writing projects and articles, and learning how to participate and coordinate research and collaboration networks.

• **CONFERENCE: 4th INTERNATIONAL CONFERENCE FOR WOMEN IN SCIENCE WITHOUT BORDERS: ENERGY, WATER, HEALTH, AGRICULTURE AND ENVIRONMENT FOR SUSTAINABLE DEVELOPMENT**

DATE: FEBRUARY 12 – 14, 2020 | VENUE: MUSEUM OF TOMORROW

Purpose: It will be a three-day event with oral presentations, round tables and posters sessions on topics related to the specific topics of the title. The main task of the event is to bring together female and male researchers in an environment of diversity to think about sustainable development.

ORGANIZING COMMITTEE

- Amal Amim, *Honorary Founding Chair, Egypt*
- Marcia C. Barbosa, *Chair, Brazil*
- Carolina P. Naveira-Cotta, *Coordinator, Brazil*
- Andrea Simone Stucchi de Camargo, *Coordinator, Brazil*

CONTACT

For questions about the event, please send an e-mail to: wiswb@abc.org.br

REGISTRATION

WWW.ABC.ORG.BR/WFWSBR20

(only for those interested in participate as speakers/panelists/attendees of the workshop and for international participants – registration for the general public will be open by the beginning of 2020)





12 -14 February
RIO DE JANEIRO



World Forum for Women in Science • Brazil 2020

4th International Conference for Women in Science
without Borders: *Energy, Water, Health, Agriculture
and Environment for Sustainable Development*

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WORLD FORUM FOR WOMEN IN SCIENCE IN MEDIA

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PROTAGONISM OF WOMEN IS FUNDAMENTAL IN THE SEARCH FOR A SUSTAINABLE MODEL OF LIFE

WOMEN IN SCIENCE | February 19, 2020

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The political, social and economic agenda is currently closely linked to issues of nature and the environment, mainly because of the challenges imposed by climate change and the search for a sustainable model of life. For this reason, the objective of the *4th International Conference of Women in Science without Borders*, held from February 12 to 14 at the Brazilian Center for Physical Research (CBPF), in Rio de Janeiro, was to highlight the transversality between women, science and the environment for thinking about how women can lead this debate while stimulating scientific development. This was explained in an interview with ABC, physicist [Marcia Cristina Bernardes Barbosa](#), member of the Organizing Committee of the event and of the board of directors of the Brazilian Academy of Sciences (ABC).



[Marcia Barbosa](#)

"It is important to emphasize that this development is not just a technical issue, technology or research projects. It also involves the formation and expansion of exchange networks among women scientists. It is through these exchanges that we also move forward, creating bonds and bonds that strengthen the community around knowledge. The event is about women, but also about the science they do", he clarified.

Márcia pointed out that we are living in a period in which the lack of water, linked to climate change, leads to a decrease in the population of species, which can affect natural cycles, ecosystems. On the other hand, as an answer, there is research on CO2 sequestration technology to minimize the greenhouse effect. For her, when women debate these issues, they act directly on contemporary challenges, helping to improve the living conditions of all, and especially women.

However, the proportion of women in science is not yet equal to their presence in society, which she considers a serious problem.

"Se olharmos para a inserção das mulheres na base do percurso científico, a graduação, vemos que não é irrelevante, especialmente em áreas como biologia e saúde. É mais ou menos 50% da população universitária. Contudo, à medida que se avança na academia, diminui a participação. Isso fica ainda mais evidente na Física. Existem mecanismos de exclusão, que passam pela falta de apoio à figura da mulher. Por isso, ser mulher num campo desses significa uma honra e também um estímulo para se buscar maneiras de se empoderar e de empenhar as instituições no apoio às mulheres nas diferentes etapas e desafios da vida acadêmica. É necessário que a entrada, circulação e permanência delas na academia seja prioridade, e que a inserção de jovens seja estimulada para que elas consigam, pelo exemplo, trazer mais mulheres. Isso depende das pesquisadoras e da sociedade como um todo. Exige sobretudo vontade política", defendeu.

Formada há quase 40 anos, a física tem observado uma mudança nos debates sobre ciência e mulher no Brasil. Ela contou que trabalha com gênero há mais de 20 anos e que, já naquela época, mundo afora, se discutia e se reconhecia na diversidade um elemento importante para o desenvolvimento científico. Porém, no Brasil, o debate não existia.

"Felizmente, isso mudou. O reconhecimento de que a diversidade faz diferença ganhou corpo. O empoderamento das novas gerações não aceita mais, por exemplo, o assédio que a minha geração via como natural. As novas gerações abrem espaços importantes. E, uma vez com poder, conseguem incidir politicamente. Eu vejo, sim, vontade política e, apesar de vivermos sob um governo que acredita no machismo institucional e no patriarcado, sou otimista de que as coisas podem mudar. Já estão mudando, ainda que longe de plenamente. O protagonismo das mulheres é fundamental", afirmou.

This was the fourth edition of *the International Conference on Women in Science without Borders* - the first three were in Africa. She explained that members of ABC began to reflect on the need to expand the boundaries of the event. "Why not Latin America? This geographical break is quite symbolic. And it becomes even more borderless because we have managed to expand the debates beyond African countries and America, including discussions about Europe too", he concluded.

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AMAL AMIN: "THE CHALLENGES FOR GENDER EQUALITY ARE ENORMOUS"

WOMEN IN SCIENCE | February 19, 2020

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Globally, less than 30% of the total population of scientific communities are women, according to Unesco. A smaller number of women are awarded prestigious awards, such as the Nobel Prize. In addition, in publications, 60% of the total published is men. The situation is the same in the case of patents and other achievements.

According to the chemical Egyptian Amal Amin, Women movement founder of the Science without Borders (*Women in science without borders- WISWB*), this inequality can be attributed to different and varied reasons depending on the country, among them: family and social commitments and cultural issues; absence of networks that can help the participation and integration of women in science, especially at the beginning of their careers, a period when they need more support; lack of effective cooperation between men and women in scientific communities; little emphasis on success stories and inspirational models that can share experiences and encourage young and mid-career scientists or even encourage students to find a way; sometimes the problem is also linked to the education system and the commonplace that women do not combine with heavy work or with certain fields of study; it may be that women feel that they do not need to pursue their dreams, when the social expectation is that they should form a family and have children; it can also be attributed to the fact that they do not always claim for their rights or leadership positions.

"The challenges are enormous. Women have to deal with difficulties within the scientific communities ranging from the struggle for opportunities, funding and equal positions to their male colleagues to the search for a reasonable balance between professional and daily life. This can be something very difficult to achieve and it means that they are always fighting for better positions and conditions and looking for time to be similar or even comparable with their male peers ", he said, in an interview with ABC.

Amal Amin has extensive involvement with scientific research and seeks to do it globally, creating networks and partnerships. She highlighted the principles of the Women in Science Without Borders movement and spoke about the World Forum for Women in Science, held for the first time in 2017 in Egypt, then in 2018 in South Africa, in Egypt again in 2019 and now in Brazil , in Rio de Janeiro, from February 10 to 14. Typically, the Forum includes sustainable goals related to an axis of fields, such as water, food, energy, health and the environment, in which cutting-edge research is discussed in pre-conference workshops to train women in science communication and leadership.

"The forum was originally founded to facilitate interaction between women and men, young or not, with managers, legislators, NGOs and industry, all and all involved to contribute to the scientific development of society and the world in the search for sustainability, especially in relation to gender equality. So, our event is not just a Conference, but a scientific initiative built by the community itself in order to integrate science and society more effectively. Therefore, the event in Brazil was very precious to develop the initiative for being the first time outside Africa, "he said.

Amal Amin said that the situation in Egypt is much better than in other areas: the percentage of women in science reaches 46%, although this is related to the economic situation in which a large number of men prefer to work in the industry, because of the high wages.

"We need to expand women's leadership in science. The functions of female scientists are many, as they are researchers and mothers, in a culture that makes them the main person responsible for children. Regardless of the profession, she has to raise her children in the 'right' way. On the other hand, we now have cooperation between wives and husbands. We also have good maternity leave legislation and related matters. But there is still a need to increase the general cooperation between men and women scientists, encouraging collaboration and joint projects in order to integrate the two sides in the search for sustainable development ", he said.



Amal Amin

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OPENING OF WFWS 2020

WOMEN IN SCIENCE | February 10, 2020

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Scientists from 21 countries in Africa, Asia, the Americas and Europe met at ABC on February 10, at the opening session of the [World Forum for Women in Science - Brazil 2020](#). The first two days, 10 and 11, will be dedicated to a Communication Skills and Leadership Skills *workshop* in a 5G World, for young researchers who seek to improve their public speaking skills, write projects and articles and coordinate research and networks of collaborators.



Mariana Fioravanti, Meghie Rodrigues, Nerina Finetto, Amal Amin and [Márcia Barbosa](#)

At the opening table were the founder of the initiative, the network and the movement for Women in Science Without Borders ([WISWB](#)) Amal Amin, associate professor at Egypt's National Research Center; from Brazil, the director of ABC, [Márcia Barbosa](#) (UFRGS), member of the Organizing Committee of the event; and the speakers of scientific communication Meghie Rodrigues (specialized journalist), Mariana Fioravanti ([Talent Marcel](#)) and Nerina Finetto ([Traces.Dreams](#)).

In addition to Amal Amin and [Márcia Barbosa](#) (UFRGS), the event's Organizing Committee included former affiliates Carolina Naveira-Cotta (2015-2019), from UFRJ, and Andrea Simone Stucchi de Camargo (2008-2013), from USP- São Carlos.

Amal Amin pointed out that scientists today are not just knowledge producers. They also act as science consultants and mentors, with increasing responsibility in their respective societies, worldwide.

She thanked ABC for its support and highlighted the WISWB platform, which focuses on promoting gender equality in scientific communities to ensure sustainable development. "The idea is to connect young and senior scientists, students, teachers and society as a whole with free science, without cultural or gender boundaries," he reported.

Amin explained that the meetings are always multidisciplinary and seek to stimulate leadership in young scientists, because today scientists have to have additional skills to deal with new global challenges. "They need to involve the public, public policy makers, industry, in addition to maintaining good communication with local peers and other countries, in a necessary international cooperation", he argued. For this purpose, specialists were invited to promote the *workshop* at the first moment of the event.

Chemistry, a specialist in nanotechnology and polymers, reiterated that, in addition to developing new qualifications, scientists have to broaden the understanding of their responsibilities as global citizens who can contribute to changing the world, with small actions in the right direction.

Amin ended by citing American theoretical physicist Brian Greene, who said that "when young people look at scientists as they look at musicians and actors, civilization will have taken a leap to another level".

After the other speakers who made up the table introduce themselves - we will talk more about them in the articles below -, Academic [Márcia Barbosa](#) asked all participants to use their cell phones, sharing photos, posts and comments with the hashtag # WFWS2020. "We need to use all the media to publicize our movement and our work. Communicate. Together we can."

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ANDREA DE CAMARGO: "EVENT WITH WOMEN SCIENTISTS WAS A GAIN FOR THE WHOLE SOCIETY"

WOMEN IN SCIENCE | February 17, 2020

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The affirmation of the social and economic importance of scientific research, interdisciplinarity and the participation of women in science was, in the opinion of chemist Andrea Simone Stucchi de Camargo, one of the main positive points of the *4th International Conference on Women in Science without Borders*, held at the Brazilian Center for Physical Research (CBPF), from February 12 to 14. For her, facing an unfavorable political scenario, the event marked a position not only for scientific knowledge, but also for female participation in science.

In an interview with the Brazilian Academy of Sciences (ABC), Andrea de Camargo, who is a professor at the São Carlos Institute of Physics (IFSC / USP), commented on the sessions in which she participated and stressed the need to expand ties and exchanges in the scientific community global. The conference was part of the [World Forum for Women in Science - Brazil 2020](#), held from 10 to 14 February in Rio de Janeiro.



Andrea de Camargo

For Andrea, the dialogue between different fields and areas of knowledge promotes diversity, counterpoints and allows an approach that generates encounter and spreads ideas, leading to a positive result. According to the teacher, the debates were enriching.

"In all sessions, the ideas and projects presented showed why we look at science as an ally of society. A very interesting work was that of Stavroula Balabani, from University College London, which uses flow engineering as a starting point for health research, in the specific case, for application in blood flow and cardiovascular disease research. I was also very impressed with debates about the use of normally discarded inputs, such as bagasse, for the production of enriched foods, such as pasta made from used vegetable powder. This product can be very useful for unassisted populations. We have in these two examples the use of interdisciplinarity and the social and economic importance of scientific research", he said.

According to the professor, the issue of gender also raises ideas that go beyond the world of science. "The approximation of gender with the environment, in an event like this, which brings together participants from developing countries, makes us realize that the problems are shared. The challenges are common. It's not just women scientists, but women around the world can get involved and benefit from the dialogues. Especially because, in social relationships, they are traditionally responsible for caring for their children and the elderly, managing family life and dealing with issues such as food, education and health. The knowledge produced benefits everyone. And all of them too, because in the end knowledge should favor human beings", he emphasized.

Asked about the insertion of women in her area, Andrea recognizes that she is smaller than in other areas. According to her, an interesting fact, particularly in physics, is that entry to undergraduate courses is usually balanced between the sexes, but, in the progression in career and in the academy, female participation decreases due to a series of factors inherent to the female universe. She ponders, however, that this cannot be seen only as an issue within the hard sciences. "Of course, there are particularities, but I think it is a general reflection of the devaluation and lack of support and prestige of women in society, which still links intellectual work to men. In political terms, we see few women in leadership positions and in decision-making positions in educational and scientific policies. Anyway,

Andrea defends the promotion of the occupation of women at all levels, so that their representation is proportional to the population:

"Because there are not so many women in leadership positions, we have few models of inspiration and example for young women. We therefore lose an opportunity to transform reality. The Conference seeks to inspire new models, which are very necessary in the current and worrying political, economic and social scenario. The female social condition has always been problematic. However, in the current situation, in which the country faces, in part of society and in the government itself, an opposition to education and research, it is to be concerned with the issue of gender. We have a government that in its actions disadvantages women and other minorities. This cannot be tolerated. I think the Conference, in this sense, is yet another manifesto against the attacks on citizenship, education,

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RESEARCHERS FROM SEVERAL COUNTRIES DISCUSS SCIENCE COMMUNICATION AT ABC, IN RIO DE JANEIRO

WOMEN IN SCIENCE | February 10, 2020

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Women scientists from around the world are meeting today and tomorrow at the headquarters of the Brazilian Academy of Sciences (ABC), in Rio de Janeiro, to exchange ideas and experiences on how to communicate science to the public and how to relate to journalists. They are participating in the [World Forum for Women in Science - Brazil 2020](#), promoted by ABC, which is divided into two events: in the first two days, the Workshop Skills for Communication and Leadership in a 5G World, and in the following three days, the 4th International Conference of Women in Science Without Borders: Energy, Water, Health, Agriculture and Environment for Sustainable Development, at the Brazilian Center for Physical Research (CBPF).

On this first day of the meeting, in addition to hearing tips from the speakers on how to promote science, they did practical exercises and discussed the results. Italian speaker Nerina Finetto, a specialist in *storytelling* (story building) at Traces.Dreams, raised relevant issues such as building a good image, understanding journalistic language, using data in narratives, engaging women in science, setting up a communication plan, preparing guidelines and forwarding good stories to journalists and social media.

Among the proposed exercises, she suggested that the participants write about a recent discovery in their areas, or about their latest research or whatever they wanted. Then, in small groups, they should choose one of the stories to tell the others, and listen to *feedback* from the audience and the experts present on aspects such as structure, clarity and objectivity of the report. "We don't intend to see journalists, but to understand what it takes to tell a good story," said Nerina.

Another proposed exercise was to make participants reflect on professional moments in their lives when they felt some feeling intensely, whether positive or negative: joy, accomplishment, frustration, prejudice, fear, courage, satisfaction, etc. For biologist Mariana Fioravanti, a specialist in social media at the agency Talent Marcel and founder of the marketing company Supernova, the enthusiasm of everyone wanting to participate shows that they were at ease among women, differently from what usually happens at events that mix men and women.

"We realized that everyone wants to talk more about their science, and now they have clues on how to do this, they know how to think about where to start," said scientific journalist Meghie Rodrigues. "They are not ready formulas, we only suggest starting points", added Mariana.

See photos of the event and follow the coverage here on [the ABC website](#).

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WRITTEN WORDS: THE LANGUAGE OF JOURNALISTS

WOMEN IN SCIENCE | February 11, 2020

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In the *workshop* on scientific communication held at the World Forum of Women for Science, promoted by ABC on February 10 and 11, the journalist specialized in science Meghie Rodrigues gave basic tips for good communication between scientists and journalists and between scientists and society. She has written for SciDev.Net, Chemical & Engineering News, Scientific American and other specialized media on astronomy, climate change, technology and scientific policy. He acts as a screenwriter for astronomy videos at the Giant Magellan Telescope Brazil Office (GMTBrO), in São Paulo.

Scientific communication: how, why and for whom?

When dealing with scientific writing for the general public, Meghie stressed its importance to expand the reach of science. He pointed out that, in addition to interacting with peers, scientific communication is important "to help fight false information, gain people's trust and inform them, so that they can make better decisions, and give back to supporters and sponsors."

To tell a good story, she said that you need to have good ideas and emotionally involve people. But in science, the ideas that need to be explained are often difficult. Therefore, Meghie stresses that it is essential to keep the target audience in mind. "Explaining a scientific concept to a high school student is different from explaining it to a seven-year-old child. It is also different from explaining it to an elderly person with low education, for example. The language changes, the depth too", he pointed out.

A ideia de que seu ouvinte ou interlocutor é uma tábula rasa deve ser evitada, de acordo com Meghie. Para falar sobre sua pesquisa para alguém, é bom que o cientista faça perguntas, para entender qual o conhecimento prévio daquele grupo ou indivíduo sobre o assunto. "Cada pessoa ou grupo tem ideias e um corpo de conhecimentos próprios. Isso deve ser sempre levado em conta", alertou a palestrante.

Ela deu algumas dicas para ajudar na comunicação. Simplificar conceitos, por exemplo, é uma boa tarefa para o cientista, para que o conteúdo esteja correto, mas compreensível. E para facilitar essa compreensão, boas comparações são um ótimo caminho. Meghie deu como exemplo uma informação sobre o alcance de um determinado telescópio, para explicar o que seria uma resolução angular de 20 micro-arcseconds. "Você pode dizer que é o suficiente para ler um jornal em Nova Iorque estando num café de rua em Paris. Para um determinado público, dá visualizar isso com facilidade", argumentou. Metáforas também são muito úteis, mas requerem cuidado na escolha das palavras. "Falar sobre 'a guerra da ciência' não é uma boa ideia, por exemplo, porque provoca uma associação com a existência de um 'inimigo', um sentimento negativo", disse a especialista.

O uso de vocabulário simples, familiar, é outra dica, pois estimula o ouvinte ou leitor a continuar atento. A dica é: evite o uso de jargões. Exagerar um pouco também pode ajudar a compreensão, mas é arriscado. Meghie confessou que reconhece que esse recurso é o que causa mais ruído entre cientistas e jornalistas, porque muitas vezes, para "vender" um conteúdo, o jornalista exagera demais e isso é negativo para a credibilidade científica.

Usar números e curiosidades é um ótimo recurso, "Por exemplo, para ajudar na compreensão da ideia de que um humano médio tem em torno de 39 trilhões de células bacterianas vivendo entre 30 trilhões de células humanas, você pode optar por dizer que nosso corpo tem partes iguais de células humanas e micróbios", ponderou.

E o que é que torna uma notícia interessante? De acordo com Meghie, há algumas referências básicas: ser algo que é próximo da realidade do leitor ou ouvinte, ser relevante, provocar emoção ou ser uma emergência. "Pense na sua área de pesquisa. O que você acha que daria uma boa história? Para quem a história teria interesse potencial? O que poderia ser a chamada? Escreva!"

Para guiar essa escrita, Meghie deu o roteiro básico da informação: deve conter "o que", "quem", "quando", "onde", "como" e "porque". "Normalmente, o 'como' e o 'porque' vem depois, ao longo do texto. As outras informações devem estar logo no início, chamando para a leitura", apontou.

Mas atenção: cada mídia tem uma determinada audiência e, com isso, uma abordagem própria, inclusive na seleção de temas e conteúdos. "Lembrem-se de que conhecer seu público é o que vai definir sua abordagem", reiterou a jornalista. "E conhecer mais sobre as diferentes mídias sociais também."



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CAROLINA NEUMANN KEIM: EYEING LIFE AFTER THE TRAGEDIES

WOMEN IN SCIENCE | February 18, 2020

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After the rupture of the Vale dam in Mariana, MG, in 2015, the concentrations of manganese dissolved in the water increased, which may cause a series of effects on human health and the environment. In high concentrations and chronic exposure, manganese can cause manganism, a condition that affects the nervous system, generating neurological symptoms similar to those of Parkinson's disease. Finding out how the manganese and iron cycles affect the quality of water used by people and wildlife in the Mariana and Brumadinho regions after the ore dams are broken is the focus of the study by Carolina Neumann Keim, a biologist and professor at the Instituto de Microbiology Paulo de Góes (UFRJ). She participated last week in the "Water and energy" session of 4th International Conference on Women in Science without Borders, held at the Brazilian Center for Physical Research (CBPF), part of the [World Forum for Women in Science - Brazil 2020](#), promoted by ABC in Rio de Janeiro. The event was attended by dozens of women scientists from Asia, Africa, Europe and the Americas.



Carolina Neumann Keim

De acordo com Carolina, a alta concentração de manganês observada em Mariana provavelmente resulta de processos microbianos que ocorrem nos sedimentos, processos dependentes de matéria orgânica. As análises sobre o impacto do rompimento da barragem no Rio Doce já estão mais sistematizadas e apontam para a necessidade de um controle rígido do lançamento de efluentes ricos em matéria orgânica, como os esgotos *in natura*, no Rio Doce e afluentes. Já em relação ao rompimento da barragem Córrego do Feijão, em 2019, a professora esclareceu que ainda há muita lama na calha do Rio Paraopeba, e portanto há um longo caminho a se percorrer.

"Começamos a trabalhar com material do Rio Paraopeba em agosto. O que temos são dados preliminares, muito similares aos do Rio Doce, indicando que esse controle mais restrito deve ser realizado nos dois rios", disse. Por outro lado, acrescentou, existem algas no Rio Doce que precipitam minerais contendo manganês, levando à diminuição das concentrações de manganês na água. "Mas depois do rompimento da barragem, me parece que o ciclo do manganês no Rio Doce está desbalanceado, com mais dissolução de minerais e/ou menos precipitação, o que fez com que as concentrações de manganês dissolvido na água aumentassem", atestou.

Carolina enfatizou que há formas de tratar a água, mas isso diz respeito ao abastecimento para consumo das pessoas que vivem em cidades. A população rural teria que arranjar outras fontes de água potável, e isso nem sempre é fácil. "Por exemplo, um estudo de colegas da UFRJ mostrou que a água de poço que atende populações ribeirinhas frequentemente tem mais manganês do que a do Rio Doce. Também não dá para evitar que água do Rio Doce seja consumida por animais de fazenda, nem que seja utilizada para irrigação na agricultura. Portanto, a população fica, de uma forma ou de outra, exposta aos efeitos dos rejeitos derramados. E quanto à vida selvagem, não tem como evitar que os animais silvestres consumam a água do rio, isso sem falar nos peixes e outros seres aquáticos, que não têm para onde fugir", observou.

Sobre o excesso de ferro, ela disse que pode causar diarreia, mas, no caso do Rio Doce, o ferro que é solubilizado do rejeito depositado no leito do rio reage com o oxigênio dissolvido na água, formando um precipitado que acaba se depositando de volta nos sedimentos. "É por isso que após os primeiros meses as concentrações de ferro no Rio Doce baixaram. Então é importante que a água do rio continue bem oxigenada para que as concentrações de ferro permaneçam de acordo com a legislação", alertou.

A professora contou que em 2015 havia mais verbas para pesquisa, e, portanto, mais gente em campo, investigando, coletando material, envolvendo-se com o desastre de Mariana. Já na tragédia de Brumadinho, menos recursos foram destinados às pesquisas. "Já não há tanta verba para diárias de campo, os equipamentos estão sem manutenção, entre outros problemas. Mas o pessoal da UFMG e UFOP está lá, a proximidade facilita", ponderou.

Carolina fez uma avaliação muito positiva da Conferência:

"I liked the way researchers from different areas were brought together to present their ideas, research and projects. This needs to be done more often. Interactions are fundamental to the construction of knowledge. The multidisciplinary character is very important and, for me, it is even more relevant in an event involving gender and science. The world of science, despite changes in recent times, is still conditioned by rules made almost a century ago by older men. This scenario needs to change."

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RONALD SHELLARD: "THE LOW FEMALE PRESENCE IN PHYSICS DOES NOT REFLECT THE PROPORTION OF WOMEN IN SOCIETY"

WOMEN IN SCIENCE | February 18, 2020

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Director of the Brazilian Center for Physical Research (CBPF), physicist [Ronald Cintra Shellard](#) believes that the effort towards progress involves female participation in science. Present at the opening session of the *4th International Conference on Women in Science without Borders*, on February 12, at the CBPF, he recognized that a major problem in the field is the low female presence, which does not reflect the proportion of women in society. Shellard drew attention to the fact that this gender imbalance is a problem for everyone, because the intellectual potential of women is lost, and highlighted that the CBPF acts in the search for solutions to the problem. In a conversation with the Brazilian Academy of Science (ABC), he spoke about the relevance of the event, which was part of the World Forum for Women in Science - Brazil 2020, promoted by ABC in Rio de Janeiro -, as well as highlighted the challenges posed to women and the scientific community in general in the search for gender equality.

"CBPF has an important historical role because, in 1950, the institution's first *paper* was written by two women: Elisa Frota-Pessôa and Neusa Amato. I cannot fail to emphasize that we are a physics house and that, therefore, it is necessary to mobilize for the benefit of women in science", he said.

Shellard said he participated in a study a few years ago that showed a great imbalance in the presence of women and men in science. "This is not a phenomenon exclusive to physics, it is a universal standard that affects several fields. But, within the natural sciences, there are very sharp gaps. For example, in the area of biology, there is a greater balance, which decreases in chemistry and remains uneven in physics. Therefore, the low presence of women is a pattern that does not come from today," he said.

In his view, this problem has to do with cultural issues and socially determined roles. "An example I usually repeat is that of gifts given to children. From a very early age, the gender division is clear: boys are presented with trucks and cars; the girls, with dolls. Now, why not also encourage them to take cars, to develop functions and skills other than those traditionally known? We need to reflect on this cultural learning for the debate on the place of women in science. This should start with the family itself, which is a space for the reproduction of roles, but it can also be a space for transformation", he suggested.

He explained that the CBPF is aware of the criteria for selecting students and that the discussion on gender has been increasingly carried out in recent years.

"Take, for example, the issue of motherhood. The cost of raising a baby, whose attribution is socially the woman's, must be taken into account in the evaluations, so that the woman feels protected and also valued. This means looking carefully at the distribution of scholarships, the selection mechanisms, among other factors, so that the student is contemplated, recognized and present in the field. In addition, there are more invisible issues that are gradually gaining attention, such as moral and sexual harassment. You can't hide, it has to be attacked", he emphasized.



[Ronald Cintra Shellard](#)

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THE POWER OF NARRATIVES

WOMEN IN SCIENCE | February 10, 2020

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In a lecture at the *Workshop Skills for Communication and Leadership in a 5G World*, part of the *World Forum for Women in Science - Brazil 2020*, promoted by ABC, the Italian Nerina Finetto spoke about the power of narratives, her specialty. She is the founder of *Trace.Dreams*, a platform designed to value researchers. He made documentaries and videos on innovation, technology and the future for German TVs and international organizations.

The narrator animal

"As a species, we are addicted to stories. Even when our bodies sleep, the mind stays awake all night, telling stories to itself," said Finetto. He observed that when we are awake, we think of the past, the present and the future, trying to make sense of our existence. "Children play by telling stories, we adults talk to ourselves all the time. It is our way of survival".

Finetto referred to mythology, which is universal, varying from culture to culture, but telling similar stories. And he recalled that "culture" is also a set of stories, in which we participate. "People want to belong. And the stories they are part of define them".

Essa, também, é a nossa maneira de aprender, é como percebemos o mundo em que vivemos. A especialista relatou que entre os 2 e os 5 anos crianças fazem em média 40 mil perguntas. "A maior parte delas, 'por que'", apontou.

E boas histórias provocam mudanças. Finetto citou a jovem paquistanesa Malala Yousafzai, ganhadora do prêmio Nobel da Paz, aos 17 anos, por sua atuação em favor dos direitos civis, especialmente das mulheres do vale do rio Swat, onde o Talibã proibiu a frequência escolar de meninas. Por isso, ainda adolescente, levou três tiros. Sua história provocou um movimento mundial e ela dizia: "Conto minha história não por ser única. Conto, exatamente, porque não é".

"As histórias têm poder", disse Finetto. "Se não tivessem, não haveria um esforço tão grande de governos autoritários em querer 'reescrever' o passado, mudando a história dos livros didáticos de acordo com a ideologia", ressaltou.

Também compartilhamos histórias de outras pessoas, sobre fatos acontecidos ou sobre as pessoas. "Amamos compartilhar histórias sobre outras pessoas, saber mais sobre elas. Dai a chamada fofoca", ilustrou, entre risadas.

E criamos histórias juntos. Histórias de pessoas, sobre pessoas, para pessoas. As nações modernas, segundo Finetto, são definidas pelas histórias contadas pelo coletivo. Muitas delas, inclusive, falsas. "Pessoas que querem poder precisam de que muitas pessoas confiem nelas. E histórias atraem muitas pessoas, até pelo jogo recorrente sobre quem é o herói e quem é o vilão", argumentou. As histórias criadas de forma coletiva deram origem ao dinheiro, aos deuses e ao próprio conceito de nação, de acordo com Finetto.

Hoje, todos podem compartilhar histórias e é difícil saber de onde elas vêm, se alguém checkou os fatos. E quem ouve essas histórias? Segundo Finetto, mais de 500 horas de áudio são postadas por minuto no YouTube. "E tudo pode servir ao 'bem' ou ao 'mal'".

Comunicando sua ciência

Falando então diretamente de comunicação de ciência, Finetto destacou a questão principal, que é ter preocupação com o público-alvo. "Cientistas têm que se fazer entender. Se sua explicação é difícil e vem alguém com uma explicação mais acessível, ganha a corrida da informação, sendo que nem todas as pessoas têm os mesmos valores", apontou Finetto.

É importante, também, se manter fiel ao princípio básico da ciência, que é construída pela sobreposição de paradigmas, na maioria das áreas. "O cientista deve sempre deixar claro que sua certeza é uma certeza hoje, mas que, em algum momento, pode mudar".

Outra dica é usar metáforas, mas com muita atenção. "Metáforas como 'a guerra da ciência' são negativas, associam a um 'inimigo'. Tem que haver cuidado na escolha das palavras", alertou Finetto.

And, as every good story requires, you have to have passion. "The scientist has to pass on the beauty of science, his enchantment with his research, in a language that the public understands, so that he can get involved".



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WOMEN OF SCIENCE TOWARDS SOCIAL MEDIA

WOMEN IN SCIENCE | February 12, 2020

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Mariana Fioravanti and Nerina Finetto

How to arouse people's interest in scientific issues? How to build empathy between the scientist and the public? The task is not easy, but it is not impossible, as demonstrated in practice on the second day of the Workshop *Skills for Communication and Leadership in a 5G World*, held on February 10 and 11 during the *World Forum for Women in Science - Brazil 2020*, promoted by ABC in Rio de Janeiro. The event was attended by dozens of women scientists from Asia, Africa, Europe and the Americas.

The first speaker of the day, biologist Mariana Fioravanti, a specialist in social media, showed examples of successful scientific dissemination initiatives in various social media and showed current data that corroborate the importance of producing content suitable for mobile phones, since more than 50% of accesses to social networks come from these devices.

Mariana noted that people are not as involved in science as in other areas, which makes it necessary to look for ways to build empathy with the public. She recommends experimenting with advertising on various media, from Facebook - the most accessed, followed by YouTube - to so-called "dark social", such as What's App and Messenger, which are not publicly visible, and it is not possible to measure their impact.

"There is no ready formula. Hypotheses must be created and tested. That's how social networks work," he said.

Specialist in *storytelling*, the Italian Nerina Finetto gave a step-by-step for the workshop participants to make their profiles on the networks: first think "who am I?"; then, use *hashtags* with keywords from your areas of interest - for example, #storytelling - to find out what people are talking about; start the conversation; curate content, commenting, positively or negatively, what it is promoting; create your own content. In the case of institutional profiles, know who you are, say who you are, know who you want to reach and why, when, where and how, have a clear plan, have a budget for it, if necessary change the plan, ensure the quality of the content.

And what to do as content? Nerina recommends using creativity, whether in text, video, audio or mixed. "Think holistically, do research on the public, ask for help, be practical, make mistakes, evaluate, learn from others, rethink, start over," he suggested.

Then, the workshop organizers proposed two exercises. In the first, each researcher should think about an agenda to be presented to journalists in two minutes, in order to convince them that their research deserves to be published. The participants should then present their guidelines in a way that is understandable to the others. If they understood, it is because they reached the goal.

The second exercise was, in 20 minutes, to plan a post for any social media, in any format. One participant made a video, another a script for video, others thought texts with images. In common, they all left with the feeling that spreading their own science is indeed a challenge within their reach.

WORKSHOP ON SKILLS FOR COMMUNICATION AND LEADERSHIP IN A 5G WORLD

10-11 February, 2020 | Rio de Janeiro, Brazil

Venue: Brazilian Academy of Sciences (ABC)

AGENDA

FEBRUARY 10

09:00-09:30 - **Opening Ceremony**

- Marcia C. B. Barbosa (Member of the Board of Directors, Brazilian Academy of Sciences / Chair, World Forum for Women in Science - Brazil 2020)
- Nerina Finetto (Narrative Strategist, Traces.Dreams)
- Meghie Rodrigues (Science Journalist and Science Communication Specialist)
- Mariana Fioravanti (Community Manager, Talent Marcel)
- Amal Amin (Honorary Founding Chair, Women in Science Without Borders)

09:30-10:30 - **The Power of Narrative. The Power of Content.**

- Nerina Finetto (Traces.Dreams)

10:30-12:00 - **The Written Words: the language of journalists**

- Meghie Rodrigues (Science Journalist and Science Communication Specialist)

12:00-13:30 - **Lunch Break**

13:30-14:30 - **Practical Exercises on Writing Skills**

- Nerina Finetto (Traces.Dreams)
- Meghie Rodrigues (Science Journalist and Science Communication Specialist)
- Mariana Fioravanti (Talent Marcel)

14:30-15:00 - **Networking**

15:00-17:00 - **Introduction to Storytelling for Presentations and Practical Exercises**

- Nerina Finetto (Traces.Dreams)
- Meghie Rodrigues (Science Journalist and Science Communication Specialist)

17:00-17:30 - **Exzellenz verbindet – be part of a worldwide network! Sponsorship opportunities of the Alexander von Humboldt Foundation**

- Andrea S. S. de Camargo (University of São Paulo)

FEBRUARY 11

09:30-11:30 - **Research and Social Media: how to engage your audiences**

- Mariana Fioravanti (Talent Marcel)

11:30-12:00 - **Social media, Videos and More: do you need a strategy?**

- Nerina Finetto (Traces.Dreams)

12:00-13:30 - Lunch Break

13:30-14:30 - Q&A Session - social media, storytelling and talking about science

- Nerina Finetto (Traces.Dreams)
- Meghie Rodrigues (Science Journalist and Science Communication Specialist)
- Mariana Fioravanti (Talent Marcel)

14:30-15:00 - Networking

15:00-17:00 - Practical Exercises on Storytelling through Video and Social Media Applied to Science

- Nerina Finetto (Traces.Dreams)
- Mariana Fioravanti (Talent Marcel)

17:00-17:30 - Closing Ceremony

PROFILES:

- **Mariana Fioravanti** is a biologist, social media specialist at Talent Marcel agency and founder of Supernova - influencer marketing, a company that connects brands to online content creators that are focused on Science and Education. She also has experience working with social media strategies for big science outreach events, such as Pint of Science, and YouTube channels, such as Manual do Mundo.
- **Meghie Rodrigues** is a science journalist. Among her areas of coverage are astronomy, climate change, technology and science policy. Her work has been featured at SciDev.Net, Chemical & Engineering News, Scientific American and other specialized media channels.
- **Nerina Finetto** is a director, producer, narrative strategist and founder of Tracesdreams, a platform that aims to celebrate researchers. She has made documentaries and programs about innovation, technology and the future for German broadcasters and international organizations such as the Global Young Academy, created corporate videos for small and big companies for the internal and external communication, worked as a chief producer for business television projects, and loves to interview researchers and ask about their “whys”.

PURPOSE: workshop directed to young female researchers looking for improving their abilities in areas such as public speaking, writing projects and papers, using social media and coordinating research and collaboration projects.

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4TH INTERNATIONAL CONFERENCE FOR WOMEN IN SCIENCE WITHOUT BORDERS:

Energy, Water, Health, Agriculture and Environment for Sustainable Development

12-14 February, 2020 | Rio de Janeiro, Brazil

Venue: Brazilian Center for Research in Physics (CBPF)

AGENDA

FEBRUARY 12

09:00-09:30 - Opening Ceremony

- Ronald Cintra Shellard (Director, Brazilian Center for Research in Physics)
- Marcia C. B. Barbosa (Member of the Board of Directors, Brazilian Academy of Sciences / Chair, World Forum for Women in Science - Brazil 2020)
- Amal Amin (Honorary Founding Chair, Women in Science Without Borders)

09:30-10:15 - Keynote Lecture on Health and Development Nexus

Moderator: Andrea S. S. de Camargo (University of São Paulo)

- **Engineering Global Health-Biofluids for Personalised Healthcare-** Stavroula Balabani (University College London)

10:15-11:00 - Keynote Lecture on Food and Sustainability Nexus

Moderator: Andrea S. S. de Camargo (University of São Paulo)

- **An Overview of Valorization of By-Products for Sustainable Food Production** - Sebnem Tavman (Ege University)

11:00-11:30 - Poster Session (Group 1)

11:30-13:30 - Session: Water and Materials

Moderator: Marcia C. B. Barbosa (Federal University of Rio Grande do Sul)

- **Iron and Manganese Biogeochemical Cycling in Doce and Paraopeba Rivers after Flooding by Iron Mining Tailings from Failed Dams** - Carolina Neumann Keim (Federal University of Rio de Janeiro)
- **Functionalized Polyethylenimine Coated Magnetic Nanoparticles for Lead Removal** - Chimaine Feudjio Tsague (University of the Western Cape)
- **Biophotonics with Emphasis on Female Diseases** - Natalia Mayumi Inada (University of São Paulo)

13:30-14:30 - Lunch Break

14:30-16:00 - Session: Water and Energy

Moderator: Carolina Neumann Keim (Federal University of Rio de Janeiro)

- **Developments on Heterogeneous Catalytic CO₂ Reduction to Solar Fuels** - Houda Ennaceri (Leibniz Institute of Surface Modification)
- **Bioprospecting Cellulases from Organic Wastes for Bioethanol Production in Kenya** - Eucharia Kenya (University of Embu)
- **Analysis of the 14-X S Scramjet Engine** - Ana Maria Pereira Lara (Aeronautics Institute of Technology)

16:00-16:30 - Networking and Poster Session (Group 1)

16:30-17:30 - Cocktail

FEBRUARY 13

09:30-11:00 - Overview: Health and Environment Nexus

Moderator: Marcia Pinheiro Margis (Federal University of Rio Grande do Sul)

- **Genomics & Bioinformatics Curricula Targeting Health and Biomedical Professionals & Researchers in LMIC** - Danai Tavonga Zhou (University of Zimbabwe)
- **Woman in Science through the Entomological Perspective** - Jane Margaret Costa de Frontin Werneck (Oswaldo Cruz Foundation)
- **Conservation Planning in the Face of Climate Change and in Rapidly Changing Landscapes** - Sima Fakheran (Isfahan University of Technology)

11:00-11:30 - Keynote Lecture on the Relevance of Networking

Moderator: Marcia C. B. Barbosa (Federal University of Rio Grande do Sul)

- **Networking is a Successful Aspect for Science Diplomacy and Fruitful Scientific International Relations** - Amal Amin (National Research Centre)

11:30-12:00 - Poster Session (Group 2)

12:00-14:00 - Session: Agriculture and Environment

Moderator: Carolina Horta Andrade (Federal University of Goiás)

- **Alleviating Food Security and Nutrition Issues via Novel, Green, Cost-Effective Technologies** - Arya S. Shalini (Institute of Chemical Technology)
- **Greener Synthetic Protocols to Access Biologically Relevant Chalcogen-Containing Molecules** - Sumbal Saba (Federal University of ABC)
- **Monitoring of Air Pollution Using Energy Efficient Gas Sensors** - Mahesh Kumar (Indian National Young Academy of Science)
- **Biodiversity and Climate Change Research for Sustainable Development** - Fernanda de Pinho Werneck (National Institute for Amazonian Research)

14:00-14:30 - Lunch Break

14:30-16:00 - Session: Health and Development

Moderator: Angela de Luca Rebello Wagener (Pontifical Catholic University of Rio de Janeiro)

- **Artificial intelligence Platforms for Drug Discovery for Neglected Diseases** - Carolina Horta Andrade (Federal University of Goiás)
- **Immunological Role of Gut Microbiome Among Patients with Breast Cancer and its Relation to Anthropometry** - Walaa Saad Hanafy Mahmoud (National Research Centre)
- **Nanostrategies for Removal Endocrine Disruptors from Drinking Water** - Solange Binotto Fagan (Franciscan University)

16:00-16:30 - Networking and Poster Session (Group 2)

16:30-17:30 - Roundtable: Parent in Science

Moderator: Marcia C. B. Barbosa (Federal University of Rio Grande do Sul)

- Fernanda Staniscuaski (Federal University of Rio Grande do Sul)
- Camila Infanger Almeida (University of São Paulo)
- Hugo Aguilaniu (Serrapilheira Institute)

FEBRUARY 14

09:30-11:00 - Overview: Water, Agriculture and Energy Nexus

Moderator: Carolina P. Naveira-Cotta (Federal University of Rio de Janeiro)

- **How to Face Environmental Stresses in Agriculture: rice as a model** - Marcia Pinheiro Margis (Federal University of Rio Grande do Sul)
- **Digital Transformation in the Oil and Gas Industry** - Sylvia dos Anjos (Brazilian Association of Petroleum Geologists)

11:00-11:30 - Networking

11:30-13:30 - Session: Health and Development

Moderator: Marcia Pinheiro Margis (Federal University of Rio Grande do Sul)

- **The Role of Inflammation on Amyloid Diseases** - Debora Foguel (Federal University of Rio de Janeiro)
- **Development of a Secured Mobile Societal Health System** - Agbelusi Olutola (Rufus Giwa Polytechnic)
- **Rac1 Mutations in Human Developmental Disorders** - Nurhuda Binti Mohamad Ansor (Universiti Sains Malaysia)

13:30-14:30 - Lunch Break

14:30-16:00 - Session: Agriculture and Environment

Moderator: Fernanda de Pinho Werneck (National Institute for Amazonian Research)

- **X-Ray Fluorescence Analysis of Selected Micronutrients in Ten African Indigenous Leafy Vegetables Cultivated in Nairobi, Kenya** - Alix Dehayem-Massop (University of Nairobi)
- **Hydrocarbons in the Marine Environment: how to track the presence and origins** - Angela de Luca Rebello Wagener (Pontifical Catholic University of Rio de Janeiro)

16:00-17:00 - Keynote Lecture on Policies on Women in Science

Moderator: Marcia C. B. Barbosa (Federal University of Rio Grande do Sul)

- **The gender gap in mathematics and the natural sciences: where are we now?** - Silvina Ponce Dawson (International Union of Pure and Applied Physics)

17:00-17:30 - Closing Ceremony

GROUP 1 - POSTER SESSION (FEBRUARY 12)

- **O Cenário de Impactos Ambientais na Amazônia e os Desafios e Iniciativas para o Desenvolvimento Sustentável** - Fabiana Barbosa Gomes (Centro de Estudos Riотerra)
- **Advances on Eco-Friendly Plastic Materials Enabling Sustainable Development** - Karen de Souza do Prado (Federal University of São Carlos)
- **Investigation of the enzymatic arsenal secreted by *Myceliophthora thermophila* during sugarcane bagasse growth with a focus on LPMOs** - Maria Angela Bernardes Grieco (Federal University of Rio de Janeiro)
- **Multimodal - In-Car Interaction Towards the Adoption of Autonomous Vehicles** - Omayma Alqatawneh (University of Huddersfield)
- **Evaluation of the Effect of Rare Earth Metal Doping (La, Ce, Lu and Yb) on CaO Used as Catalyst in the Synthesis of Ethyl Biodiesel** - Pâmela Felipe Guebara

GROUP 2 - POSTER SESSION (FEBRUARY 13)

- **Lifestyle Modalities and Health Outcome of People in Urban Areas in Africa** - Chinelo Henrietta Okonkwo (University of Nigeria)
- **Applications of Medical Image in Nuclear Science** - Inayá Correa (Federal University of Rio de Janeiro)
- **Electronically Divergent Tris-Cyclometalated Homoleptic Ir(III) Complexes: Synthesis and Applications in Health and Agriculture** - Rachael Everlyn Njeri (University of Nairobi)
- **Edible Toppings of Polymeric Blends of Corn Starch and Celery Potatoes Applied to Acerola** - Rejane Dias Pereira Mota (Federal Institute of Goiás)
- **Study of Women's Participation in the Organizing Committees and Poster Presentations of the Brazilian Polymer Congress** - Talita Angelica dos Santos (Federal University of ABC)

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