



SPACE GENERATION
ADVISORY COUNCIL

ANNUAL REPORT 2020



SPACE GENERATION
ADVISORY COUNCIL

In support of the United Nations programme
on Space Applications

c/o European Space Policy Institute (ESPI)
Schwarzenbergplatz 6
Vienna A-1030
AUSTRIA

Space Generation Advisory Council
5335 Wisconsin Avenue N.W.
Suite 520
Washington, D.C. 20015
USA

info@spacegeneration.org
www.spacegeneration.org

+43 1 718 11 18 99

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The SGAC 2020 Annual Report was compiled and edited by Richard Nederlander (Reports Team Coordinator), Ewerton de Marchi (Reports Team Co-Coordinator), Ana Avila (former Reports Team Coordinator), Deepti Pattabhi (Report Editor), Rachel Venn (Report Editor), Dhanisha Sateesh (Report Editor), Eleni Charitonos (Report Designer), and Nikita Divay (Report Designer). Members of the Space Generation Advisory Council worldwide were the primary contributors to the content of this report.

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The Space Generation Advisory Council (SGAC) in Support of the United Nations Programme on Space Applications is a non-profit organization and professional network that represents university students and young professionals in the space sector. SGAC has permanent observer status at the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) and is a member of the UN Economic and Social Council, and the International Astronautical Federation (IAF). Headquartered in Vienna, with full-time staff, the organization is supported by a volunteer network of over 15,000 members in more than 150 countries. SGAC is a registered 501(c)(3) in the United States.

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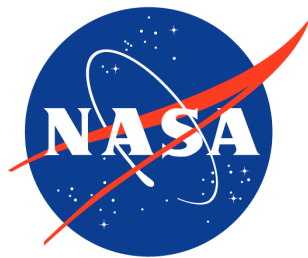
ACRONYMS

Term	Definition
AF	Africa
AP	Asia Pacific
CA	Central America
E	Europe
EU	European Union
ESA	European Space Agency
IAC	International Astronautical Congress
IAF	International Astronautical Federation
ISS	International Space Station
JAXA	Japan Aerospace Exploration Agency
LEO	Low Earth Orbit
ME	Middle East
NEO	Near Earth Object
NPoC	National Point of Contact
PG	Project Group
SA	South America
SDGs	Sustainable Development Goals
SGAC	Space Generation Advisory Council
SGC	Space Generation Congress
SGFF	Space Generation Fusion Forum
SGW	Space Generation Workshop
STEM	Science, Technology, Engineering and Maths
UAE	United Arab Emirates
UN	United Nations
UN COPUOS	United Nations Committee on the Peaceful Uses of Outer Space
UN OOSA	United Nations Office for Outer Space Affairs
USA	United States of America

SPONSORS AND PARTNERS

SGAC is very grateful for the generous support of its sponsors and partners who have continued to expand both their financial and intellectual contributions to the organisation. Despite the difficulties presented by an unusual year of operations, SGAC is proud of the events, awards, and outreach that your support has helped us to provide. SGAC would like to thank all sponsors and partners once again for their contribution to another fantastic year in SGAC history.

Platinum



Gold



**MADE
IN SPACE**



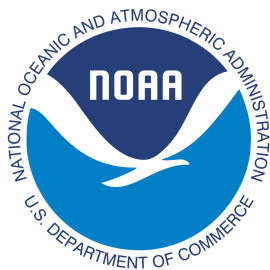
mynaric

MAXAR
TECHNOLOGIES

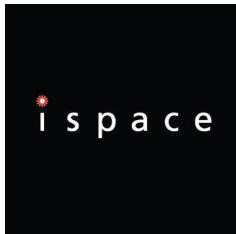


iABC





Silver



Bronze



FROM THE EXECUTIVE OFFICE

Letter from the Chairs

Dear members, colleagues, and supporters,

As we approach the end of the year, we want to reflect on the hard work and outstanding efforts of SGAC members, as well as our mission as the leading international space youth organisation. At this juncture, with the COVID-19 crisis still raging, we would like to share with you a strong message of hope for the year to come.

Undoubtedly, 2020 has been a great challenge for all. Yet, in SGAC members we have seen strong glimpses of confidence in the future and persistence in front of adversity that have inspired us to go above and beyond. The message is clear - we must continue connecting our passionate members from all corners of the globe, and provide them with a platform for growth to become the future beacons of the space community.

Last year, SGAC celebrated its 20th anniversary, which highlighted the incredible progress of the organisation over the years since its foundation in Vienna at UNISPACE III all the way to becoming the leading space youth organisation with over 15,000 members in more than 150 countries. The dream from that bold group of students and young professionals who founded SGAC in the Summer of 1999 remains as strong as ever. Since then, every new generation of SGAC volunteers, staff, and alumni has renewed their commitment to the foundational vision *to employ the creativity and vigour of youth in advancing humanity through the peaceful uses of outer space*. Long years have passed since our humble beginnings in 1999, in which collectively we have grown to overcome new challenges in our pursuit of new horizons. Along the way, SGAC has expanded to more countries, welcomed more members, collaborated with new partners, started exciting projects, organized more events, participated in international space fora, with the list ever-growing. As Newton once said, *"If I have seen further, it is by standing on the shoulders of giants"*, and so we endeavour to reach higher orbits in our never-ending quest for making a positive impact in humanity through the peaceful uses of outer space.

The international space community has not remained idle this year, and we rejoice in the success of many inspiring space missions around the World. We have seen the successful launch of three probes to Mars from the UAE, US and India, the recovery of asteroid samples from Japan's Hayabusa 2, the lunar sample return mission from China's Chang'e 5, the launch of astronauts to the ISS from SpaceX's Dragon, and many more missions.

From SGAC, we have adapted to COVID restrictions by pioneering new formats of online space events that maintain the essence of SGAC signature events. From webinars to online workshops, summits, panels, space parties, trivia nights, we have pursued every avenue to maintain our community connected and having fun. The boundless imagination of our team members has demonstrated that we can keep our members close to each other as we gear up for resuming in-person events as circumstances permit. Furthermore, we have launched new initiatives to continue inspiring our members, provide a diverse and inclusive environment, and support the growth of this great space family.

Stay healthy and our best wishes for 2021!
Per aspera ad astra!


Arnau Pons
 SGAC Co-Chair


Harriet Brettle
 SGAC Co-Chair


Arnau Pons,
SGAC Co-Chair



Harriet Brettle,
SGAC Co-Chair

Letter from the Executive Director

Dear members, colleagues, and supporters,

2020 was a great challenge for us all. Yet, in 2020 and 2021, SGAC needed to promote and support our global network of students and young professionals stimulating and propelling the creativity of our community. SGAC's members have done more than 120 webinars where we had a total attendance of more than 11,000 people connected from more than 130 countries. This has been and is an excellent opportunity to inspire the present and future workforce of the space sector, to provide opportunities to network and enable to exchange opinions and ideas in an international context.

Last year, SGAC organized SpaceGen United - SGAC's first online Global Congress. SpaceGen United saw 143 delegates from 53 different countries join together for a dynamic and engaging, nine-day programme which hosted 14 hours of keynote speeches. In addition, we hosted online the NextGen Summit in collaboration with IAF and ISEB where we joined forces together to bring a platform for the next generation providing inspiring opportunities and advice through a dedicated 4 hours live session with more than 40 speakers where 70% of them were women.

SGAC also held the SpaceGen Summit designed to provide a comprehensive and diverse programme that brought to the forefront pertinent topics across the current global space industry. SpaceGen Summit proved to be dynamic, stimulating, and fun.

Furthermore, SGAC hosted a total of 9 Regional and Local events online with a specific exception on the SG[France] event that was held on-site as the situation in France remitted at that time. The event organisers followed health authorities' regulations and safety measures, so that the event was both successful and safe for all participants.

The SGAC community has continued to thrive through our Project Groups. In 2020, an outstanding cross collaboration between different SGAC Project Groups brought SGAC to being shortlisted as part of the 10 final winning projects of the Mars City Design Competition out of 176 applications received.

This past year has also helped SGAC secure its position as one of the largest international networks of students and young professionals in the space sector, with more than 15,000 members and alumni in 168 countries.

In summary, SGAC has shown positive growth over the past year, which would not have been possible without the tireless effort of our volunteers, as well as the support of our international partners and sponsors, including Lockheed Martin, NASA, Space Foundation, Secure World Foundation, the European Space Agency, the German Aerospace Center (DLR), the Italian Space Agency (ASI), ArianeGroup, Airbus, and many others.

With the experience acquired from the past year, SGAC is gearing up with optimism and encouragement towards a better 2021 with a strong engagement and connection with our members and partners. As we plan our activities for 2021, we want to reflect on the hard work and outstanding efforts from SGAC members, as well as our mission as the leading international space youth organisation. At this juncture, as the COVID-19 storm abates, we would like to transmit a strong message of hope for 2021 opening a new era for SGAC.

Looking forward to a successful 2021!



Davide Petrillo
SGAC Executive Director



Davide Petrillo,
SGAC
Executive Director

Executive Members

CHAIRPERSONS

HARRIET BRETTL

United Kingdom

ARNAU PONS

Spain

EXECUTIVE OFFICE

DAVIDE PETRILLO

Italy

Executive Director

MATTEO CAPPELLA

Italy

Operations Manager

JOSH SCHERTZ

USA

Treasurer

HAMZA HAMEED

Pakistan

Legal Team Coordinator

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Legal Team Coordinator

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Project Groups Coordinator

ALESSANDRA VERNILE

Italy

Project Groups Coordinator

KRISTINE JANE ATIENZA

Philippines

Executive Secretary

PHYLIS MAKURUNJE

Zimbabwe

Executive Secretary

LUCILLE BAUDET

France

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Germany

Events Coordinator

CAROLINE THRO

Germany

Events Coordinator

DAVIDE PETRILLO

Italy

SGU Manager

TARA HALT

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SG Summit Manager

ABRAHAM AKINWALE

Nigeria

HR Team Coordinator

MARIA GRULICH

Germany

Scholarships Coordinator

MICHAEL KRETZENBACHER

Australia

Scholarships Coordinator

ANA AVILA

Costa Rica

Reports Coordinator

RICHARD NEDERLANDER

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Reports Coordinator

ERIN GIBBONS

Canada

**Public Relations &
Communications**

MAGGIE HANDLER

USA

**Public Relations &
Communications****LAUD BENTIL**

Ghana

Web & Data Team Lead**SAMAHAR GARBAYA**

Tunisia

Web & Data Team Lead

SGAC Regional Coordinators

ILLIAS TANOUTI

Morocco

Africa**RANIA TOUKEBRI**

Tunisia

Africa**BERNADETTE JOY DETERA**

Philippines

Asia-Pacific**KENTA WATANABE**

Japan

Asia-Pacific**ALEXANDRA JERCAIANU**

Romania

Europe**ELEONORA LOMBARDI**

Italy

Europe**RAWAN ALSHAMMARI**

Kuwait

Middle East**AHMED BARAKA**

Kuwait

Middle East**ANGEL ARCIA**

Panama

NCAC**ELIZABETH BARRIOS**

USA

NCAC**ISI CASAS DEL VALLE P.**

Chile

South America**SANTIAGO ENRIQUEZ**

Argentina

South America

OUTPUT AT A GLANCE

We are the world's LARGEST youth network of space enthusiasts



In 2020 we GREW

224

MEMBERS
APPOINTED
AS ACTIVE
VOLUNTEERS

ALL UNDER
35 YEARS
OF AGE

43% IDENTIFY
AS FEMALE



57% IDENTIFY
AS MALE



We connected digitally

100+
WEBINARS

VIEWED IN
NATIONS **126**

REACHING
10,000+
PEOPLE

**WITH
SPACE
CONTENT**

2

VIRTUAL
GLOBAL
EVENTS

**SpaceGen
United**

143 young space leaders united to
discuss key space issues



4 Days of mentorship
Launching the careers of today's youth

Scholarships

2020 had a busy start for the SGAC Scholarships team. Early scholarships such as the Australian Space Agency scholarship had record applicants, with almost 100 applicants applying to attend SGFF through the ASA scholarship. In order to help with the workload, the team expanded to 2 co-leads and 5 members. This team expansion helped greatly with judging the large number of essays that had to be reviewed for the Space4Youth competition, held in cooperation with the United Nations.

The COVID-19 situation had a large impact on scholarships for the year, as the cancellation and postponement of most of our events affected the vast majority of our scholarships. As a result, we were only able to award a few scholarships this year. The sponsors of some of these scholarships have agreed to allow winners to attend events when they can take place again next year. Regardless, despite the COVID 19 situation, it was still possible to hold a variety of online-only competitions, such as the SMLS and SSS project group competitions and the SGAC store logo competition. The team has also been using the extra time this year to streamline processes and focus on longer-term goals. The scholarships team is looking forward to our expanded team to continue to create and support SGAC opportunities for existing and prospective members from the global space community.

Scholarship/Award/Competition	Event Supported	Number of Awardees
Global Grant**	SGFF	5
Malisetti Foundation**	SGFF	1
SGAC4ST(E)AM Photographer Award**	SGFF	1
University of Boulder**	SGFF	
Australian Space Agency**	SGFF	
Australian Space Agency**	SGC	
NASA SCaN**	SGFF	2
SEDS USA	SGFF	1
SGAC/SSPI Competition	SGx/SATELLITE	1
NASA SCaN SGC	SGC	2
SGC 2020 Logo Competition	SGC	1
Space4Youth		3
\$pace is Business Competition	SGC	1

African Space Leaders Award	AF-SGW	4
SGAC Space Medicine and Life Sciences Essay Competition		1
NAS Early Career Program	Space Science Week	2
SGAC Logo Store Competition		1

** SGAC Scholarships are organised by SGAC itself or together with a partner. It also includes partnerships with programmes such as the Future Space Leaders Foundation (FSLF) or the International Space Education Board (ISEB)*

***postponed*

Awards

Member of the Month Award

The SGAC Member of the Month Award has been established to pay tribute to the most active volunteers each month, recognising their hard work and contributions to SGAC. Members of the Month may be nominated by any SGAC member, and represent those who have brought leadership and inspiration to our space community.

The Member of the Month Award recipients of 2020 are:

January



DANIEL WISCHERT
Germany

SGAC Organising Team
SGC 2019- Washington

February



**SAHITH REDDY
MADARA**
UAE

SGAC Organising Team SGC
2020 - Virtual

February



**SAIRA ROXANA O.
WILLIAMS**
Nicaragua

SGAC National Point of
Contact - Nicaragua

March



**JOSÉ GODINHO
UZCATEGUI**
Venezuela

SGAC National Point of
Contact - Venezuela

April



MEHAK SARANG
USA

SGAC SPT Co-Lead

May



**SG LATIN AMERICA
WEBINAR SERIES
ORGANISING TEAM**

June



**SGAC PR &
COMMUNICATIONS
TEAM**

July



**SPACEGEN UNITED
ORGANISING TEAM**

August



ÁNGEL ARCIA GIL
Panama

SGAC National Point of
Contact - Panama

September



YULIA AKISHEVA
Russia/Sweden

SG[France]2020 – Our Giant
Leap Deputy Manager

October



**SG[FRANCE]2020 OUR
GIANT LEAP
ORGANISING TEAM**

November



**SGAC TEAM FOR THE
MARS SOCIETY CITY
DESIGN COMPETITION**

December



**ANTONIO
SCANNAPIECO**
Italy

SGAC National Point of
Contact - Italy

Pioneer Award

The Pioneer Award was created to recognise individuals who consistently go above and beyond in their work for, and personify the values of, SGAC. The recipients of the Pioneer Award represent the best of the best of our organisation and are selected through a nomination process and independent review board. The Pioneer Award consists of a special pin with a certificate that states the accomplishments of the recipient, along with recognition on the SGAC website. The Pioneer Award is presented twice a year to up to four individuals.

In 2019, the Pioneer Award was awarded to Carmen Victoria Felix Chaidez, Ahmed Abdi, and Harriet Brettle.

The Pioneer Award recipients for 2020 are:



Maria Grulich (Germany)
SGAC Scholarship Coordinator



Maria currently works at the German Aerospace Center (DLR) in Cologne, Germany as a Payloads Operations Engineer, is a co-lead of the SGAC Scholarships team, and has participated in two analogue missions at the Mars Desert Research Station.



Tania Robles (Mexico)
SGAC Regional Coordinator of North, Central America and the Caribbean (NCAC)



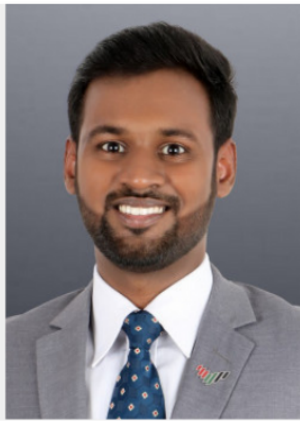
Tania is co-founder and former director of the Aerospace Association of the Engineering School at UNAM. National Point of Contact of SGAC in Mexico from 2016 to 2019, and current Regional Coordinator of the NCAC region. She has volunteered in science and technology outreach associations and amateur astronomy societies, as well as offered conferences in multiple space and educational forums since 2013.



Pauline Delande (France)
SGAC National Point of Contact - France



Pauline works at CNES in Toulouse as Earth Observation Satellite Operations Engineer. Within the Space Generation Advisory Council, Pauline is the National Point of Contact for France and is co-leading the Our Giant Leap initiative.



Sahith Reddy Madara (UAE)
SGAC National Point of Contact - UAE



Sahith is currently pursuing an Advanced Master's in Aerospace Systems Engineering at the ISAE-SUPAERO (National Higher French Institute of Aeronautics and Space) in Toulouse, France.

He is also SGAC UAE's National Point of Contact since 2019, and 'Space Education – Goodwill Ambassador' for the National Endeavour for Student Transformation (NEST), an initiative by The Akshaya Patra Foundation, India.

Alumni Award

Launched on the occasion of SGAC's 20th anniversary in 2019, the SGAC Alumni Award Programme aims to acknowledge selected alumni for meritorious contributions to the SGAC community, demonstrating a high degree of loyalty and commitment to SGAC, and their outstanding leadership and ongoing support of the organisation.

The Alumni Award for 2020 was presented to Agnieszka Lukaszczyk at the online SpaceGen United Congress.



AGNIESZKA LUKASZCZYK



Agnieszka has been selected based on her ongoing support and tireless engagement with SGAC, as well as for her genuine care for the next generation. Agnieszka has been actively advocating for, empowering and inspiring young professionals and students across the sector.

Currently Senior Director – European Affairs at Planet, Agnieszka has been contributing to SGAC as Executive Director (2006-2009), becoming Chair of the organisation right after, until 2011. Agnieszka has been supporting SGAC members ever since, eager to join events and share her professional experience with students and young professionals

Ambassador Award

In 2019, SGAC launched the SpaceGen Ambassador Award Programme with a view to acknowledge organisations that care deeply for the youth, their talents, skills and needs – organisations that actively support, empower and enable this generation to grow as the next generation of space leaders.

SGAC is pleased and honoured to announce that the 2020 recipient of the SpaceGen Ambassador Award is Lockheed Martin.



Lockheed Martin has been a sponsor and partner of SGAC for over a decade and has greatly contributed to SGAC's mandate of providing a platform for growth and engagement for our members around the world to gain skills that prove essential to their future careers.

As SGAC's long-term anchor sponsor, Lockheed Martin has helped raise the visibility of SGAC to a global audience, laying the foundation for SGAC to recruit partners from industry, agency and academia. SGAC is grateful for Lockheed Martin's leading role in supporting SGAC, leading national agencies to initiate their involvement, reflected in the increase of agency scholarships, working group discussion topics and speakers at SGAC events.



Conferences, Events and Workshops



Global

- SGx (Washington DC, USA)
- SpaceGen United (Online)
- SpaceGen Summit (Online)



Local

- SG[France] (Toulouse, France)
- SG[Germany] (Online)



Regional

- Asia-Pacific Space Generation Online Workshop (AP-SGOW)
- North and Central American Space Generation Online Workshop (NCAC-SGOW)
- Africa Space Generation Workshop (AF-SGW)
- European Space Generation Workshop (E-SGW)



Webinars

SGAC responded to the challenges presented by COVID-19 on our usual operations with an increased online output, maintaining a means of accessible engagement for our members across the globe. SGAC are proud to have presented over 120 webinars over the course of 2020, connecting more than 11,000 people from more than 130 countries. This has been and continues to be an excellent opportunity to inspire the present and future workforce of the space sector, to provide opportunities to network, and to enable the exchange of ideas across international borders. The shift to this online engagement meant that the activities of SGAC were more accessible than ever before, and we are pleased to have had the chance to reach members from countries and communities that may not have had the chance to attend in-person events up until now.



Conferences and Events with Official SGAC Representation

Members of the SGAC Executive Committee officially represented SGAC at the following conferences and events:

- STSC, 3-14 February 2020. (Vienna, Austria)
- Space Rocks Uplink: Yuri's Night edition, April 2020. (Online)
- Galassica, Festival dell'Astronomia, 4-10 October 2020. (Online)
- Space Health Symposium, 5-6 October 2020. (Australia)
- UNOOSA/Spain - Dark and Quiet Skies for Science and Society, 5-9 October 2020. (Spain)
- 2nd Shaw-IAU Workshop on Astronomy for Education, 6-9 October 2020. (Germany)
- IAF NextGen Summit, 10 October 2020. (Online)
- Young Professionals IPMC Workshops from the IAF, 11 October 2020. (Online)
- WoAA - Pre IAC Networking Event, 11 October 2020. (India)
- Space Gen United (SGU), 18-26 July 2020. (Online)

Formalised Partnerships



Space Foundation



Moon Village Association



UNOOSA



Eureka Geo



ISAE-SUPAERO



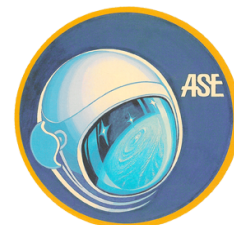
SpacePark



Aerospace Engineering
Students' Association Torino



Los Cadejos



Association of Space
Explorer European Regional
Chapter



Nica Women Tech



SEDS



Aquanauta

Papers, Publications and Presentations

COMMERCIAL SPACE PG

Bhattacharya A., Rondoni F., El Khantouti I., Ferreira J. P., Mommerency M. *"The Space-Faring Africa: Commercial Space Industry and its Readiness for Innovation-Driven Investment"*. Presented at IAF BUSINESS INNOVATION SYMPOSIUM (E6) Entrepreneurship Around the World (5-GTS.1); IAC 2020 Cyber Edition, 12-14 Oct. 2020.)

NEAR EARTH OBJECT PG

Srivastava S., Romero M., Manghaipathy P., Sagar Pradhan S., Luitel B. *"Analysis Of Technology, Economic and Legislation Readiness Levels Of Asteroid Mining Industry : A Base for The Future Space Resource Utilization Missions"*. Presented at the 18th IAA SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FUTURE (D4) Space Resources, the Enabler of the Earth-Moon Ecosphere (5); IAC 2020 Cyber Edition, 12-14 Oct. 2020.

SMALL SATELLITES PG

Muhire D., Stepanova D., Santra S., Baranwal P., Romero M., Amrutkar R., Bonnard S., Jha D., Zucherman A. *"Optical Communications for Small Satellites: A Review of Pointing Strategies & Requirements Optimization"*. Presented at IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2) Advances in Space-based Communication Technologies, Part 1 (4); IAC 2020 Cyber Edition, 12-14 Oct. 2020.

Wischert D., Baranwal P., Bonnard S., Álvarez M., Colpari R., Daryabari M., Desai S., Dhoju S., Fajardo G., Faldu B., López-Contreras González E., Low P., Malcolm K., Mardhani S., Miralles P., Mohanty J., Morchedi S., More H., Ortega-González H., Parasuram S., Romero M., Santra S., Somkuwar A., Soni K., Stepanova D., Thangavel K., Vinayak Bhale K., Zainab R. *"Conceptual Design of a Mars Constellation for Global Communication Services using Small Satellites"*. Presented at the 18th IAA SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND DEVELOPMENT (D3) Systems and Infrastructures to Implement Sustainable Space Development and Settlement - Systems (2A); IAC 2020 Cyber Edition, 12-14 Oct. 2020.

SPACE AND CYBERSECURITY PG

Carlo A., Lacroix L., Zarkan L. *"The challenge of protecting space-based assets against cyber threats"*. Presented at the IAF SYMPOSIUM ON SPACE SECURITY (E9) Cyber-security threats to space missions and countermeasures to address them (2.D5.4) IAC 2020 Cyber Edition, 12-14 Oct. 2020.

Kerolle M., Capurso A. *"How to Estimate Insurance Coverage for Cybersecurity Protection for Satellites"*. Presented at the IAF SYMPOSIUM ON SPACE SECURITY (E9) Cyber-security threats to space missions and countermeasures to address them (2.D5.4) IAC 2020 Cyber Edition, 12-14 Oct. 2020.

Bonnart S., Pickard A., Jha D., Manti N. P. *"The Mission as a Tree: A Novel Approach to Identifying Cyber Threats to Satellites"*. Presented at the IAF SYMPOSIUM ON SPACE SECURITY (E9) Cyber-security threats to space missions and countermeasures to address them (2.D5.4) IAC 2020 Cyber Edition, 12-14 Oct. 2020.

Zarkan L. *"Space Domain Awareness Governance & Security in Outer Space"*. Presented at a joint webinar with AMC Solutions and NATO CCD COE, 11 Jun. 2020.

Stefoudi D. *"Cyber and Legal Perspective of Tracking Apps"*. Presented at a joint webinar with SGAC and Eurisy, 5 Jun. 2020.

SPACE EXPLORATION PG

Salmeri A., Jimenez M. C. V. *"A Social License to Operate for Lunar Resources Activities: Towards a Fair and Sustainable Era of Space Exploration"*. Presented at the 18th IAA SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FUTURE (D4) Contribution of Moon Village to Solving Global Societal Issues (2), IAC 2020 Cyber Edition, 12-14 Oct. 2020.

Pino P., Hugo A., Humes S., Salmeri A. *"Waste Management for Lunar Resources Activities: Towards a Circular Lunar Economy"*. Presented at the 18th IAA SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FUTURE (D4) Space Resources, the Enabler of the Earth-Moon Ecosphere (5); IAC 2020 Cyber Edition, 12-14 Oct. 2020.

SPACE MEDICINE AND LIFE SCIENCES PG

Team Novidien/ SMLS. *"Developing a COVID-19 case prediction tool from Earth observation air pollution data"*. Entered for the NASA Space Apps Challenge for COVID-19, 2020.

Yuen A., Velho R. *"Tackling the COVID-19 Pandemic using Space Technology"*. Presented at the Space Generation Summit 2020, 5 - 8 November 2020.

Yen A., Velho R. *"Addressing Global Health (specifically COVID-19) with Space Medicine on Earth"*. Presented at the Asia Pacific Space Generation Online Workshop 2020, 28 - 29 November & 5 - 6 December 2020.

SPACE SAFETY AND SUSTAINABILITY PG

Oluwafemi F., Abdelbaki R., Lai J., Mora-Almanza J. G., Afolayan E. M. *"A Review of Astronaut Mental Health in Manned Missions: Potential Interventions for Cognitive and Mental Health Challenges"*. Life Sciences in Space Research, February 2021.

SSSPG Team. *"Possible Gravity Variation Researches and their Benefits: A Case Study of Terrestrial Microgravity"*. (Not yet presented at the time of publication of this report).

ALL PROJECT GROUPS

Hayward H., Paternostro S., Seltikova E., Vashishtha A., Foster A., Luitel B., Pradhan S. S., Manghaipathy P., Gunarathne S., Sirorattanakul K., Jain U., Bhusal S., Baltide E., Viswanathan V. K., Quizzagan H., Nikolov A., Gopal C., Vizireanu A., Batul B., Lobo G. J., Susana N., Abdeljelil N., Pavleti B., Church L., Baraka A., Ray K., with Editor: Crossman F. *"Mars City States: New Societies for a New World"*. Entered for the Mars City Design Competition, 2020.

Professional Development

Recruitment

45
Vacancies Posted

617
Applications Received

224
Members Recruited

Mentoring Program

The SGAC Mentoring Programme seeks to connect members of SGAC with more senior members and affiliates of SGAC twice a year, in order to advance their networking and career opportunities. In addition to our matching process, we host a networking platform for our mentees and mentors within Slack in order to allow for connections all around the world. Finally, the program also includes invitations to webinars we host about SGAC and how to get more involved.

In 2020, a total of 126 mentees completed all stages of the application process and were successfully matched with mentors. The number of applications continues to grow in advance of the next mentoring cycle, following on from our biggest year in mentoring yet. We look forward to another successful year of mentoring!

Jobs Board

SGAC Jobs Board is the product of the initiative SGAC Direct Connect. Following an initial trial run earlier this year, the Jobs Board is a highly successful new initiative, posting the 'Jobs Weekly' newsletter direct to the inboxes of SpaceGen members with a wide range of opportunities from SGAC sponsors, partners, and other exciting organisations. Online, the Jobs Board maintains a Slack channel for members to post opportunities in their own companies and a website that is currently under maintenance. While various functionalities are currently being added to the Jobs Board site, we expect it to be back online and serving the space community as soon as possible.

About SGAC Direct Connect:

We connected SGAC members with space careers around the world! SGAC allows companies to post job openings directly on our website, and to present their brands to our members.

SGAC's members are students and young professionals from all disciplines across the space industry. By posting open positions to SGAC, space companies are not only featured but their profile and information are also available to our members on the web page and in our newsletters. With over 15,000 members in over 150 countries, SGAC represents one of the largest active communities of space professionals and is an essential recruiting location for any space company or organization.

ACTIVITY HIGHLIGHTS

General

SGAC welcomed Harriet Brettle (UK) as the new SGAC Co-Chair

In response to COVID-19 restrictions, SGAC hosted the first ever SGUnited and SGSummit, replacing SGC 2020 and SGFF 2020

SGAC partnered with the UNOOSA to organise the 2nd edition of the Space for Youth Competition, supporting the first priority of the UN Youth Strategy: "Engagement, Participation and Advocacy to amplify youth voices for the promotion of a peaceful, just and sustainable world"

SGAC announced Lockheed Martin as the Recipient of the 2020 SpaceGen Ambassador Award

SGAC launched a new online store

SGAC nominated Agnieszka Lukaszczuk as the 2020 recipient of the SGAC Alumni Award

Appointments

SGAC is pleased to have appointed the following new staff members in 2020:

**HARRIET
BRETTLE,**
UK

SGAC Co-Chair

**ILIAS
TANOUTI,**
Morocco

**Regional
Coordinator:
Africa**

**ALEXANDRA
JERCAIANU,**
Romania

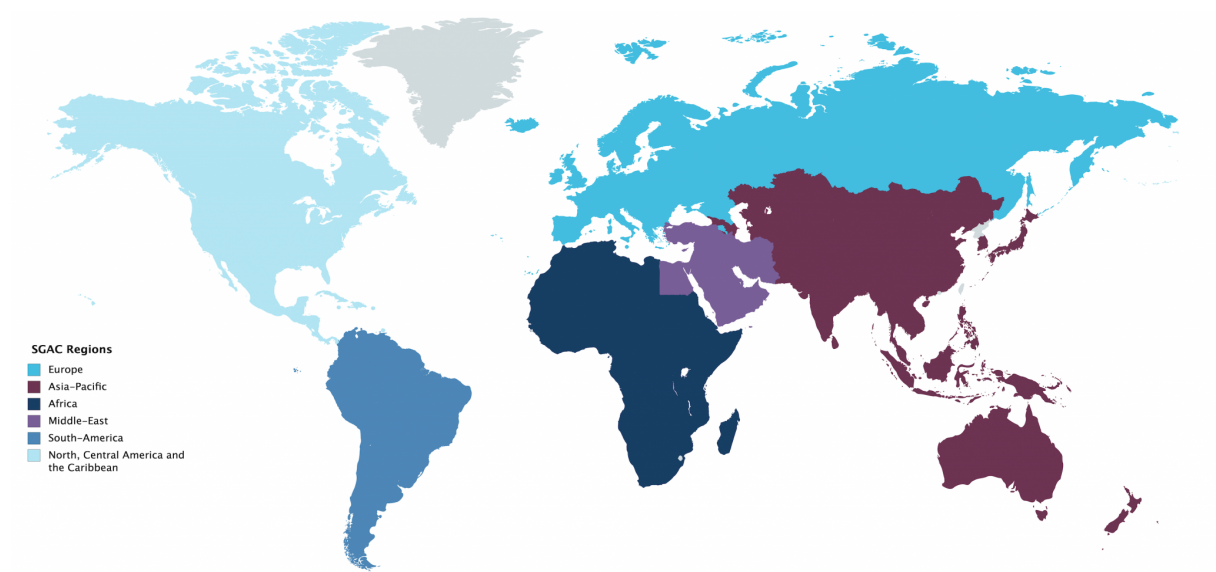
**Regional
Coordinator:
Europe**

**RAWAN
ALSHAMMARI,**
Kuwait

**Regional
Coordinator:
Middle East**

<p>AHMED BARAKA, Egypt</p> <p>Regional Coordinator: Middle East</p>	<p>ISI CASAS DEL VALLE, Chile</p> <p>Regional Coordinator: South America</p>	<p>JOSH SCHERTZ, USA</p> <p>SGAC Treasurer</p>	<p>HAMZA HAMEED, Pakistan</p> <p>Legal Team Co-Lead</p>
<p>ALICE RIVIERE, France</p> <p>Legal Team Co-Lead</p>	<p>LUCILLE BAUDET, France</p> <p>Strategic Partnerships Co Lead</p>	<p>ALESSANDRA VERNILE, Italy</p> <p>Project Groups Coordinator</p>	<p>DANIEL SEYBOLD, Germany</p> <p>Local Events Coordinator</p>
<p>MEHDI SCOUBEAU, Belgium</p> <p>Regional Events Coordinator</p>	<p>ABRAHAM AKINWALE, Nigeria</p> <p>Human Resources Lead</p>	<p>KRISTIN SHAHADY, USA</p> <p>SGFF Manager</p>	<p>MARIA GRULICH, Germany</p> <p>Scholarships Co-Lead</p>
<p>MICHAEL KRETZENBACHR, Australia</p> <p>Scholarships Co-Lead</p>	<p>ERIN GIBBONS, Ireland</p> <p>Public Relations and Communications Team Co-Lead</p>	<p>MAGGIE HANDLER, USA</p> <p>Public Relations and Communications Team Co-Lead</p>	<p>LAUD BENTIL, Ghana</p> <p>Web and Data Team Co-Lead</p>
<p>SABRINA ALAM, UK</p> <p>Alumni Lead</p>	<p>SHAYNA HUME, USA</p> <p>Mentoring Program Co-Lead</p>	<p>VICTORIA DA-POIAN, France</p> <p>Mentoring Program Co-Lead</p>	

Regional



AFRICA

- Prepared a total of 42 online webinars and events
- Organised successfully the African Space Generation Workshop (AF-SGW) in Ghana and the SGAC-DARA Hackathon
- Increased the number of MOUs and grew to 23 partnerships
- Created 6 Micro Projects to improve SGAC activities in the region
- Covered more NPoCs (49 NPoCs) and countries (29 countries)



ASIA-PACIFIC

- Delivered successfully the first Asia-Pacific Space Generation Online Workshop (AP-SGOW) with 22 countries represented
- Ran a series of online webinars and events including the Japan Space Talks and SG[Philippines]
- Completed the Regional Executive Team, with an Executive Secretary, Partnerships Manager, and Communications Manager
- Improved communication and rapport within AP NPoC team; launch of E-nomikai initiative
- Increased attendance of NPoCs in quarterly meetings and General Assembly meetings



MIDDLE-EAST

- Led a series of webinars in response to COVID-19
- Maintained a good number of active NPoCs in the region for the second year, with 14 NPoCs representing the Middle East
- Improved communications between NPoCs



EUROPE

- Organised many high-quality local events online with substantial attendance figures
- Arranged the first regional and local events in the Balkan region, including the Balkan Hackaton and Croatia webinar series
- Completed successful online event E-SGW Madrid, with the next one already set to happen in Cyprus in 2022
- Pivoted SG[France] Our Giant Leap 2020 into a dedicated project group on diversity
- Conducted 1.5 months of one-to-one meetings between the 30 NPoCs of the Region and the European Regional Coordinators



NORTH, CENTRAL AMERICA AND THE CARIBBEAN

- Introduced the Open Course Introduction to Space Engineering, pioneered by Panama with Costa Rica, El Salvador, and Nicaragua integrating into the program as well. The course has just finished its 3rd edition and plans to continue in the coming years.
- Organised the Latin America Webinar Series, in collaboration with the South American region. This series was presented in Spanish.
- Developed a Caribbean based space webinar (What space can do for WI*?) organized by Barbados, Jamaica, and St. Lucia.
- Presented the North and Central America Space Generation Online Workshop (NCAC-SGOW) in an online format in December.
- Strengthened Canada's SGAC presence through attendance and development of multiple webinars and the initiation of new partnerships and MOUs (i.e. Launch Canada, SEDS Canada, Zenith Canada)



SOUTH AMERICA

- Ran the SpaceGen Latin American Webinar series and organised the South America Space Generation Online Workshop (SA-SGOW)
- Produced the brochure SA-SGAC
- Drafted the South American Newsletter
- Ensured that each country in the region has at least one NPoC
- Improved dialogue and communication with SGAC regional members

FINANCIAL SUMMARY

Revenue

€ 162,715.72 ▼ - 61.6%
Change from 2019

Expenditure

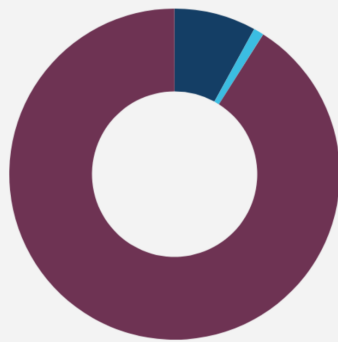
€ 148,070.56 ▼ - 62.5%
Change from 2019

Surplus / Loss

€ 14,754.55 ▼ - 48%
Change from 2019

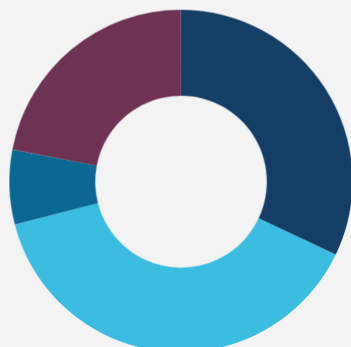
% Surplus / Loss

+ 10 %



Revenue Split

- Ticket Registrations (8%)
- Donations (1%)
- Sponsorships (91%)



Expense Breakout

- Overhead (32%)
- Payroll (39%)
- Legal (7%)
- Events (22%)

GLOBAL AND REGIONAL EVENTS



SPACE GENERATION
ADVISORY COUNCIL

In Partnership With:



Washington D.C., USA
 9 March 2020



SGx was a day-long of short talks from top-level industry professionals. The talks ranged on anything from networking to building your career path.

In partnership with Future Space Leaders Foundation (FSLF) and SATELLITE 2020, SGAC hosted its fifth SGx. SGx2020 was a technology-focused event that brought together young professionals, industry experts, and government leaders to discuss pressing issues and innovative ideas in an exciting way.

Sponsors



Partners





SPACEGEN UNITED

Online Event
18 – 26 July 2020



SpaceGen United – SGAC's very first online Congress! It gathered more than 150 participants, experts from across the space industry as well as SGAC Alumni, all during the course of a week. As a unique and dynamic experience, SpaceGen United included workshops, podcasts, virtual coffee hours, a trivia night and many other online gatherings.



Sponsors



Partners



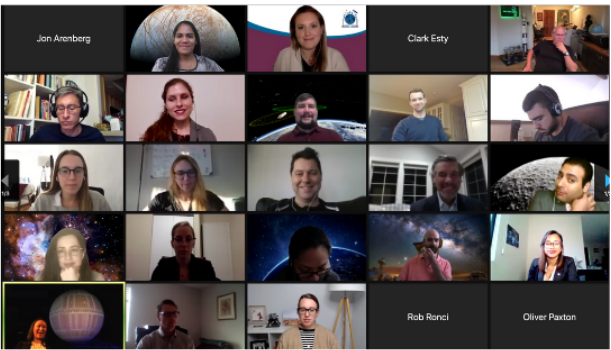


SPACEGEN SUMMIT

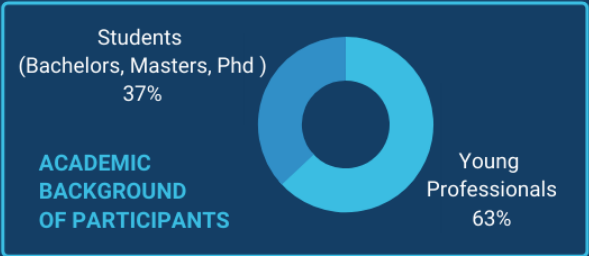
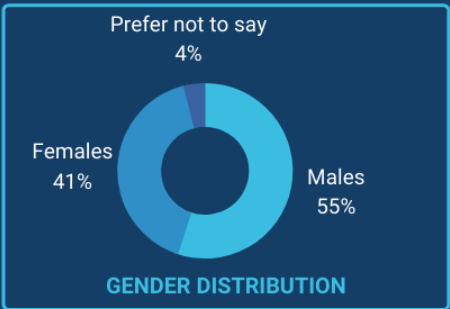
Online Event
5-8 November 2020



The SpaceGen Summit (SGS) was the 2020, online edition of the Space Generation Fusion Forum. We gathered more than 75 participants, experts from the industry worldwide and SGAC Alumni over the course of four days. SGS included breakout sessions, lightning talks, keynotes, and other online gatherings.



Statistics



NUMBER OF NATIONALITIES REPRESENTED	23
NUMBER OF DELEGATES	79
NUMBER OF BREAKOUT SESSIONS	7

Sponsors



Partners



Supported by



Space Generation Workshops



ASIA PACIFIC SPACE GENERATION ONLINE WORKSHOP

 **Online Event**
 **28th, 29th November
& 5th, 6th December, 2020**



Given that Asia-Pacific is one of the largest regions for space growth, there is a need to continue building a community of practice in the region to capitalize upon opportunities. Over the last 6 years, SGAC has been successfully organising AP – SGW's, inviting university students and young professionals across the Asia-Pacific region to discuss some of the key topics on space.

Due to the current global health situation associated with COVID-19, the 7th Asia Pacific – Space Generation Workshop which was scheduled in Vietnam is being postponed to 2021 (tentative). However, the organizing team has come up with its first online edition, the Asia Pacific – Space Generation Online Workshop, which congregated more than 75 delegates to discuss diverse space topics moderated by experts. As a unique online experience, AP-SGOW

included Workshops, Virtual Coffee Hours, an International Night and many other engaging activities.

AP-SGOW was built upon the roadmap of previous years, providing an ideal platform for delegates to voice their opinions, exchange ideas on salient space issues, and connect with one another from the comfort of their homes.

Sponsors



Platform Partner



Partners and Supporters





NORTH, CENTRAL AMERICA & THE CARIBBEAN SPACE GENERATION ONLINE WORKSHOP



 **Online Event**
 **11- 13 December 2020**

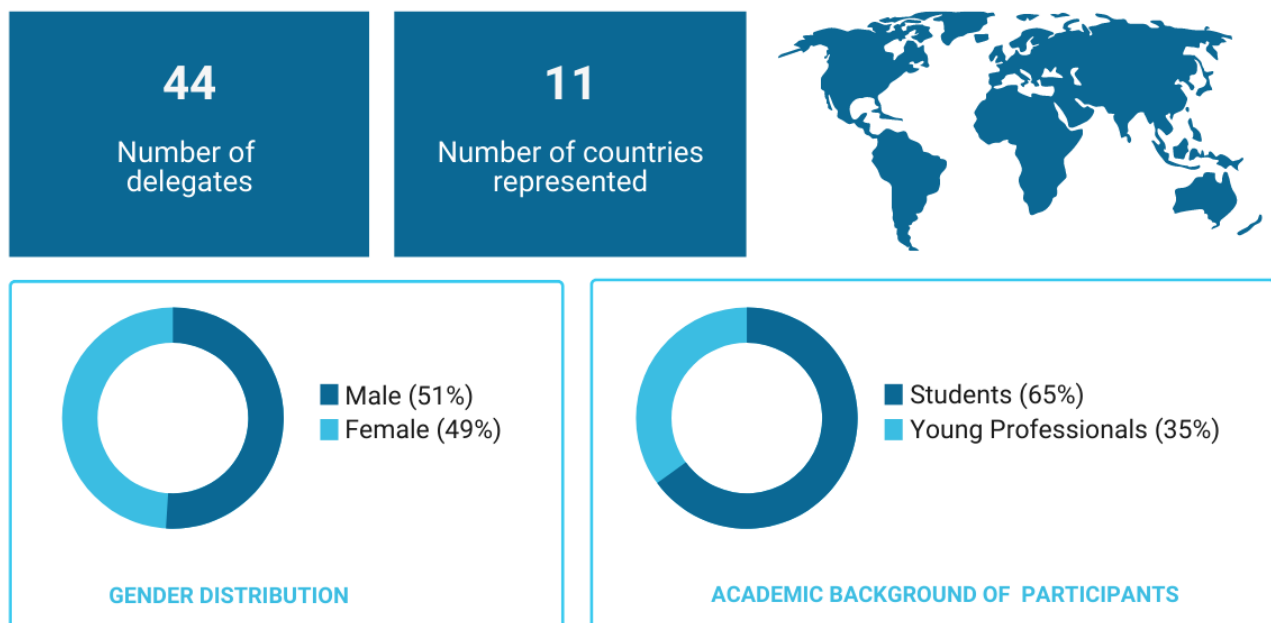
The Space Generation Online Workshop was a three-day workshop from December 11th through the 13th. Built on the successes of the numerous Space Generation Advisory Council (SGAC) events around the world, it focused on enhancing the understanding of students and young professionals in space in the region of North, Central America, and the Caribbean (NCAC).

The event witnessed up to 80 delegates (aged 18-35 years) and guests from space agencies, embassy space attaches, and space industry representatives. NCAS- SGOW featured panel discussions, keynote speeches, and intensive working group discussions on relevant topics and challenges for the region.

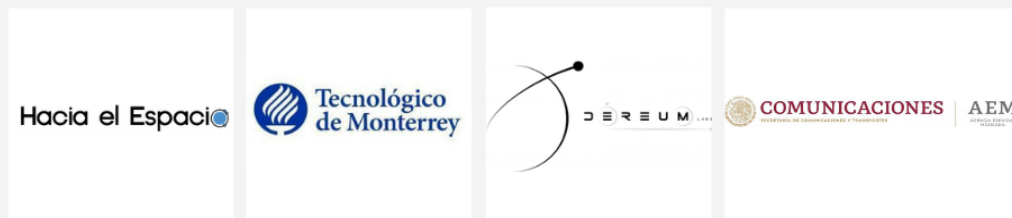
The workshop was postponed from April 2020 (Mexico City) due to the ongoing COVID-19 pandemic. Thus, the efforts to develop the online workshop offered members of the NCAC

region opportunities to continue learning and growing within the aerospace sector and to bring to light the visions and goals of the NCAC region. The online workshop was held on the Gather and Zoom platforms, providing a multi-dimensional avenue for collaboration and networking. Multiple panels, workshops, games, and other fun networking events were held to engage our delegates and speakers over the 3 days (14 hours) workshop. In addition to our 44 delegates, we had 6 speakers, 4 special guests, and 4 subject matter experts. Sponsorship and support came from multiple sources including Agencia Espacial Mexicana, Tecnológico de Monterrey, Hacia el Espacio, Space Makers, SETEC Lab, ISU, Maxar Technologies, CSA, Dereum, and NASA.

Statistics



Sponsors





UNITED NATIONS INVOLVEMENT

SGAC works constantly to accomplish a key component of its mission as an organisation: to be the link between UN Member States present at the UN COPUOS and the next generation of international space sector leaders.

SGAC has permanent observer status in UN COPUOS and is regularly present at its annual meeting (in June) and at its two subcommittees' meetings: Scientific and Technical (in February) and Legal (in March). As one of the permanent observers in UN COPUOS, SGAC contributes to the activities and action teams of UN COPUOS.

In 2020, the regular annual cycle of sessions of UN COPUOS and its subcommittees was disrupted as a result of the pandemic. The 59th session of the Legal Subcommittee and the 63rd session of the Committee were taken by written procedure.



UN COPUOS Scientific and Technical Subcommittee

As a permanent observer of the Scientific and Technical Subcommittee, SGAC participated in the 57th session held from 3 to 14 February 2020 at the UN in Vienna, Austria. Clémentine Decoopman, SGAC Executive, presented on the recent activities of SGAC, of which the following were highlights:

- The creation of four new project groups in 2019: (i) The Space Technology for Earth Applications Project Group; (ii) The Ethics and Human Rights Project Group; (iii) The Space and Cybersecurity Project Group; and (iv) The Space Medicine and Life Sciences Project Group.
- International events and workshops for young professionals and university students bringing industry leaders and SGAC members together: SGx event, held in conjunction with SATELLITE in Washington D.C.; 8th Space Generation Fusion Forum, in conjunction with the 35th Space Symposium, hosted by the Space Foundation in Colorado; 18th Space Generation Congress (SGC) in Washington D.C., United States in conjunction with the 70th International Astronautical Congress (IAC); The first time one regional workshop per region including the first Middle-Eastern Space Generation Workshop in Istanbul, Turkey; 24 events in more than 20 different countries.
- More than 152 scholarships and awards to students and young professionals in 2019;
- SGAC formalised partnerships with 20 new entities;
- SGAC launched the SpaceGen Ambassador Award;



SGAC delegates attending the 57th meeting of the Scientific and Technical Subcommittee of COPUOS

- SGAC launched the SGAC Alumni Award;
- SGAC went through a major restructure of its Executive Committee to lead the way to the recruitment of a second full-time employee.

Additionally, during the two-week meeting, SGAC members made two Technical Presentations. On 6 February 2020, Anthony Yuen presented the new Space Medicine & Life Sciences Project Group aiming to provide an international, intercultural and interdisciplinary platform for young professionals with an interest in space biomedical science. On 11 February 2020, Matteo Capella presented An Overview of the Outcomes of the SGC 2019 (held on 17-19 October 2019 in Washington, D.C., USA). In his presentation to the S&T Subcommittee, Matteo provided delegates with an overview of the Congress, noted some of the many prominent Speakers and Experts and presented the guiding questions and recommendations.

Furthermore, on 11 November 2020, SGAC provided to the Working Group on Space and Global Health of the S&T Subcommittee responses to the set of questions regarding policies, experiences and practices in the use of space science and technology for global health.

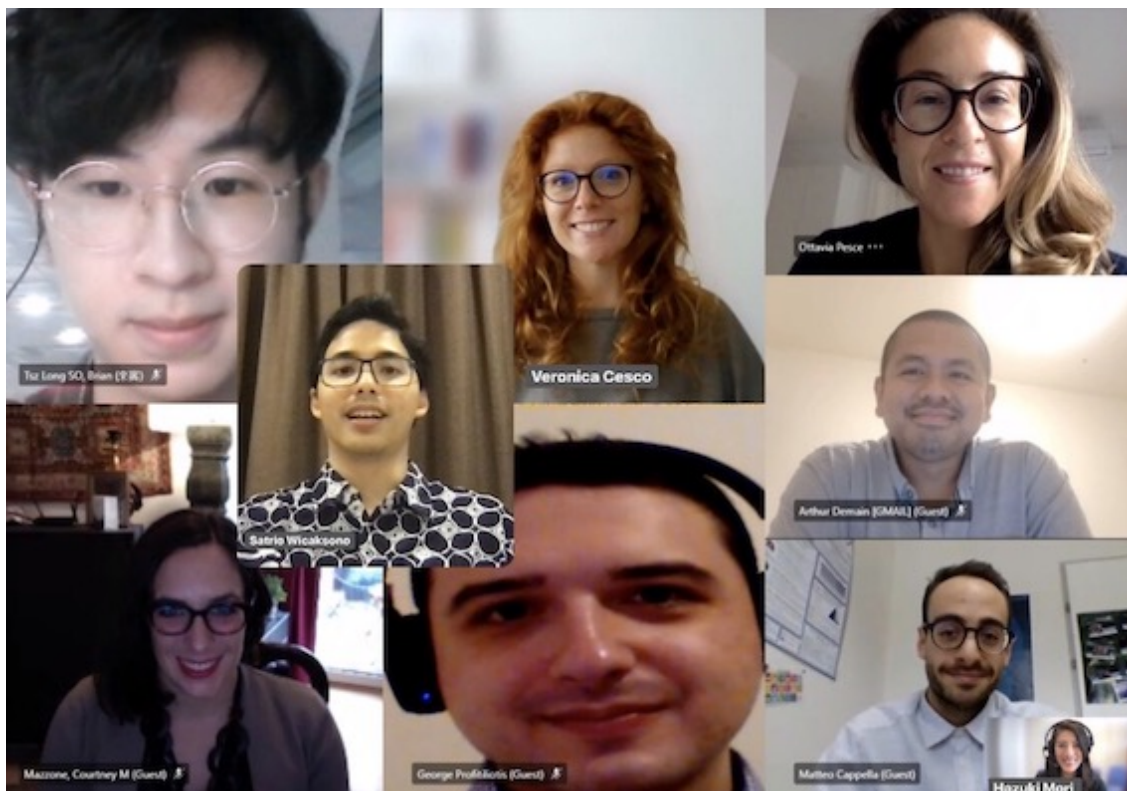


Space4Youth Competition

In September 2018, the UN Secretary-General launched an UN-wide 'Youth 2030' strategy to recognize, inter alia, young people's positive contributions as agents of change. Space exploration is by nature a long-term, inter-generational pursuit. Involving youth in determining the future direction of space policy and exploration is essential to building a better future for humanity beyond the timeline of present leaders.

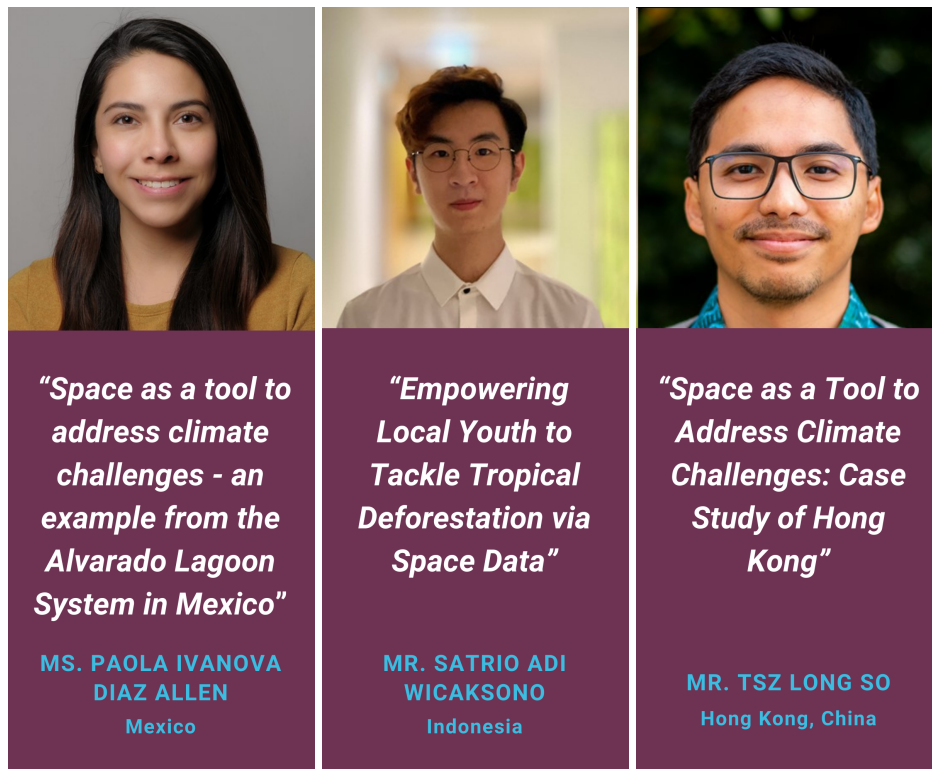
The focus of the 2020 Competition was on SDG 13: Climate Action. UNOOSA and SGAC wanted to give a voice to and promote youth's ideas on how space, in all of its aspects, can mitigate climate challenges.

On 8 September 2020, UNOOSA, in collaboration with the SGAC, hosted a webinar to announce the winners of the Space4Youth Competition! Thanks to the support of the U.S. Mission to the International Organizations in Vienna, the winners will attend an adult space camp in the U.S.. Five additional participants received a special mention for their excellent work! It was an exciting event to showcase the results of the competition that had 400 young people from 70 countries participate, with each of the 3 winners presenting their outstanding ideas and examples from their community to leverage space for Sustainable Goal 13: Climate Action.



From the top left Tsz Long So (2020 Space4Youth Competition winner), Veronica Cesco (UNOOSA), Ottavia Pesce (UNOOSA), Courtney Mazzone (U.S. Permanent Mission to the International Organizations in Vienna), Satrio Wicaksono (2020 Space4Youth Competition winner), George Profitiliotis (2019 Space4Youth Competition winner), Arthur Demain (2019 Space4Youth Competition winner), Matteo Cappella (SGAC), Hazuki Mori (UNOOSA).

Winners



Special Mentions

Ms. Tania Jeannette Llamas Franco, Paraguay **"Space as a tool to address climate challenges: Examples from local communities"**

Mr. Pankaj Adhikari, Nepal **"Use of Space Technology In Glacial Lake Outburst Flood Mitigation: A case study of Imja glacier lake"**

Mr. Oluwakorede Adejoro, Nigeria **"Space as a tool to address climate challenges: the example of Lake Chad"**

Ms. Alessandra Matteis, Italy **"Space, Climate Change and the Arctic" remote sensing activities for the benefit of Greenland"**

Ms. Zhou He, China **"Using high-resolution remote sensing CubeSat to observe the distribution of sea ice"**

PROJECT GROUPS AND ACTIVITIES

Commercial Space



Scope and Objectives

The Commercial Space Project Group is a forum that discusses the vibrant commercialization of space activities for members of the Space Generation Advisory Council.

The group's research interests include exploring:

- The Context of Commercial Space
- Commercial Space Models and Market Segments
- The Role of Policy and Law in Shaping the Commercial Space Industry
- Idea Acceleration and Entrepreneurship.

Besides academic research, the group's goal is to motivate and support the involvement of young people in commercial space activities, through competitions, round tables, webinars and further outreach activities.

Initiatives

Some initiatives that were taken up by the Commercial Space PG during the year 2020, are:

- Space-Fairing Africa - which aims to assess the business readiness of the space industry in Africa through analysis of facilities, infrastructures and other activities. The Space Business Readiness Level (SRBL) is the index that was formulated to be used as a standard for the analysis. The research was presented as a paper titled "The Space-Faring Africa: Commercial Space Industry and its Readiness for Innovation-Driven Investment" at the IAF Business Innovation Symposium (E6), in IAC 2020 Cyber Edition.
- D-Orbit Capacity Building - Commercial Space PG aims to partner with key entrepreneurs in underdeveloped space countries to develop their capacities.
- CS Think Tank - This initiative works to develop the entrepreneurial spirit within SGAC by supporting the brainstorming of new space businesses and technical ideas.

Space Exploration



Scope and Objectives

Space Exploration Project Group focuses on ongoing and future deep space- manned and unmanned missions.

The main aim of the Group is to create an international and interdisciplinary forum focused on different aspects of space exploration, including, but not limited to:

- Development of exploration technologies and capabilities
- Safety enhancement
- Performing Space, Earth and applied sciences
- Search for life;
- Stimulation of economic expansion

Their focus is the Global Exploration Roadmap (GER) currently being developed by 14 space agencies around the world. The GER Strategy reflects the international effort to prepare a collaborative space exploration platform, beginning with the International Space Station, continuing to the Moon, near-Earth asteroids and working towards the ultimate goal of a manned mission to Mars.

Initiatives

In 2020, SEPG engaged in the following activities:

- **T.U.R.T.L.E.** - Technical Unit Research for a Thriving Lunar Ecosystem (ongoing) - The T.U.R.T.L.E. Group was established on the 1st of September 2020 with the goal to conduct original research on the fundamental challenges for upcoming lunar exploration missions. It currently has 16 young talented researchers and aims at presenting its preliminary conclusions over the course of spring 2021. The group is managed by Antonino Salmeri and the scientific coordination is provided by Paolo Pino.
- The **Mars City State Design Competition** by The Mars Society - The SEPG has promoted and coordinated the development of a SGAC team for the Mars City Design competition, organized by the Mars Society to design a city-state on Mars for 1M people. The project involved all the co-leads of the SE, NEO, SSS, CS, SS, SMLS project groups as mentors, and a total of 27 active members working on the project. The SGAC Team made it all the way through the competition up to the finals.

- **Webinar Series** on the future of space exploration which had 7 episodes that started on 22/04/20 and ended on 10/06/20. It covered various topics related to lunar exploration, economy and challenges.
- Online events with the Moon Village Association - contributions to the Webinar series **“Governance of Global Moon Exploration and Settlement”** and the **First Online Global Moon Village & Symposium**
- Two papers titled **“A Social License to Operate for Lunar Resources Activities: Towards a Fair and Sustainable Era of Space Exploration”** and **“Waste Management for Lunar Resources Activities: Towards a Circular Lunar Economy”** were presented at the 18th IAA Symposium On Visions and Strategies for the Future (D4) in IAC 2020 Cyber Edition.

Space Law and Policy



Scope and Objectives

The Space Law & Policy Project Group was established in the summer of 2012 at the initiative of SGAC members pursuing legal training and building careers in the intersection of the legal profession and the space industry. Open to all members of the SGAC, the group will serve as a forum for young professionals and university students interested in space law and policy and looking to work together to have their voices heard in the global discussion on the legal and policy aspects of outer space. Dedicated to investigating and addressing current issues in international and national space law and policy, and anticipating likely space law and policy issues in the coming decades, the Project Group will pursue projects relevant to the field of space law and policy, and to the broader international space community.

Initiatives

The activities pursued by the Space Law and Policy Group in 2020 are:

- **The Hague Building Blocks** - a collaboration between Commercial Space and Space Law and Policy Project Groups, which aims to propose a framework for international regulations on commercial space mining by combining perspectives from the legal side (SLPPG) and commercial side (CSPG).

The various subgroups of the Space Law and Policy Group undertook various projects as given below:

- Weaponization subgroup - Empirical qualitative research on the **failures of arms control agreements and measures**.

- National space legislation subgroup - **Review of the draft of Ugandan space legislation and policy** to support the SGAC NPoC for Uganda (David).
- Sustainability subgroup - Comparative and normative research on the implementation of long term Sustainability guidelines.
- Space resources subgroup - Comparative planetary protection research and participation in the **EAGLE** project along with SEPG.
- Communications team - Installation of a bi-monthly newsletter, bi-monthly blogs with interviews and opinion pieces, dissemination of news and achievements through social media.

Ethics and Human Rights



Scope and Objectives

The vision of the Ethics and Human Rights Group is to identify how space technology can best contribute to the realization of the United Nations objectives on Human Rights and the Sustainable Development Goals. The group serves as a platform for the diverse people who make up the space sector and help shape its development to be representative of all humanity.

Initiatives

In the year 2020, Ethics and Human Rights Group were involved in the following activities:

- **Ethics and Human Rights in the Space Sector Reading List** - This project will leverage the PG's expertise to develop a reading list of high-quality materials which will ignite questions about Ethics and Human rights and their intersection with Space and Space technology. It would also work to address diversity with a critical and inclusive intersectional approach to gender, race, class, ability, sexuality and other components of oppressed identities in space or space-adjacent fields. The reading list would be made publicly available to all space advocates interested in the intersection of Space and Ethics in the 21st century.
- **Membership Survey and Summary Report** - The project group is preparing a survey of SGAC membership perspectives and prioritises on issues of ethics and human rights in the space sector. Through this project, an anonymous online survey would be available to all SGAC members and would focus on their experiences in the space sector and its diversity. A summary publication of the results and future directions of

the project group based on the survey would be developed immediately after and would be presented at a future Space Generation Fusion Forum or Space Generation Congress.

Small Satellites



Scope and Objectives

The Small Satellite Project Group was initiated after SGAC recognised that the landscape of space exploration is changing because of the introduction of small satellite missions. Small satellite programs are particularly attractive since they are “affordable”. It shall be no surprise if, in the near future, many developing countries, groups from the academic world or even small teams of space enthusiasts develop their own space mission based on small satellites. Thus, the Small Satellite Project Group caters to new actors such as members from developing countries, students, and amateurs.

Initiatives

The activities that were undertaken in 2020, by the Small Satellites Project Group, include:

- **On-board AI technology application for small satellites** - This project analyses the possible applications of technologies onboard the satellites.
- **UNICEF research: constellations review to enable communications** - The research aims to analyse the growth of interest in the field of global communications in order to provide background knowledge as well as describe the technological capabilities of developing small satellite constellations.
- **IOD: using CubeSats for In-Orbit Demonstration missions** - This project seeks to examine small satellite capabilities to address the growing market of technology demonstration missions.
- A paper titled, “**Conceptual Design of a Mars Constellation for Global Communication Services using Small Satellites**” was presented at the 18th IAA Symposium On Building Blocks for Future Space Exploration and Development (D3), in IAC 2020 Cyber Edition.

Near Earth Objects



Scope and Objectives

The Near Earth Object (NEO) Project Group is dedicated to helping the worldwide planetary defence community. The group provides a youthful perspective to planetary defence through annual reports, competitions, conference attendance, and public outreach projects related to Near Earth Objects.

Initiatives

In 2020, the Near Earth Object (NEO) PG engaged in the following activities:

- **NEO Renaissance Poster Competition 2020** was a competition to express creative ideas regarding NEO during COVID-19 to keep our space community engaged. It was launched on April 8th and the poster entries were accepted till 5th May 2020 on the SGAC NEO PG Facebook, SGAC NEO PG Twitter page with #SGAC_NEORenaissance.
- **The group's first newsletter** was released on 30th June 2020 in collaboration with the IAF NEO Technical Committee for 'International Asteroid Day 2020.'
- **The NEO committee collaborated with the IAF NEO Technical Committee** on the AIAA - LA Planetary Defense Virtual Panel on 5th December 2020.
- **'Find An Asteroid (FAA)'** campaign was a 4-week event (9 November - 4 December 2020) with a special focus on teams from schools and universities.
- A paper titled **"Analysis Of Technology, Economic and Legislation Readiness Levels Of Asteroid Mining Industry: A Base for The Future Space Resource Utilization Missions"** was published in the 18th IAA Symposium on Visions and Strategies for the Future in October 2020.

Space and Cybersecurity



Scope and Objectives

The Space and Cybersecurity PG follows the outcome of the Space & Cybersecurity working group at the European Space Generation Workshop (ESGW) 2018 to emphasize the nature of space and cybersecurity, the priorities of governments and international institutions in this realm, and data availability (whether open-source or restricted). Possible technical solutions to the challenges posed above are considered by the PG, as well as the threats of cybersecurity in space.

Initiatives

In 2020, the Near Earth Object (NEO) PG engaged in the following activities:

- **Multiple webinars** ranging from 'Cybersecurity and Space Law' to 'Emerging Threats in Emerging Space Technology'
- **Podcast titled "Decoding Cyber Space"** hosted by Jonathan Lim. It engaged with leading experts and industry professionals operating in the intersection between ICT and outer space and reach out to a broader audience.
- The social media campaign **"Meet our Members AND Advisors,"** was an activity aimed to share our members' interests in space and cybersecurity, backgrounds, and ambitions.
- A paper titled **'The challenge of protecting space-based assets against cyber threats'** was published in the 'IAF Symposium on Space Security' from 12-14 October 2020.
- A paper titled **'How to Estimate Insurance Coverage for Cybersecurity Protection for Satellites'** was published in the IAF Symposium on Space Security on 12-14 Oct. 2020.
- A paper titled **'The Mission as a Tree: A Novel Approach to Identifying Cyber Threats to Satellites'** was published in the 'IAF Symposium on Space Security' from 12-14 October 2020.
- A webinar titled **'Cyber and Legal Perspective of Tracking Apps'** was presented on the 5th of June 2020.

Space Safety and Sustainability



Scope and Objectives

The Space Safety and Sustainability Project Group assists in building the highest possible degree of uniformity in regulations and standards, procedures and organisation regarding space safety and sustainability. This is achieved through meetings, reports, conference presentations, competitions, and outreach projects.

Initiatives

- The **'Space Environment'** project focuses on the safety, health and comfort of astronauts participating in manned space missions. It has been ongoing for several years with different focuses each year.
- **Education and outreach** have been done to raise awareness of space safety and sustainability issues. This includes the third volume of the Space Safety education series.
- The **'2nd SSS Essay Competition'** follows up on last year's success of the SSS Essay Competition. The topic of the 2020 competition revolved around the question "What Space Traffic Management measures must be internationally implemented to improve the safety and sustainability of outer space?".

Space Medicine and Life Sciences



Scope and Objectives

The Space Medicine and Life Sciences (SMLS) Project Group provides an international, interprofessional, and interdisciplinary platform for young professionals with an interest in space medicine and the life sciences. The group endeavours to provide a conduit for students and young professionals to engage in the ongoing activities in the space medicine sector in order to optimise human health on Earth, low-Earth orbit and beyond. Overall, the PG aims to incubate and support ideas from the next generation to solve today's health challenges.

Initiatives

- **'Health in Space'** was a webinar series that showcased an international space medicine or space life science expert to talk about their work, paired with a young professional about their work in the same field and how they got involved.
- **'SGAC SMLS and UK Space LABS Essay Competition'** had the theme 'How would you address the COVID-19 pandemic using a space application/technology?'
- **'The Systematic Review Workshop in Space Medicine & Life Sciences'** was a collaboration between SMLS and UK Space LABS and Aerospace Medicine Systematic Review Workshop. Those involved conducted a hands-on systematic review based on a particular research question over six months virtually.
- **'SGAC SMLS and SEPG Mentorship Webinar'** introduced leaders of the Space Medicine and Life Sciences to the other Space Exploration Project Groups for collaboration purposes.
- **'UNOOSA Space for Global Health Working Group Questionnaire'** was a collaboration with the UN Working Group where SMLS members participated in submitting a reply to the UNOOSA Space for Global Health Working Group 2020 questionnaire.
- **'Twitter Space Life Sciences Journal Club'** was a space where critical appraisal of the latest scientific papers in aerospace medicine and life sciences was done via Twitter with our members and advertised on Slack as well as our newsletter.

Space Technologies for Earth Application



Scope and Objectives

The Space Technologies for Earth Applications (STEA) Project Group (PG) provides a global and interdisciplinary forum for students and young professionals with an interest in the application of space technologies for the improvement of life on Earth. A key goal of STEA is to develop research to support and provide a “plan of action for people, planet and prosperity.” This involves focusing our attention on the United Nation’s Sustainable Development Goals (SDGs) while using Agenda 2030 as inspiration. A combination of RS (Remote Sensing), GNSS (Global Navigation Satellite System), and AI (Artificial Intelligence) technologies are also considered.

Initiatives

- **‘Roles of Space-related NGOs’** was a project aimed at exploring the public perceptions of the roles of space-related NGOs in disaster management in order to develop a framework for improved collaborations between space-related NGOs, governmental bodies, and first responders. The PG received over 100 responses from participants and prepared a manuscript that was submitted to a peer-reviewed academic journal.
- **‘AI4OceanFarming - Feasibility of ocean farming using satellite data’** is an ongoing project that aims to improve the performance of ocean farms by studying their current situation in terms of feasibility and hazards (e.g., harmful algal blooms, ocean acidification and harsh weather conditions). This goal will be achieved by analyzing several sources of input data: multispectral images and marine data parameters from the Copernicus program, in-situ data obtained through deployed IoT devices and feasibility databases from specialised organisations.
- **‘Flood Management in Cameroon’** is a project that aims to develop an improved methodology for rapid flood monitoring using artificial intelligence and open-sourced data including optical satellite imagery, Synthetic Aperture Radar (SAR), and social media crowdsourcing. As a part of the project, the PG plans to have a series of workshops and training activities for local scientists in Cameroon to transfer knowledge from this project to practitioners.
- **‘Social Media for Disaster Management’** is a project that utilizes different types of social media data to supplement remotely sensed data to improve the effectiveness of disaster relief efforts. In the first phase of the project, we focus on the use of

Twitter to distribute news about the recent Bobcat fire in Southern California.

- **'Applying Space Data and Technology for the Benefit of Earth'** is a project developed by the SGAC Space Technology for Earth Applications Project Group in collaboration with the careers and education charity group known as 4wardfutures. The program is addressed to young people (aged between 12 and 18 years old) to give them the opportunity to collaborate with professionals to explore possible applications of space data and technologies that have been collected and developed for Earth monitoring.
- **'Applying Space Data and Technology for the Benefit of Earth'** is a topic begin explored by a multicultural subgroup within STEA to investigate how the lockdown impacted climate change by using earth observation data, coupled with other sources (e.g., weather forecasts and local on earth vibrations linked with traffic behaviour in metropolitan areas).
- **'Investigation on how COVID-19 pandemic related lockdown impacted climate change'** was started by a multicultural subgroup of STEA investigating how the lockdown impacted climate change by using earth observation data coupled with other sources (e.g., weather forecasts and local on earth vibrations linked with traffic behaviour in metropolitan areas).
- **'Diversity in Space Industry'** is an initiative to improve our understanding of the effectiveness of recent global efforts to encourage gender and racial diversity in the space industry. We utilize available data including SGAC memberships, IAC conference participations, and co-authors in peer-reviewed publications.
- **'Tree Logging identification (Ghana and other African countries)'** was a project that began after a conservation group from the Kalakpa reserve of Ghana contacted one of the co-leads in asking for help in showcasing the massive effects of illegal tree logging and deforestation, especially of Rosewood in the reserve. With the help of satellite data and observation through a period of time, the report could be submitted to the UN shining some light into such issues in Ghana and other kinds of logging activities in different parts of Africa. This project is in its early stages.



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